

TRANSIT ORIENTED DEVELOPMENT:

HOW TO MAKE CITIES MORE COMPACT,
CONNECTED AND COORDINATED

RECOMMENDATIONS
FOR BRAZILIAN
MUNICIPALITIES



EDITORS

JASON HOBBS
CAROLINA BAIMA CAVALCANTI
MARIO DURAN-ORTIZ
DALVE SORIA ALVES
KARISA RIBEIRO
RENATA SEABRA

2021



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Abstract:

The monograph “Transit Oriented Development: how to make cities more compact, connected and coordinated” derives from the work carried out by the IDB, MDR and IDOM on Transit Oriented Development (TOD) in Brazil. The main objective of the publication is to present recommendations for the application of TOD systems in the context of developing countries. The publication includes detailed research to design, analyze and understand Brazilian legal, financial and institutional frameworks, as well as map limitations and opportunities to implement TOD systems, based on lessons learned from national and international cases.

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IDOM is an association of independent professionals working in the areas of Consulting, Engineering and Architecture in multidisciplinary teams, with projects in more than 125 countries on five continents. Through its City and Territory department, it provides technical assistance to cities and regions, responding to the challenges of climate change, urban resilience, demographic and economic growth, urban infrastructure, long-term planning and social integration. In addition, it carries out TOD projects in several cities in Latin America and the Caribbean (LAC), in Europe, in the Middle East, in Asia and in Africa, whose objective is to promote the development of denser, more compact and connected cities with the use of public transport and the application of viable management and financing models.



Preface

MORGAN DOYLECountry Representative IADB Group in Brasil

Albeit not yet widely adopted across Latin America and the Caribbean, Transit Oriented Development (TOD) represents one of today's primary strategies for transforming cities into more dynamic, sustainable, and integrated spaces for all citizens alike.

Brazil is moving towards a 90% urbanization rate within the next ten years and a large part of its existing urban network already shows the wear of decades of rapid growth with little or no planning—a reality shared with other countries in the region.

A majority of the families living these areas, usually far from urban centers, continue to lack not only access to basic health, education, and transportation services, but also opportunities for employment and professional development.

Urban mobility challenges impact many different aspects of life; this book thus seeks to offer a strategy for planning cities around the most sustainable means of transportation.

Many global experiences have shown that TOD can offer significant and sustainable benefits for urban planning. In addition to reducing travel time, optimizing use of resources and services, and reducing greenhouse gas emissions, TOD makes it possible to contain horizontal urban expansion, instead

integrating people, public space, institutions, and companies within the existing urban space.

The following recommendations will thus help cities in Brazil and the region more generally to make better use of existing urban infrastructure investments, with the accompanying implication of lower public sector costs. They will also help generate gains for the local economy and in urban dynamics, as TOD promotes greater circulation of people, helping to boost both businesses and services in cities.

For this to happen, city planning needs to be integrated with public transportation planning in a sustainable manner.

Through this effort, the result of an important partnership with the Ministry of Regional Development, we hope to provide public administrators, urban professionals, and citizens with detailed research – drawing on national and international experiences - to help them both analyze and understand the advantages and benefits of a TOD system, ranging from legal frameworks to opportunities for deployment.

We believe that it is possible to build more resilient, intelligent, and innovative cities for Brazilian citizens. And the first step in doing so is to plan in an integrated manner.

ROGÉRIO MARINHO

Ministry of Regional Development

Rapid urbanization, combined with inefficient urban planning and the prioritization of individual transportation, is a reality in most Brazilian cities. This model has, for decades, resulted in negative impacts on the environment, people's health, and social development in cities.

In 2012, Law No. 12,587 established the National Urban Mobility Policy's guidelines, including, notably, the recommended integration of urban development policy with sector-based policies for housing, basic sanitation, planning, and land use management. The promotion of this policy integration has been, in many ways, urban and regional development's greatest challenge in recent years.

This is exactly what Transit Oriented Development (TOD) is all about. Through an urban project-based territorial strategy, we seek to integrate urban components - such as land use, public space, and the promotion of economic activities - with mobility systems, thus stimulating the concentration of housing, commerce, and services close to transit stations and corridors.

In addition to improving urbanization and integrating public transit with other transportation modes, TOD strategies also offer alternatives for expanding the reach of public investment, both through partnerships with the private sector and by using real estate valuation gains generated by mobility infrastructure.

Many cities in the world have already successfully applied TOD models and our expectation, with this work, is to disseminate these strategies more broadly among Brazilian municipalities. This project is the result of a partnership between the Inter-American Development Bank (IDB), the Ministry of Regional Development, and the Ministry of Economy and aims to offer practical guidelines for the adoption of TOD strategies as adapted for Brazilian cities, drawing on lessons learned from national and international case studies.

MDR's mission is to reduce inequalities and to foster the sustainable social and economic development of cities and regions. With this project, we hope to give Brazilian cities new investment and development opportunities, improving citizens' quality of life and promoting more compact and environmentally-friendly cities.



Source: Fuyu Liu. Moving car with blur light through city at night. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



Introduction





Source: TheOldhiro. Trilha de trem de exposição dupla com luz turva edifício escritório da cidade. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

Today, cities face a multiplicity of new challenges requiring new models of governance, technology, management, and more. Considering that the world's urban population will almost double in the next 30 years, identifying new forms of urban development that are more efficient, more inclusive, and more sustainable has become imperative (UN, 2019). These challenges are particularly complex for cities in Latin America and the Caribbean (LAC), representing not only the most urbanized region in the world, but also one of the least populated in relation to the territory itself (UN, 2012). LAC cities are growing at faster rates than those in the rest of the world (the number of cities has increased six-fold in 50 years) to the extent that by 2050, urban areas will house 87% of the region's population (UN, 2012).

In Brazil, more than 175 million Brazilians (85% of the total population) already reside in cities (Evers et al., 2018). As in the United States, the Brazilian urbanization process was strongly marked by the emergence of the personally-owned vehicle. Contrary to what occurred in North American cities, however, where urban expansion was associated with the emergence of low-density, middle-class suburbs, Brazil's urban growth has resulted in the dispersion of low-income individuals to peripheral areas, where they face long daily commutes, poor public infrastructure, a low quality of public transportation, and a dearth of quality public spaces (Evers et al., 2018).

The result has been a sprawled city model, marked by a strong imbalance between housing,

located along the urban periphery, and the supply of jobs, education, health, sanitation, and leisure amenities, located in the urban center. Such a model is accompanied by significant adverse impacts on the population's quality of life, particularly those at lower income levels.

In light of this situation, it is imperative to seek more sustainable development models. One solution is to promote **Transit Oriented Development (TOD)** strategies. Various experiences around the world have shown that TOD systems are capable of supporting both city planning efforts and the implementation of sustainable urban development policies. TOD can help reduce travel time, optimize the use of resources and services, contain urban spread, and reduce greenhouse gas emissions, among others. Successful TOD implementation notably requires the integration of urban planning with public transit infrastructure development and planning in a sustainable manner.

With the goal of contributing to the expansion of TOD systems and strategies in Brazil, the Inter-American Development Bank (IDB), with resources from the Clean Technology Fund, began a technical cooperation with the Brazilian government¹, including the Ministries of Economy and Regional Development. The overarching scope of the project included detailed research to understand and analyze the legal, financial, and institutional

frameworks of TOD, as well as to map the challenges and opportunities associated with TOD's implementation, drawing on lessons learned from domestic and international cases.

This publication contains the main findings related to this work, whose main objective is to present recommendations for the adoption of Transit Oriented Development (TOD) principles and strategies in developing country contexts and in Brazil specifically.

The following text is divided into three parts. The first serves as the contextualization of the theme, including the concepts, principles, and fundamentals of TOD systems. It places each of these in the context of both urban and transportation planning, highlighting the challenges of effective implementation. The second part offers a benchmarking analysis in the form of five international case studies: Bogotá (Colombia), Washington (USA), Bilbao (Spain), London (United Kingdom) and Tokyo (Japan). And the third and final part draws on the findings from the aforementioned case studies to present the main challenges and opportunities for the implementation of TOD strategies and proposes a series of actions and recommendations that can be carried out by Brazilian institutions to encourage and instigate urban projects aligned with TOD principles. These recommendations target **FIVE strategic areas**:

¹ Technical Cooperation BR-T1394—Sustainable Transit-Oriented Development in Brazil, initiated in 2018 and connected with the “Low-Carbon Urban Mobility in Large Cities (BR-G1006)” project, which aims to develop planning and technical frameworks to enable systematic evaluation of investments in urban transportation in large cities and to promote the adoption of scientifically-grounded measures to support sustainable transportation.

STRATEGIC LINES FOR TOD: ACTIONS AND RECOMMENDATIONS



ORGANIZATION OF THE PUBLICATION

WHERE WE WANT TO BE:

integration across public transit and urban planning through sustainable development according to a 3C city concept: compact, connected, and coordinated (WRI 2018).



1



TRANSIT ORIENTED DEVELOPMENT (TOD)

- + Concept and need for a new city model
- + Origin
- + Principles and benefits
- + Limitations of TOD systems

+

2



ADOPTION OF TOD SYSTEMS ACROSS THE GLOBE

- + Bogota
- + Washington, DC
- + Bilbao
- + London
- + Tokyo

+

3



ACTIONS AND RECOMMENDATIONS FOR TOD IMPLEMENTATION IN BRAZIL

- + Governance and equity
- + Laws and policies
- + Tools for planning and Implementation
- + Financing and value capture
- + Sustainable mobility and public transit

BRAZILIAN CONTEXT:

accelerated growth based on a "3D" city model: distant, dispersed, and disconnected (WRI 2018).



SOLUTION:

Develop a TOD strategy that breaks the vicious cycle of 3D cities in Brazil.

How?

Through the integration of urban planning and mobility to ensure the sustainable development (including transportation-related, economic, social and environmental) of Brazilian cities.



Source: Nelson Antoine. A young woman rides a shared electric scooter along the Bike path of Paulista avenue, São Paulo. Maio, 2019. Shutterstock, consultado em 2020. www.shutterstock.com

Source: Tavanus. Aerial view of cars and trains with intersection or junction with traffic, Taipei Downtown, Taiwan. Junho, 2019. Shutterstock, consultado em 2020. www.shutterstock.com



What is TOD?



TOD is a territorial strategy, applied in urban projects, that aims to connect urban development with mobility systems in order to build more compact and environmentally friendly cities. The objective is to increase the concentration of housing and economic activities close to public transit corridors and stations, promoting urban development with greater built environment and population densities.



175
million

Brazilians
already living
in urban areas



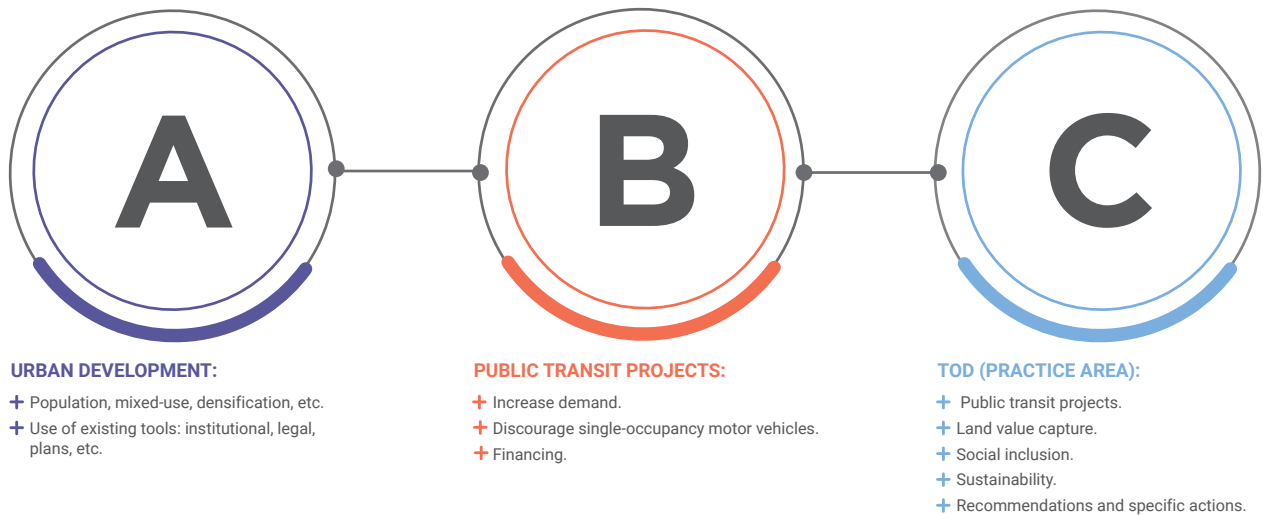
85%

of the total
population

TOD strategies can improve land use efficiency, increase economic growth, and reduce environmental impacts. TOD can also help to optimize resources, improve public space, increase multimodality (using a combination of different transport modes to address travel needs), reduce distances traveled, expand affordable housing, improve public service management, and, as a result of all of the above, reduce greenhouse gas emissions.

This strategy requires the integration of infrastructure, urban planning & design, laws, policies, regulations, and even public finances. TOD is thus a complex urban transformation process with participation from an array of public and private actors, both in decision making and in project development and management. Actors include **public institutions, professionals from an array of different disciplines, developers, investors, and current and future residents, among many others.**

↓ **FIGURE - SINE QUA NON CONDITION.**
URBAN DEVELOPMENT, PUBLIC TRANSIT PROJECTS AND TOD



Source: Developed by the authors

“

TOD projects aim to integrate mobility systems (with an emphasis on public transit) with urban development.

”

Urban development should provide the proper framework to ensure that TOD projects are built in a sustainable and inclusive manner, incorporating the following aspects:

- **Land use optimization:** encouraging the integration of urban development and activities with the public transportation network.
- **Land Value Capture opportunities:** using instruments such as Land Readjustment and other strategies to recover land value increases with the underlying goal of building a collaborative financing model for urban projects that supports financial sustainability and potential budgetary independence of public coffers.
- **Coordination of public and private sector efforts throughout a project's life-cycle:** encouraging development of designated urban areas and re-balancing the costs and benefits of urbanization.
- **New public transit infrastructure:** encouraging the use of clean and renewable energy in the transportation sector.
- **Urban regeneration:** achieving a better urban quality of life through the provision of housing, infrastructure, and public spaces for different socioeconomic strata.
- **Diversification of economic activities:** meeting market demand, adhering to planning strategies, generating jobs, and reducing travel times.



CONTEXT AND ORIGINS: A RESPONSE TO THE CHALLENGES OF URBAN EXPANSION

Many of the strategies we define as TOD are already intrinsic to the urban planning guidelines adopted by various cities across the globe, particularly in Europe. Such strategies were notably present in the urban development models that emerged throughout the 20th century in response to the need to rebuild cities after the Second World War. They include:

- I. A greater relevance of urban centers.
- II. Land use planning with a mixture of uses.
- III. Increased access to public transit.
- IV. Reductions in travel time

Copenhagen's "Five Finger Plan," developed in 1947 by Steen Eiler Rasmussen and Christian Erhardt, offers an example of this natural incorporation of TOD concepts into European urban planning (Thandi Norman, 2018). Four train lines (over 170 km long) served as the plan's anchors, distributed like the palm of a hand to cover the city's entire urban perimeter. London's "Greater London Plan," adopted in 1944, serves as another example; according to Fainstein (2020), Leslie Patrick Abercrombie designed a green belt to catalyze higher densities and thereby improved access to transit in the city's urban core.

Source: GaudiLab. Menina hipster sorridente à espera de transporte público. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

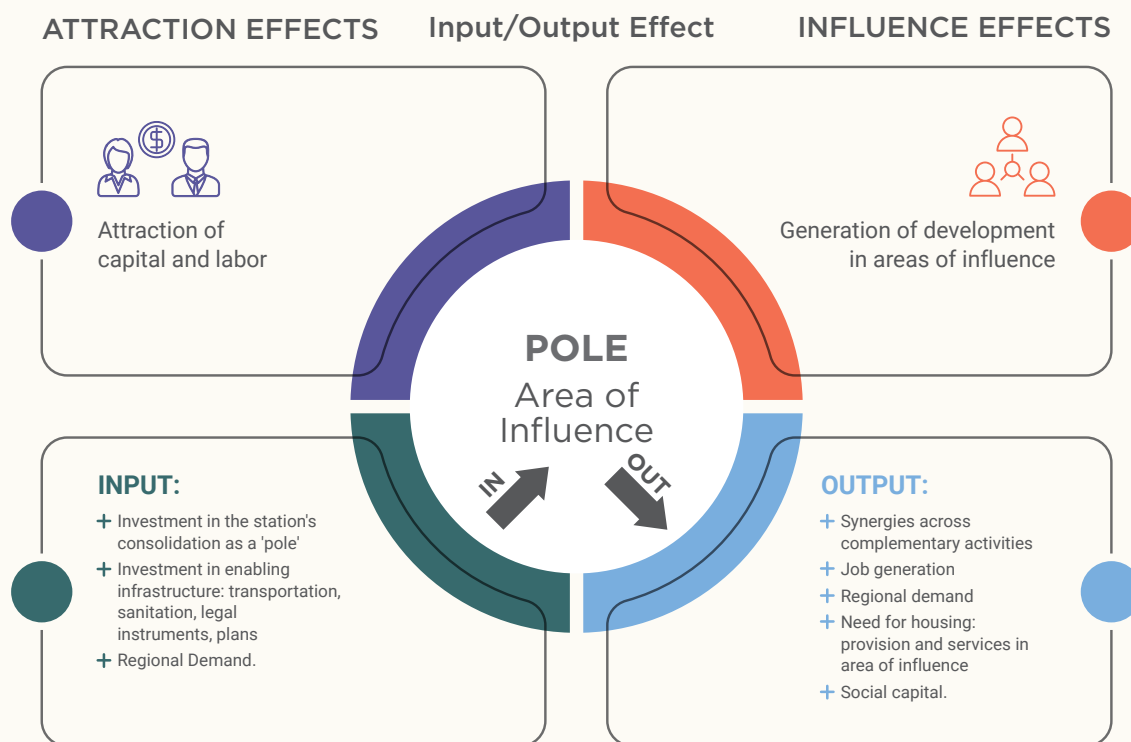


ECONOMIC POLES

TOD's origins can also be connected with the emergence of the concept of Economic Poles. Economic Poles are geographic areas with concentrated industrial and commercial activity, which, in turn, helps to boost economic activity and induce economic and social growth. This concept was adopted in Latin America in the 1960s, inspired by the "Development Poles" model presented by economist François Perroux in 1955, as well as by Jacques Boudeville's 1966 theories of "Economic Spaces" (Boisier, 1976).

The concept was initially centered around a single large industrial actor which served as an engine for generating services and flows of goods and people in its vicinity, helping to catalyze urban and regional growth. According to Perroux's theory, growth does not occur everywhere at the same time but rather at specific points. It extends throughout the surrounding region, functioning as a force field.

↓ SOURCE - INPUT/OUTPUT SCHEME FOR THE POLES OF GROWTH AND ECONOMIC DEVELOPMENT



Source: Elaboração própria

Several years later, Curitiba pioneered the use of planning strategies as associated with today's concept of TOD in the Brazilian context. The 1965 Curitiba Master Plan adopted avant-garde urban solutions and initiated the first BRT (Bus Rapid Transit) system in Latin America. The city strategically planned and densified the areas along its BRT corridors, prioritizing livability and diversity of modes. Curitiba today serves as an international TOD success story (Cervero, 1998).

The current conceptualization of TOD, however, was formalized by urbanist architect Peter Calthorpe in the late 1980s, following OPEC's (Organization of the Petroleum Exporting Countries) 1973 oil embargo (the Oil Crisis)². The embargo had shown the perils of automobile dependence, leading to an "anti-car" movement in the United States, which, in turn, gave rise to skepticism regarding urban development models anchored around suburban expansion³.

The "New Urbanism"⁴ movement leveled the harshest criticism at the North American model

of the middle-class suburb, of which Peter Calthorpe himself was one of the leaders. In his 1993 book "The New American Metropolis," the architect introduced the idea of more efficient land use, with greater energy efficiency and reduced congestion. He proposed taking long-term action, emphasizing:

- the preservation of quality open spaces;
- air quality improvements;
- the promotion of affordable housing within urban boundaries;
- congestion reduction along streets and avenues; and
- restructuring infrastructure costs and the availability of public services.

Calthorpe's model was based on the premise of reestablishing the quality of life found in many ancient cities (mainly European) and, in doing so, addressing the environmental crisis and reducing urban sprawl⁵. As based on these principles, **TOD thus also ends up stimulating urban renewal**⁶.



1973

Oil Crisis

-
- ² In October 1973, OPEC members embargoed oil from nations allied with Israel, which was then involved in the Yom Kippur War against Syria and Egypt. The barrel price quadrupled as a result, triggering the Oil Crisis. The resultant economic consequences were devastating for the West, especially the United States and European countries, forcing them to prioritize the development of alternative energy sources.
- ³ For a detailed analysis of TOD in the United States, see Carlton, Ian: "Histories of Transit-Oriented Development: Perspectives on the Development of the TOD Concept." IURD Working Paper Series. 2009, University of Berkeley.
- ⁴ A movement that emerged in the US in response to the disorderly urban growth. Its principles can be found in the 1966 Charter of the New Urbanism, which proposes: "a regional system organized around a central urban area that is bounded by sector-specific, smaller cities to avoid sprawl; accessibility via public transit; overlapping land uses as a way of creating compact communities; increased public participation; and a return to traditional forms of architecture and block design." - MACEDO, A. C., The letter of the new North American urbanism. <https://www.vitruvius.com.br/magazines/read/arqui-textos/07.082/262>.
- ⁵ Other authors, like Cervero, promote similar concepts based on the systematization of projects executed in various cities ("Transit Metropolis: A Global Inquiry" et. al., 1998).
- ⁶ Urban renewal or regeneration references areas where underutilized or deteriorated land has been rehabilitated. It results from changing growth and productivity patterns. Urban regeneration is often sparked by public/private sector partnerships, due to the immense financial investment required. The World Bank, "About Urban Regeneration," n.d., <https://urban-regeneration.worldbank.org/about>.



Source: William Perugini. Blurred crowd of people walking on zebra crossing in Copenhagen in late afternoon.
Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

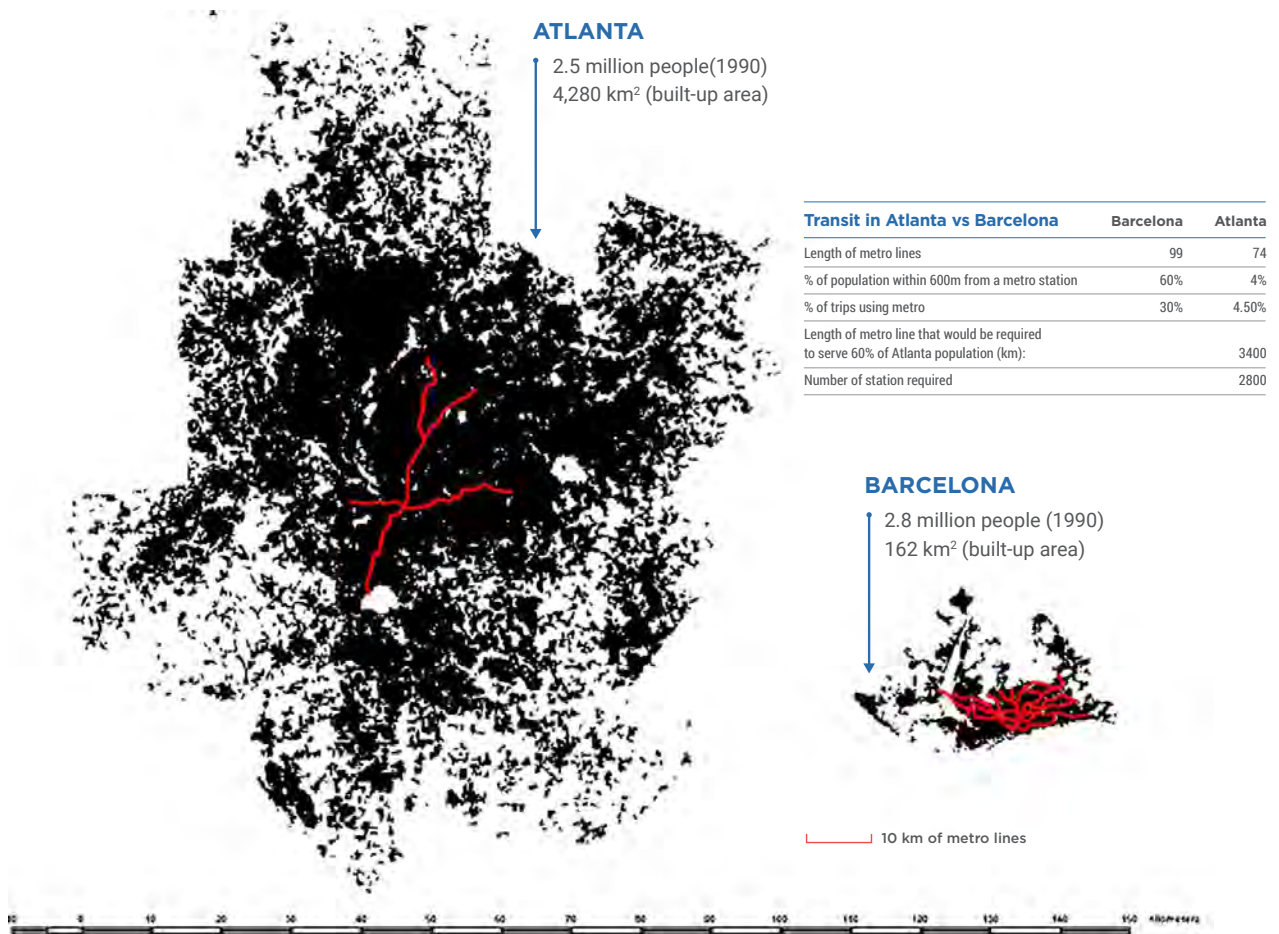
THERE IS NO TOD WITHOUT TRANSPORTATION

Urban planning and the way cities develop have a direct impact on the mobility system. Compact and dense cities enhance sustainable travel, while there is a greater dependence on single-occupancy vehicles in low-density cities.

This can be exemplified in a comparison of Barcelona and Atlanta. Both cities have the same population and a similar metro network (10 km). Yet Barcelona’s network serves 60% of the population,

while Atlanta’s network serves only 4%. Atlanta’s urban area is 26 times larger than that of the Spanish city, showing how much urban planning impacts mobility and transportation systems.

↓ **FIGURE – REPRESENTATIVE SCHEMES OF THE CITIES’ METRO NETWORKS ACCORDING TO SCALE AND COMPACTNESS**



Source: Alain Bertaud (NYU’s Stern Urbanization Project)

Planning for urban mobility

The two main factors (aside from socioeconomics and demographics) that impact and shape urban mobility are:

- **Urban morphology:** a city's physical and structural conditions, including its buildings and

activities, which directly impact mobility choices and the mobility system itself

- **The transportation system:** an individual's array of options to move from point A to point B. It is a "system" that includes non-motorized (foot or bicycle) and motorized (private or collective) modes.

Urban mobility plans should align with a city's existing transportation system, based on its population density, urban form, and land uses. Such factors define current and future mobility patterns, after all, as well as transportation demands and needs.

“

TOD can serve as a mechanism to jointly develop planning and mobility policies, helping to better integrate land use and transit infrastructure.

”

Source: Rasto SK. Metro railway and fully automated train in modern and luxury Dubai city, United Arab Emirates. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



Public transit can include travel by air, land, water, or underground. Each form is connected with different modes, whose technology and infrastructure can be improved and enhanced based on need.

Each mode, in turn, presents specific challenges related to its implementation, operation, and maintenance, as well as costs related to passenger needs. Transportation planning thus depends heavily on human and economic factors in addition to the morphology and urban planning itself.

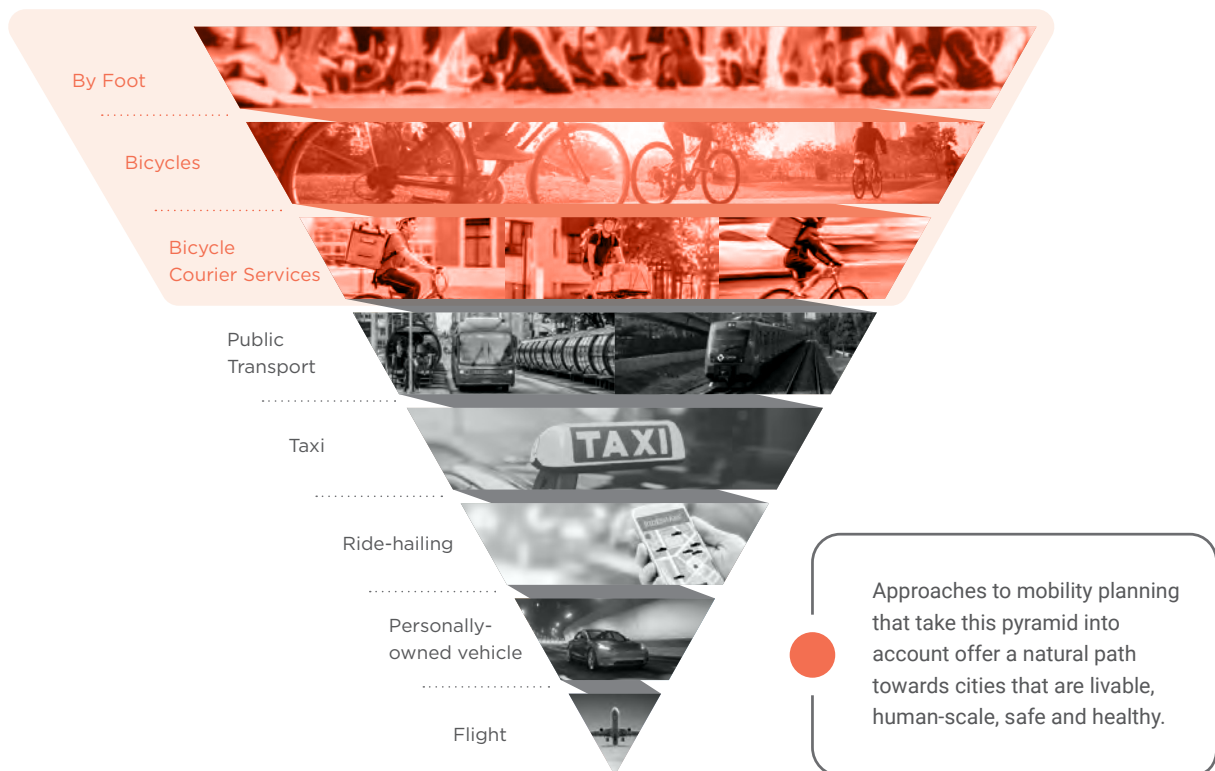
Among a myriad of additional factors, the choice of modes and the composition of the transport

system notably depend on the difficulty of structuring complex public transit projects, the adjustment of demand to available modes, and the investment and resources required for implementation.

Non-motorized modes

Non-motorized modes include pedestrians, bicycles, and other related modes. Walking should serve as the main mode of access to public transit terminals and stations in TOD areas. Any TOD-related public transit planning should include designs for pedestrian-oriented streets and sidewalks, especially in close proximity to stations and terminals.

↓ **FIGURE – MOBILITY PYRAMID**



Source: BBicycle Innovation Lab. Images: Various artists. Shutterstock, consulted in 2020. www.shutterstock.com

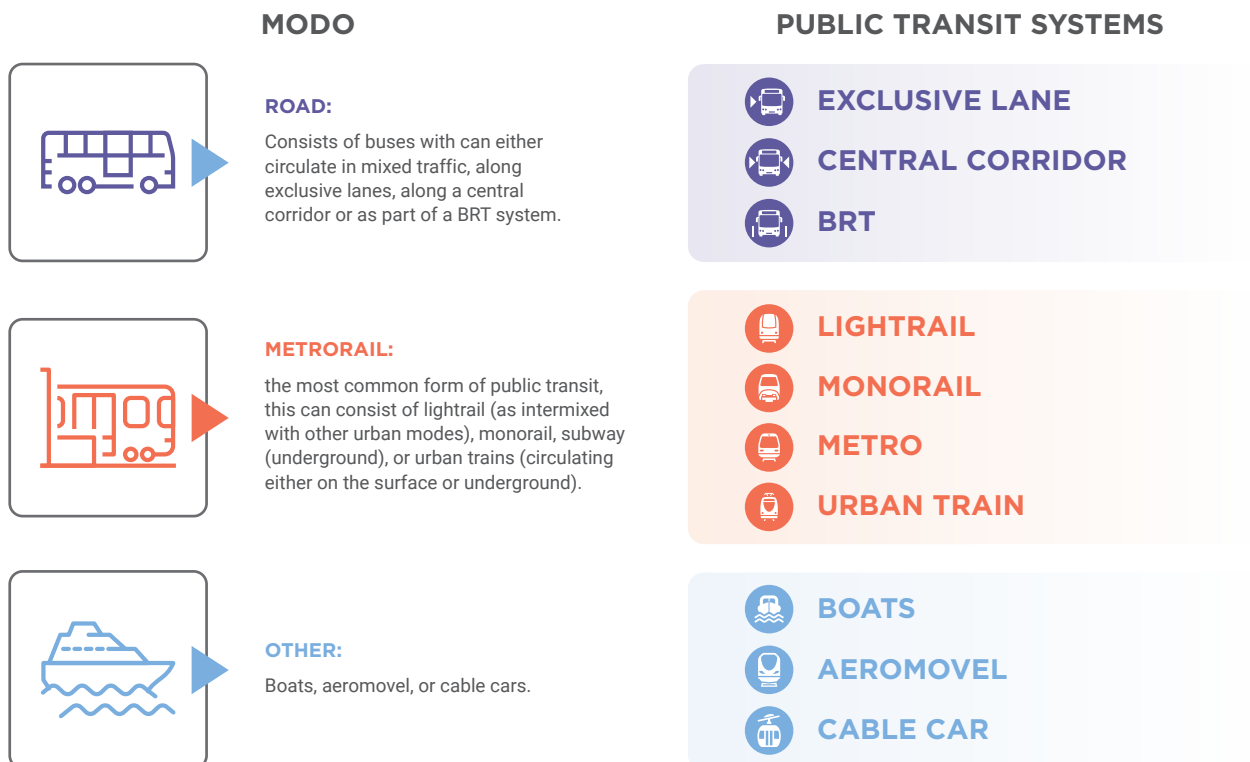
Public transit

Implementing a well-structured and integrated transit system is one of the main challenges facing cities and metropolitan regions where development has traditionally been car-oriented. There is a need to break paradigms. To ensure a more sustainable system, transit should be prioritized alongside other non-motorized modes for everyday urban travel. When efficient and implemented according to TOD planning principles, public transit systems can help to reduce the costs associated with car-heavy systems, including:

- **ECONOMIC AND SOCIAL COSTS**
 - **Congestion:** time costs (hours of congestion).
 - **Accidents:** productivity and medical costs.
 - **Social exclusion:** opportunity costs (a significant portion of the population does not have access to individual vehicles, hindering job access).

- **ENVIRONMENTAL COSTS**
 - Greenhouse gas emissions and public health impacts.

↓ **FIGURE – PUBLIC TRANSIT MODES AND ASSOCIATED TRANSPORT SYSTEMS**



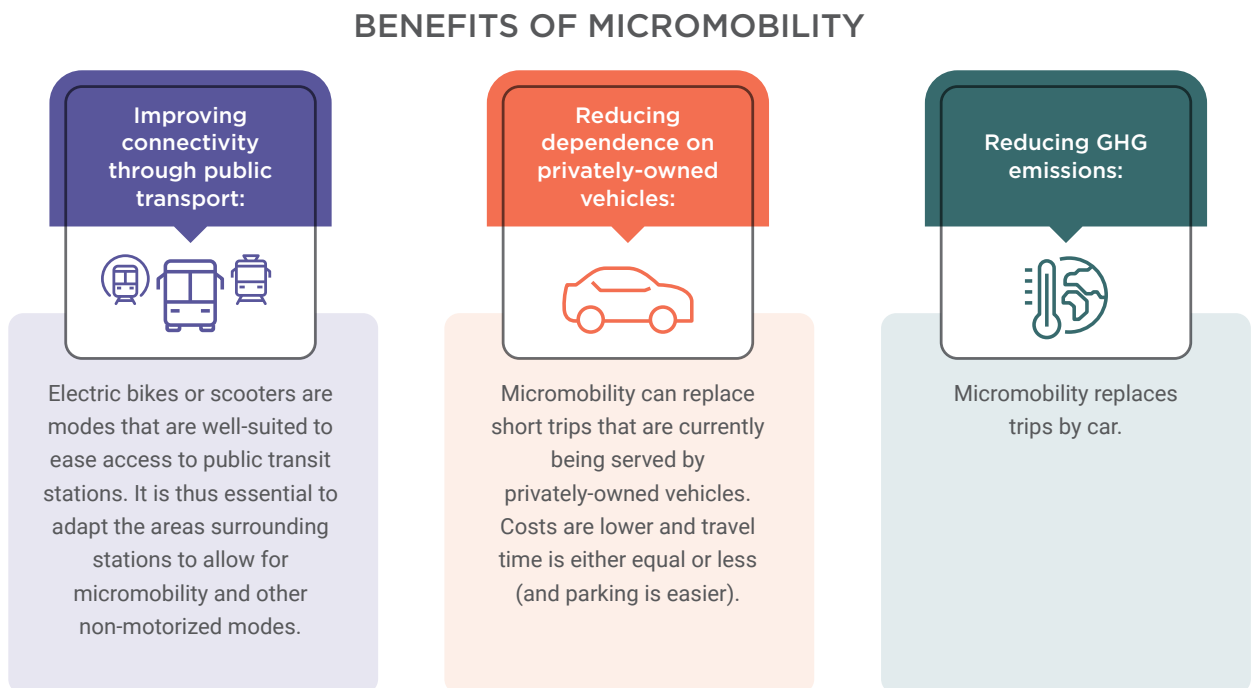
Source: Public transit guide. Guidelines for selecting technologies and implementing public transit projects (2018), Ministry of Cities--BNDES--KFW

Micromobility

“Micromobility” refers to vehicles—small and usually electric—intended for shorter trips. This does not include public transit or non-motorized modes. Rather, micromobility refers to personal mobility devices that are either public (shared) or private, such as scooters or electric bicycles. The

concept is still nascent, and cities are currently working to understand its role in the larger urban mobility system. An electric bicycle, for example, can enable 10 km trips in a mere 20 minutes. This has the chance to disrupt and re-define urban mobility patterns—an opportunity that should be tapped to improve and enhance the urban transportation system.

↓ **FIGURE** – BENEFÍCIOS DA MICROMOBILIDADE



Source: Developed by the authors.

Planning, financing, and managing public transit

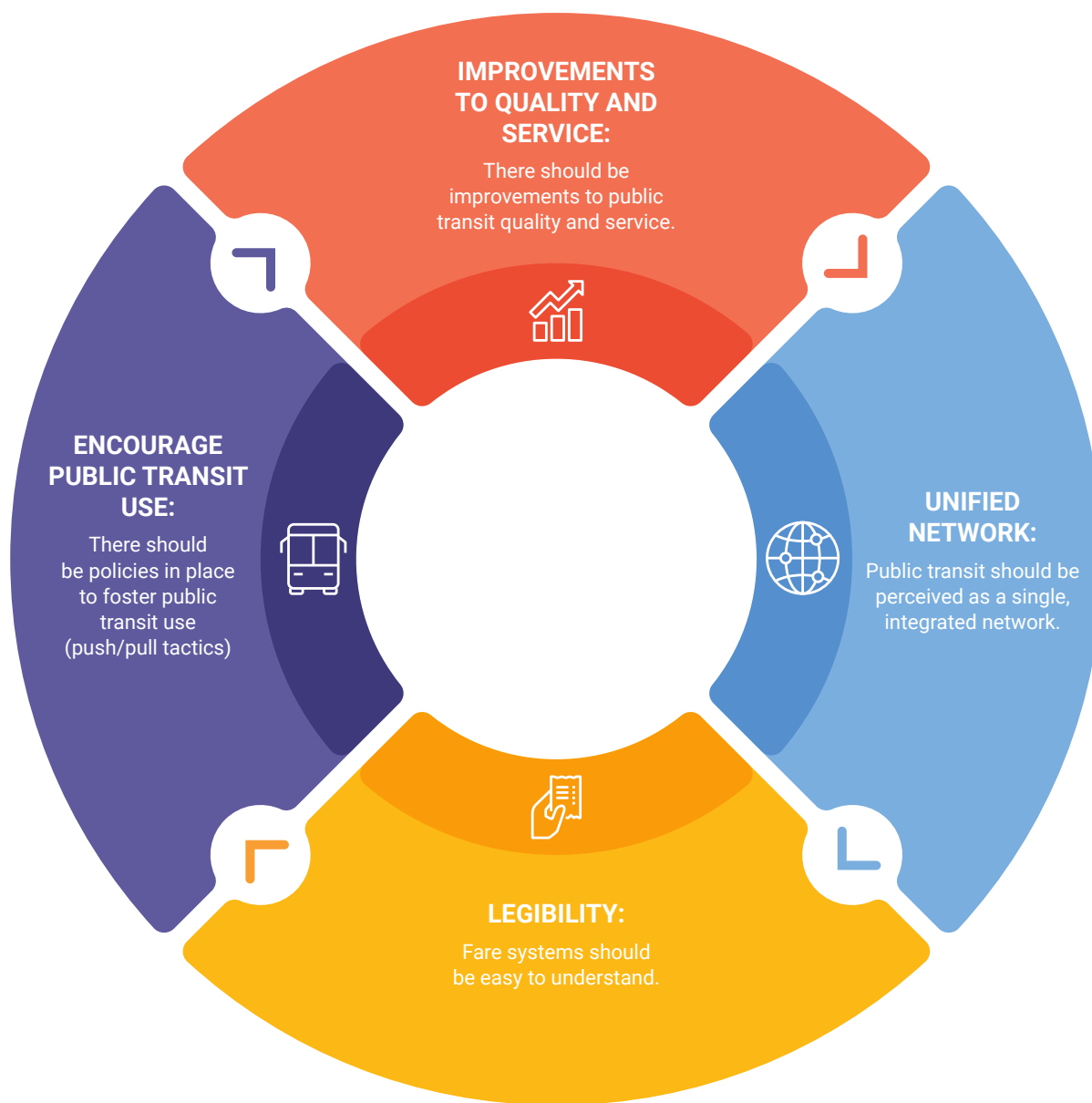
A city’s structural features, ability to shape urban development, and technical capacity are all factors that can impact its transportation system. Poor transportation planning can result in both mobility-related problems (idleness or system saturation) and economic problems.

Cities can finance transportation infrastructure through a partial return on the initial investment from fare revenues or through land value capture strategies. Companies that build transportation infrastructure in Hong Kong, for example, fund their efforts by selling construction rights in areas close to the city’s subway stations (Suzuki, Cervero and Luchi, 2013).

Most cities around the world that are building new transit systems are doing so via public-private partnerships (PPPs) or concessions (Veloz, 2015). Yet despite the private sector’s experience and efficiency in managing public transit systems, it is important to remember that public transit is, after all, a public service. The public sector

should therefore maintain control of the system, ensuring that the system adheres to the collective interest. The public sector should ensure, for example, that fares are fair (at the lowest possible rate and consistent with the population’s spending power) and integrated with modes—as aligned with TOD principles.

↓ **FIGURE - FARE INTEGRATION**



Source: David Arturo Carhuamaca Glenni (2014)

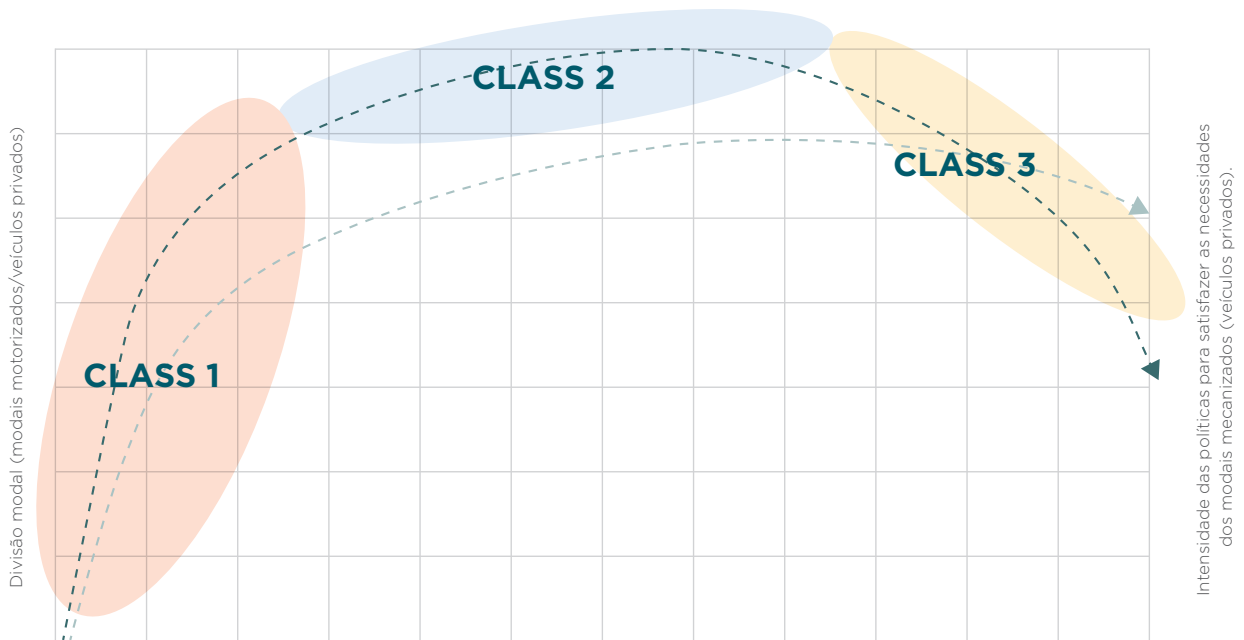
What can we expect from mobility for the future?

“The future will be one with walkable, healthy cities that boast quality public transit systems fully integrated with an array of other modes.”

And where are we now?

↓ FIGURE – STEPS IN TRANSPORTATION AND MOBILITY PLANNING IN CITIES.

EVOLUTION OF PLANNING POLICIES: TRAFFIC ► TRANSPORTATION ► MOBILITY



Evolution of public policies over time:

CLASS 1:
Planning structured around the **movement of vehicles**. Expansion of parking and the road network.

CLASS 2:
Planning oriented around the **movement of people**: public transit, bicycles, and restrictions on private vehicles.

CLASS 3:
Planning oriented around city life: transportation as place, a holistic vision, importance placed on health.

Source: Developed by the authors based on the International Association of Public Transport (UITP)

We need to move away from a car-oriented city model and toward one that prioritizes increasing quality of life, including improvements to safety, air quality, public services, and more. Currently, most cities should be in class 2, with people-oriented urban planning and public policies that favor public transit and non-motorized modes.

Those already in class 2 are adopting changes in their approaches to transportation. As opposed to increasing the supply of transportation, their focus is on reorganizing demand. The solution for a traffic jam, for example, is not to add lanes, but rather to prioritize higher-capacity modes. One solution is to create a public transit network that is capable of accommodating a larger number of people. Another is to better integrate different transportation modes into a single mobility service accessible on demand—the concept of Mobility as a Service (MaaS)⁷.

How to facilitate the transition from one class to another?

There are three areas to prioritize for targeted efforts:

- Reducing the number of trips.
- Improving the modal split.
- Improving energy efficiency.

Brazilian cities are in a period of transition from predominantly car-oriented city models (class 1) to people-oriented ones (class 2), where public policies favor public transit and non-motorized modes. In this transition period, efforts to better integrate public transit with urban planning should be focused in two primary areas:

- I. Public sector-led, coordinated development strategies; and
- II. Innovative project development, incorporating new concepts and ideas.

One of Brazil's main challenges is adopting new approaches and strategies in the various departments responsible for mobility and urban planning. TOD projects, which require clear integration between mobility and urban planning, serve as good examples for how actions focused around demand management can improve overall mobility.

⁷ MaaS envisions transportation systems as an integrated service. The user pays a weekly, monthly, or yearly fee to obtain a transportation 'service' that integrates public transit, micromobility, and individual motorized travel. Each individual can select a membership plan according to his or her needs.

THE 12 ELEMENTS

OF A TOD STRATEGY



COMPACT CITY:

Cities should grow by maximizing use of existing space, especially along public transit corridors and areas of influence. Urban planning is an essential tool to promote sustainable mobility.



ACCESSIBILITY AND CONNECTIVITY:

An urban mobility system is only universal when it is accessible. The objective should be to create a city whose configuration does not force its population into long commutes or to make long trips. It is essential that all individuals have access to diverse modes of transportation.



MIXED-USE:

Mixed-use areas boast a diversity of uses and activities—fulfilling living, working, and leisure needs—in order to reduce the need for motorized trips. Both the ground floor and the first floor of an apartment building can be used for shops, offices, and other commercial activities, for example, in order to spark local economic activity.



ACTIVE TRANSPORTATION:

Develop neighborhoods that promote walking and the use of bicycles, scooters and skates; prioritize non-motorized transportation infrastructure and networks, such as lanes dedicated to cyclists or pedestrian-only streets. Implement building regulations that set parking minimums for new developments or charge for street parking. Such measures can improve social interaction and health, as well as reduce emissions by discouraging car use.



INCLUSIVE AND AFFORDABLE HOUSING:

Lack of access to affordable land in large urban centers results in suburbs and “artificial cities” along a city’s periphery with limited transportation connections to the urban core. An urban development model should provide for various housing types that accommodate families from different socioeconomic levels. Cities can institute affordable housing minimums, for example, to ensure that new developments are not exclusionary.



PARTICIPATION AND INCLUSION:

Master plans and urban projects should require the input and participation of the local population—in addition to the project’s main stakeholders—in order to align expectations and interests.



COOPERATION:

Mobility planning should be coordinated with municipal master plans and other urban planning regulations. Urban planning guidelines should favor non-motorized modes and public transit. To this effect, the development of integrated policies and cross-institutional cooperation structures and mechanisms should be a priority for any project. Political leaders, in turn, need to support long-term, coordinated strategies, prioritizing the interests of the collective whole over those of political parties.



ENVIRONMENTAL SUSTAINABILITY:

TOD projects can help reduce GHG emissions, preserve natural areas by reducing sprawl, reduce ground-level pollutants over the short term, reduce vehicle-related noise levels, and preserve energy and natural resources.



OPTIMIZING RESOURCES:

Containing urban growth through TOD interventions can help optimize use of existing infrastructure, which, in turn, lowers the costs associated with infrastructure expansion to accommodate sprawl. Coordination with existing transportation infrastructure reduces daily commuting time with positive effects on both a city’s economy and on residents’ quality of life.



SAFETY:

Active commuting can result in more vibrant, lively, and, significantly, safer cities. Using TOD strategies to instigate urban regeneration of degraded or underutilized areas, similarly, can make those areas safer and more vibrant for the population.



LAND VALUE CAPTURE:

Public sector investment in transportation infrastructure, in most cases, enhances the value of adjacent land. This increase in value must be shared between the local government and the property owners; these new resources can then be invested in new infrastructure, improvements in public spaces, or other services for the benefit of the city and its citizens.



SOCIOECONOMIC BENEFITS:

Improving the quality of life of urban populations is one of the three pillars of sustainable urban mobility. If coordinated with urban planning efforts, mobility projects can promote growth and economic development by attracting private investment, generating new jobs, increasing the number of companies housed in the area, stimulating physical activity, reducing the number of traffic accidents, improving pedestrian safety, and revitalizing social vibrancy.

TOD AS A REGIONAL DEVELOPMENT POLICY

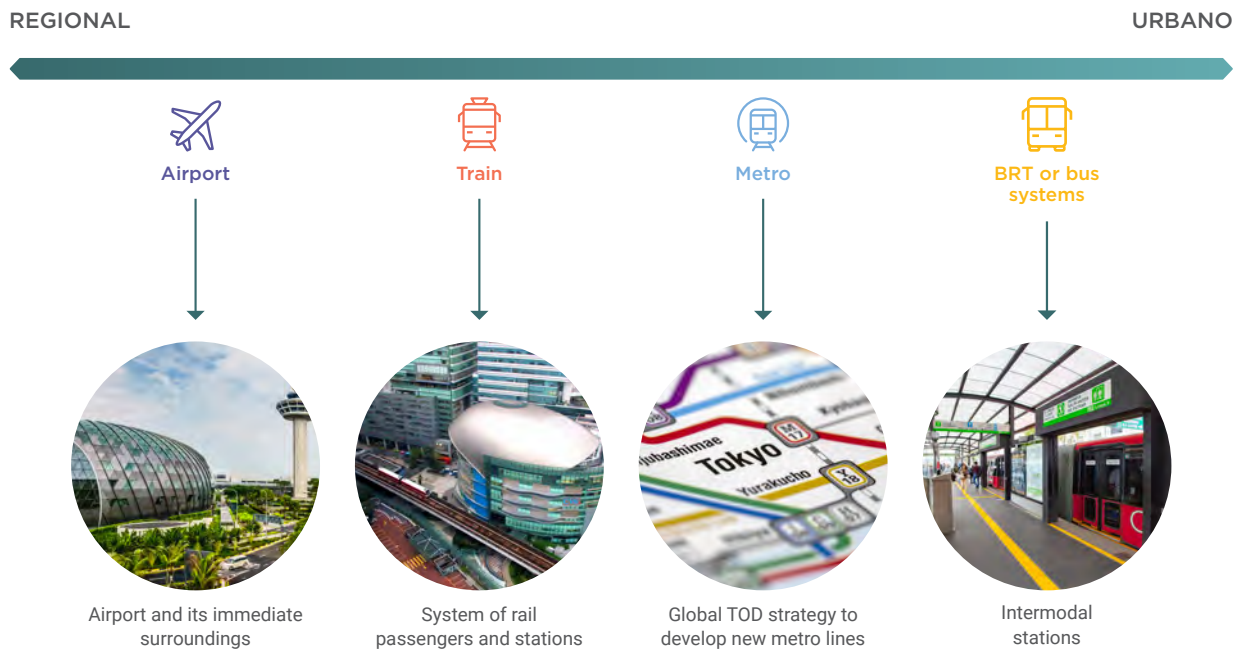
TOD can play different roles depending on the existing public transit system as well as the planning—and execution—of urban development and infrastructure projects. It can also be characterized as either regional or urban in its impact. Regional TODs can be developed around:

- Airports, by installing activities that complement air travel.
- Ports, by catalyzing activities in support of the port and its logistical and industrial uses.
- Intermodal stations with regional or international connections.

Urban TODs, on the other hand, can be developed around subway stations or urban trains, BRTs or light rail systems, or even multimodal stations, which can function as economic centers with diverse activities and uses.

The main differences between the regional and urban forms of TOD lie in the kinds of activities that can be developed around the stations and in the number of transit users. Such characteristics, in turn, help to determine the size of the area of influence and the economic importance of the TOD area in question.

↓ **FIGURE – SCALE OF TOD PROPOSALS**



Source: Developed by the authors.

A REGIONAL STRATEGY APPLYING TOD: THE GRAND PARIS EXPRESS

The largest infrastructure project in Europe, the Grand Paris Express project, aims to develop a transportation network to boost the metropolitan region's development. The initiative strives both to help correct the territorial inequalities of the French capital's metropolitan region and to reestablish Paris as a global center of economic activity.

The undertaking involves three challenging tasks:

- modernizing and expanding the transportation network;
- constructing new housing; and
- catalyzing economic activity.

The new subway network is expected to integrate the city's main centers of economic activity (airports, centers of businesses, research centers, and universities) with areas that are currently difficult to access. The goal is to reduce travel time in the region and to improve everyone's access to employment, education, culture, and leisure.

The main strategy is to construct 68 stations along four new subway lines (totaling 200km) as part of an underground expansion. Upon the project's completion, 95% of the metropolitan population is expected to live less than 2km away from a train or metro station. This subway network, in turn, is intended to serve as a guide for urban projects in the areas surrounding the stations.



The city is also planning a series of regional development projects and new economic and university centers. The project specifies four station typologies: **City Center**, **New Center**, **Typical**, and **Metropolitan Gate**—each with different kinds of projects and emphases, according to the strategic nature of each station.

The Société du Grand Paris serves as the body responsible for executing the Grand Paris Express project and for developing real estate projects in proximity to the stations in partnership with private actors.



Source: (1) <http://andreslorenzo.com/revista-obras-urbanas-no65-paris-express;>
(2 e 3) <https://94.citoyens.com/2019/grand-paris-express-les-gares-de-la-ligne-15-est-en-images,18-04-2019.html>

“

A TOD project's success depends on a detailed territorial diagnosis, both at the macro level –the larger context of the project's city or region—and at the micro level, pertaining to more immediate areas of intervention.

”

MACRO SCALE: This scale consists of a city or a region where interventions can help shape and direct development and transportation.

Effective strategic plans both diagnose the main local or regional challenges and identify areas with the potential for project implementation.

A macro-territorial analysis should take the following factors into account:

- **Mobility:** the characteristics and qualities of daily trips, including distance, modal distribution, existing transit systems, and the latter's capacity.
- **Territorial organization:** the characteristics of the expanding urban network (whether it is dense or sprawled), urban growth trends, land use, conurbation (when neighboring cities grow and form a single urban core), population density, and distance from the

population to areas with a concentration of jobs and services.

- **Existing projects:** existing strategic urban projects and their impact on mobility and urban development.
- **Municipal and mobility-related legislation:** this includes rules that regulate the city and its mobility system, master plans, land parceling, and environmental legislation. Such an analysis assesses the degree to which legislation can assist in a TOD strategy's success.
- **Prospective analysis:** identifying possible trends in future travel behavior and how this might impact flows and functions within the region. This analysis helps in decisions about investments in mobility and urban planning.

MICRO SCALE: This scale consists of areas that will be the direct recipients of mobility-related interventions, such as stations or bus stops or sites that are located along transport corridors or along active transportation routes (such as sidewalks).

An analysis at this scale helps to furnish a deeper understanding of the immediate area, including its economic development, accessi-

bility, and investment in housing, among others. It, in turn, helps to shape the proper intervention strategies developed in response to the prob-

lems faced by each city, its urban planning norms, and its existing public space. The goal is to encourage urban development around stations and to increase the efficiency of the transportation network.

This ultimately helps to create a multimodal exchange hub—each station should be integrated with a network of pedestrians, cyclists, shared bicycles, and public transit, offering citizens an array of commuting options. The same concept should be applied along public transit axes.

APPROACHES TO DEFINING ‘AREAS OF INFLUENCE’ FOR TOD PROJECTS:

- **RADIAL INFLUENCE AREAS:** an area is defined without taking its physical context (road, blocks, etc.) into account; pedestrian access is estimated at between 250 and 500 meters from a station.
- **ISOCRONIC AREAS OF INFLUENCE:** streets and urban morphology are taken into account when defining an area, including maximum travel times (O’Sullivan et al. Apud Miller and Shaw, 2001). This is most commonly done by estimating foot travel, but proposals are increasingly integrating micromobility as well. Proposals should consider multiple modes for each station, along with new technologies, which invariably affect travel times.

A TOD’s ‘area of influence,’ as measured in city blocks, can fall into two categories:

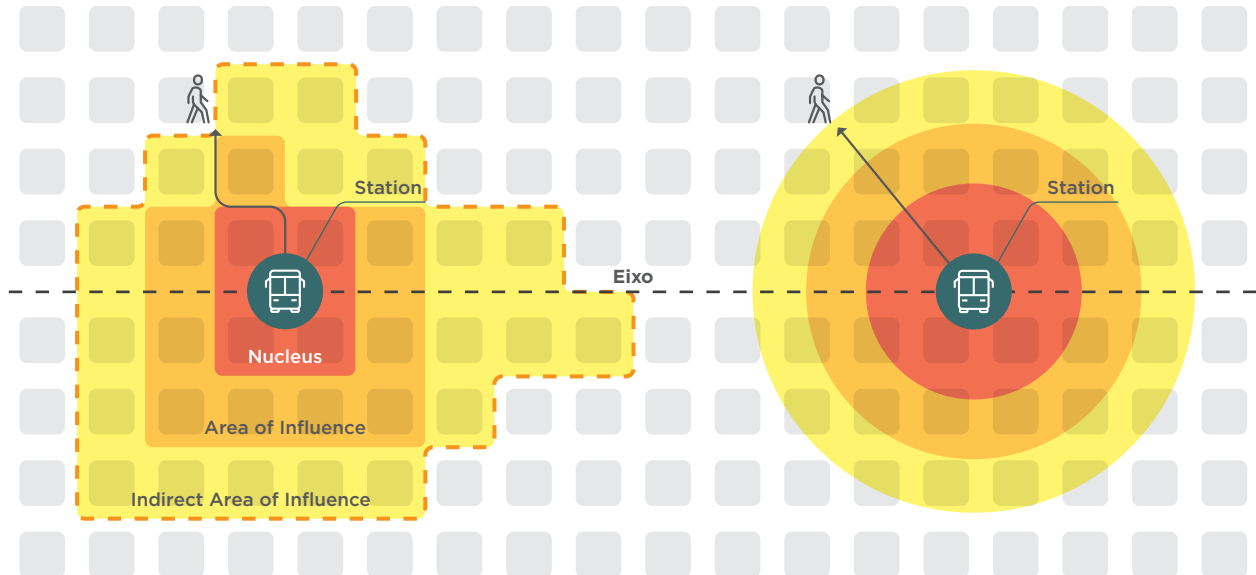
- **Zones parallel to the street that connects (or aligns) with the public transit system** (at least 150 meters and at most 300 meters in size).
- **Based on distance from the station;** the radius should be based on the challenges and objectives of each station. This is measured at, on average, 400 and 800 meters from the station, corresponding to approximately 5 to 10 minutes of walking.

According to TOD literature, each transit or mobility system generates a different area of influence. Public transit systems, for example, have different line lengths, numbers of stations and distances between those stations. The resultant areas of influence thus depend on the context; they can be lin-

ear (along the transit line) or radial (encompassing the stations’ surroundings).

In the case of a BRT or light rail station, the radius of the area of influence is usually 800 meters. For a bus station, it can be 500 meters or less. A shorter distance between stops or stations increases the value of a linear TOD approach.

↓ **FIGURE – AREAS OF INFLUENCE AND SCALES OF IMPACT**



Source: Developed by the authors

The World Bank carried out an analysis based on ‘coverage intervals’ in the case of Bogotá’s BRT system. It defined the areas of influence for the project at 1,000 meters along the TransMilênio corridors and at 500 meters along the secondary transit network. The Rosslyn-Ballston metro corridor, meanwhile, took a ‘Bull’s Eye’⁸ approach, with an 800-meter radial ‘area of influence’ around each individual station (SUZUKI; CERVERO; IUCHI, 2013). The TransCarioca BRT corridor in Rio de Janeiro, set 400-meter areas of influence around its BRT stations (ITDP Brasil, 2017).

All three of the above examples boast the same mode and apply the same estimated travel time for pedestrians (5 to 10 minutes)—yet the resultant parameters of the areas of influence are different. This is a result of each case’s unique ter-

ritorial characteristics and differences across the transit systems themselves.

Features and characteristics such as slopes and sharp curves as well as climactic, cultural, and social conditions all affect the distance that can be covered in 5 to 10 minutes.

According to the ITDP guide on TOD standards, the maximum walking distance for transit access should not exceed 1,000 meters for BRT stations or 500 meters for frequent local bus service (ITDP, 2017). These parameters apply for bicycling infrastructure as well, for which the standards define an average speed of between 15 km/h and 20 km/h. It is important to note that bicycle parking is an essential feature and should not be located further than 200 meters from public transport stations.

⁸ Built in the 1970s, the Rosslyn-Ballston metro corridor in Arlington, Virginia is considered one of the most successful TOD projects, boasting high levels of density around its five metro stations.

“

Areas of influence can serve as physical borders within which to apply policy and regulatory mechanisms at the local and metropolitan levels, as well as to implement urban design efforts and targeted financial mechanisms to support urban renewal.

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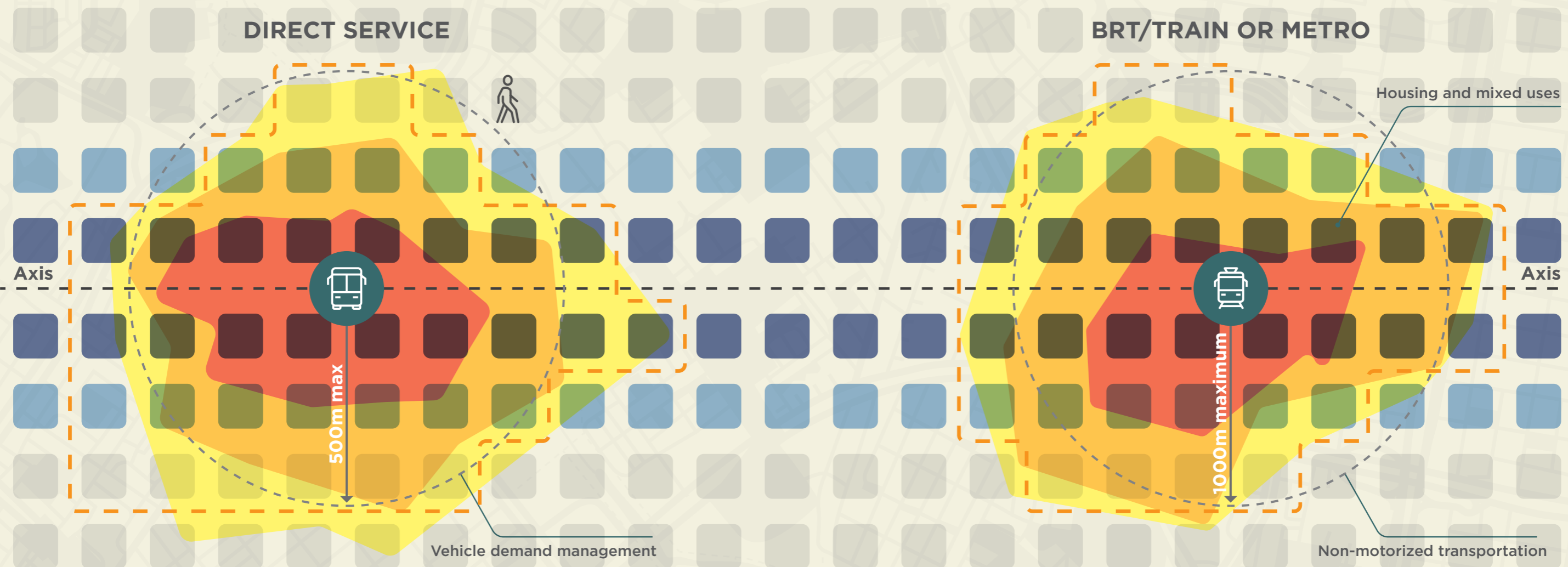
Source: f11photo. Avenida Paulista in Sao Paulo during twilight. Unknown date. Shutterstock consulted in 2020. www.shutterstock.com.



Some details to consider



Among others



Density gradation

High

Medium

Low



Walking times based on terrain

0 to 2 minutes

2 to 4 minutes

4 to 7 minutes

Zone of indirect influence

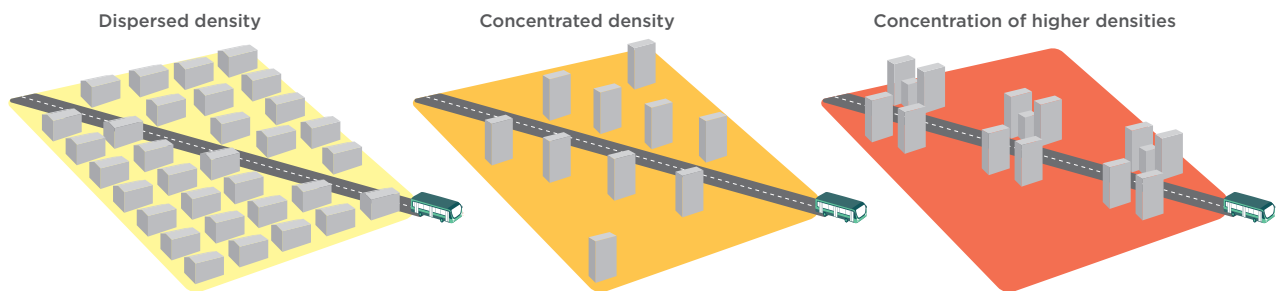


- + Establish target zones through the zoning law
- + Apply urban planning instruments (OODC, PAUC, IPTUprog)
- + Define parameters of the OUC
- + Define the parameters of the Special Assessment Tax

Accurate areas of influence should serve as a guide for urban planners for targeted densification under the assumption that an increase in the number of individuals living close to transit will result in more passengers using the system. This, in turn, increases the financial sustainability of the system, both as a result of increases in fare revenues as well as opportunities to implement land value capture strategies.

Nonetheless, increasing the population density around stations and along transportation corridors should not be the sole criterion for a transit-oriented development strategy, as it is necessary to balance density with the quality of the urban space itself. Other factors such as infrastructure capacity, traffic conditions, and environmental impacts should also be taken into account (SUZUKI; CERVERO; IUCHI, 2013).

↓ **FIGURE – DENSITY REQUIRED FOR PUBLIC TRANSIT**



Source: Developed by the authors based on OECD 2012, E Suzuki et al, Transforming Cities with Transit

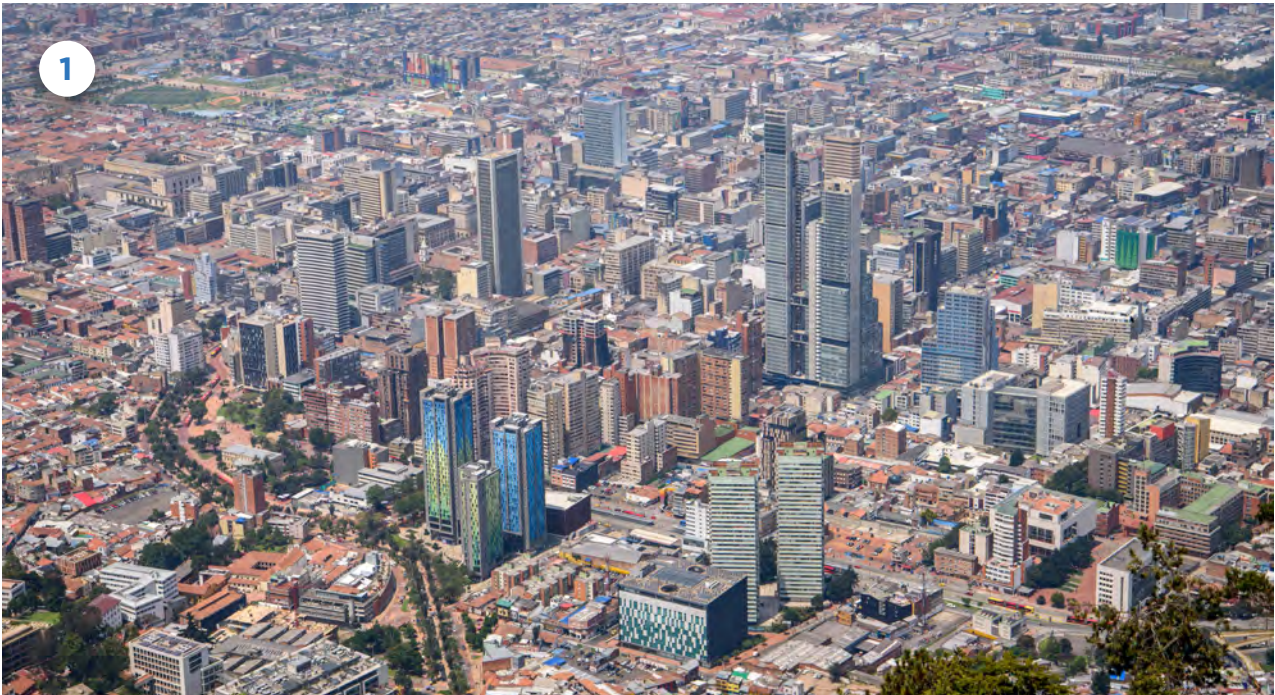
The cities of Curitiba and Bogotá serve as good examples of differing approaches. In the case of Curitiba's Green Line, the objective was to ensure safe pedestrian circulation in order to avoid any problems arising from friction between increased flows of pedestrians and the existing road network. Municipal Law No. 9,800 was passed in 2000 to address this by regulating zoning and land use to help transform the key axes along the new Green Line into human-scale, mixed-use zones.

In the case of Bogotá and its TransMilênio BRT system, however, there was a lack of coordination

between the transit system and urban planning efforts as evidenced by restrictive norms that hindered densification. This, in turn, made it impossible to instigate a process of urban renewal and regeneration centered around the new infrastructure and resulted instead in greater sprawl.

The idea behind these strategies is to enable the more efficient use of urban land that is already built up as well as existing services and transport infrastructure. This, in turn, helps to avoid greater sprawl and reduces the environmental impacts of the built environment.

↓ **FIGURE** - DENSITY COMPARISON OF THE BRT CORRIDORS IN BOGOTA (1) AND CURITIBA (2)



Sources:

- (1) Tunde Gaspar. Aerial shot of the gigantic city of Bogota, Colombia. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com;
- (2) Diego Grandi. Vista aérea da cidade de Curitiba ao pôr-do-sol. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

TOWARD A COMPACT AND SUSTAINABLE CITY MODEL: TRANSFORMING 3D CITIES INTO 3C

The 20th-century city was designed, built, and adapted to prioritize single-occupancy vehicles at the expense of public transit and active mobility. This choice had harmful consequences for society and the environment. TOD strategies seek to break with that 20th century logic as guided by the theories of New Urbanism—a school that seeks an alternative to excessive land consumption and indiscriminate car use.

It is instead about promoting more efficient cities—from both a social and an environmental perspective—by combating unsustainable urbanization models as characterized by the **“3D city” model: Distant, Dispersed and Disconnected**. In contrast, the **“3C” approach brings together the principles of a Compact, Connected and Coordinated city** (CTS EMBARQ México, 2013).

Source: Csaba Peterdi. Man on bicycle in transit with sunflare.
Date unknown. Shutterstock, consulted in 2020. www.shutterstock.com



Currently, Brazilian and Latin American cities largely display 3D characteristics:

- **Distant:** extensive use of land along the urban periphery, far from the urban center.
- **Dispersed:** dispersed urban areas, resulting in the discontinuity of density.
- **Disconnected:** limited or non-existent public transit connectivity across different urban districts and centers.

TOD efforts seek to instead generate 3C cities, in pursuit of a city model that is:

- **Compact:** with efficient use of land, transport infrastructure, and existing services.
- **Connected:** urban centers that are interconnected (according to the economic center model) through an efficient public transit system.
- **Coordinated:** integration across mobility and urban planning efforts.

↓ **FIGURE - 3C CITY CONCEPT**



Source: Developed by the authors



URBAN SPRAWL AND URBAN SPREAD



INCREASED TRAVEL TIME



CONGESTION



POLLUTION AND GHG EMISSIONS



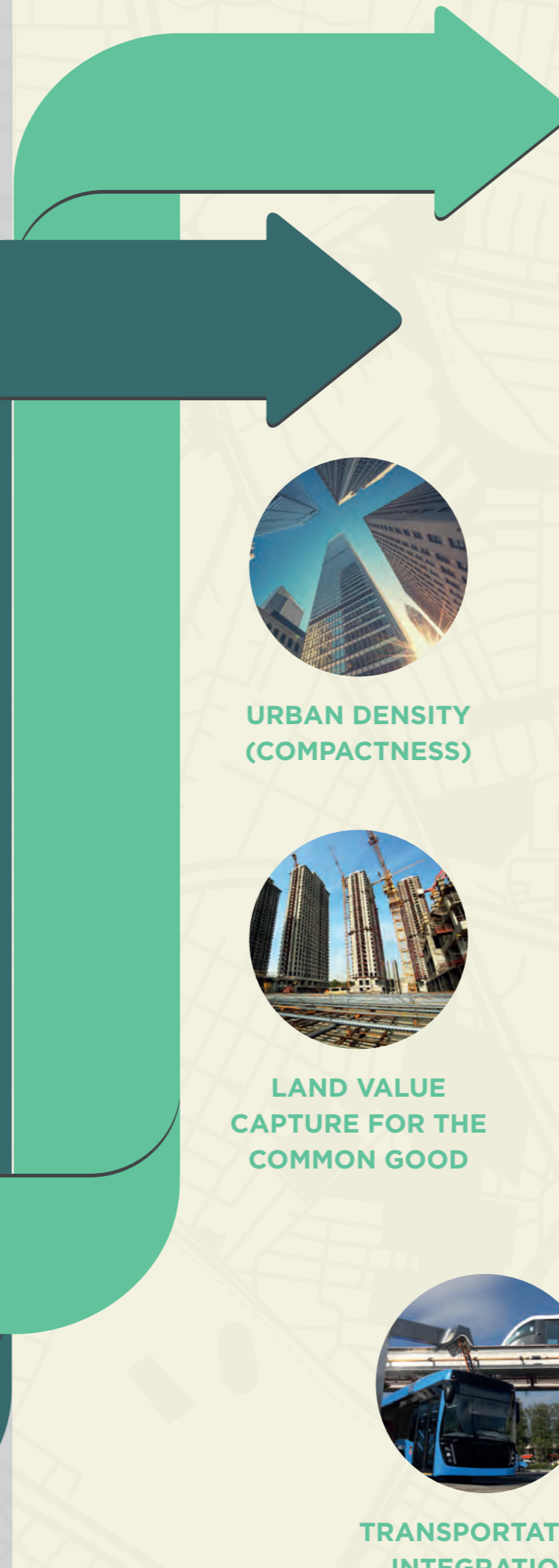
DETERIORATION OF HISTORIC CENTERS



SEGREGATION OF ACTIVITIES

3D

DISTANT
DISPERSED
DISCONNECTED



3C
COMPACT
CONNECTED
COORDINATED



URBAN DENSITY (COMPACTNESS)



URBAN REGENERATION



MIXED USE



LAND VALUE CAPTURE FOR THE COMMON GOOD



ROAD SAFETY



EASE OF MOVEMENT FOR PEDESTRIANS AND CYCLISTS



TRANSPORTATION INTEGRATION



RESOURCE OPTIMIZATION

“

Even with new urban projects and initiatives, several Latin American cities still plan according to 3D concepts!

”

This was the case in Bogotá, Colombia, as mentioned above, where the disconnect between transit planning and urban planning has prevented more-intensive land use and densification. This is largely a result of restrictive urban

regulations and difficulties in building new properties close to transit stations, which has made densifying the built environment in close proximity to transportation infrastructure all but impossible.

↓ **FIGURE - CARACAS AVENUE. WITHOUT BRT DURING THE 1960S (LEFT). IN 2019 AFTER THE CONSTRUCTION OF TRANSMILENIO (RIGHT)**



Sources:

(Left) District Planning. Bromberos section of Caracas Av in the 60s. Date unknown. Flickr. Consulted in 2020. www.flickr.com

(right) Google maps. 18-45 Caracas Av. Image captured May 2019. Google Maps. www.google.com.br/maps/@4.6085914,-74.0764855,3a

Despite being one of the most efficient BRT systems in the world—transporting more than 2 million passengers a day along its 113km-long corridor—the TransMilênio system was unable to generate new centers of economic activity. It also did not catalyze land value increases for properties that were renovated and densified, with its impact instead limited to addressing housing needs, ancillary services, and infrastructure.

A 2013 World Bank study measured urban change in the city of Bogotá between the years of 2004 and 2010 and found only minimal densification in the

city’s urban core. In fact, densification was most evident in the areas most peripheral to the TransMilênio system (Suzuki; Cervero; Iuchi, 2013).

Transit Oriented Development

The Colombian capital continues to suffer from its failure to develop a long-term vision and from the absence of a more formal adoption of TOD and 3C guiding principles. The same study shows that Bogotá has yet to adopt basic changes to zoning, land use, or building codes to help guide urban development around Transmilenio's transportation infrastructure (Suzuki; Cervero; Iuchi, 2013).

On the other hand, TOD strategies have been successfully implemented in cities such as Tokyo (Shinjuku station), London (King's Cross), and Washington, DC (NoMa), enabling the emergence of new centers of economic growth through more efficient and effective urban planning around transportation systems.

These cities, generally defined, successfully identified pertinent national and municipal planning instruments, defined locations around stations and mass transit corridors as "areas of opportunity," and embraced regulatory creativity and flexibility in order to facilitate densification, form

public-private partnerships, and recover land value—in pursuit of a 3C city.

The NoMa (North of Massachusetts Avenue) neighborhood in Washington D.C., for example, underwent a process of urban renewal as catalyzed by public transit infrastructure investment in the early 21st century. Gallaudet U station, built in 1907, was, by the late 20th century, a run-down area with vacant and underutilized land. Thanks to a combination of local government renovation strategies, dubbed Small Area Plans (SAP), and tools such as Business Improvement Districts (BID) and TOD principles, the region today has been revitalized and is a new center of economic growth (more details can be found in Strategic Line 4). In 2005, the transformation helped generate 424,000 jobs in addition to the city's 706,000 existing ones (NoMa IDB, 2016: Plano Integral 2006). Land use in the pertinent "areas of influence" was primarily dedicated to office space in addition to some commercial and retail uses. According to the area's Comprehensive Plan, another 66,800 jobs are expected to be generated by 2025.

↓ **FIGURE - URBAN PROPOSAL TO DENSIFY URBAN VOIDS (LEFT: CURRENT SITUATION; RIGHT: PROPOSAL)**



Source: NoMa Vision Plan 2006.

Drawing on national and international experience, the evidence indicates that urban planning, design, regulations, and efforts towards economic and social diversity are intricately intertwined with

mobility and transportation systems. The transportation network needs to be designed to effectively respond not only to the needs of daily commuting, but also to local urban planning needs and goals.

A more dense and compact city is better able to respond to today's environmental, energy, and social challenges, in addition to facilitating more sustainable forms of mobility.

The 3C model and TOD strategies should therefore be a priority for developing countries. To achieve this, urban planning should:

- Foster compact and dense land use, restricting the expansion of urban boundaries.
- Minimize time spent traveling and favor non-motorized and sustainable means of travel.
- Foster vibrancy in central urban areas.
- Avoid urban and peripheral sprawl.
- Ensure the integration and transparency of urban projects - avoid closed projects and increase activities at the street level.
- Encourage mixed-use projects, avoiding single-use neighborhoods that depend on motorized travel.
- Catalyze multiple urban centers – the polycentric city.
- Propose regional strategies and urban regulations that favor sustainable urban mobility.





Source: Flamingo Images. Young African businessman wearing a suit standing on a bus listening to music on a smartphone and headphones.
Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

Source: Connel. Man on bicycle in transit. Date unknown. Shutterstock, consulted in 2020. www.shutterstock.com



Case studies



CASE STUDIES: THE ADOPTION OF TOD SYSTEMS WORLDWIDE

As addressed in the previous chapter, TOD is an urban planning concept that offers integrated, multidisciplinary strategies and solutions for improving both mobility and urban quality. Yet despite its proven benefits, transit-oriented development is still not widespread in regional or urban projects in the cities and metropolitan areas of Brazil.

To support the diffusion and adoption of TOD, this second chapter proposes a benchmarking analysis based on international case studies, offering potential references for the execution of similar activities in Latin American—and particularly Brazilian—cities.

Cases were selected based on a matrix of criteria and categorized into three overarching groups to allow for a more systematic comparison of best practices along several different dimensions. The first dimension explores the physical context for TOD, including existing or planned infrastructure and physical characteristics that have the potential to either help or hinder TOD projects, including the city's scale¹, type of TOD², mode³, and affordable housing. The second group, dubbed planning, explores the characteristics of the project planning process itself, including cross-institu-

tional planning⁴, land use⁵, transportation planning⁶, sustainability efforts, and land value capture⁷. The third dimension, implementation and applicability, explores sub-criteria related to the implementation phase of TOD projects, including financing⁸, regulations⁹, institutional frameworks, and the stage of implementation itself¹⁰.

We first considered twelve (12) cities¹¹ with relevant TOD projects. After compiling the pertinent data on instruments, standards, financing mechanisms, institutional organization, general strategies, and the specific measures adopted for each project, we selected the following five cases:

- **Bogotá (Colombia):** a case selected for its land value capture efforts and land use management tools as well as for the lessons learned from the TransMilenio system and its success linking TOD strategies with national climate change mitigation policies (the NAMA strategy).
- **Washington D.C (United States):** a case focusing on the city's NoMa neighborhood, offering an effective example of innovative strategies for attracting private participants in TOD projects to ensure a project's economic sustainability.

¹ Megalopolis (8,000,000+ inhabitants), large city (1,000,000+ inhabitants), medium-sized city (500,000+ inhabitants), small town (fewer than 500,000 inhabitants).

² Urban, suburban, or interurban

³ Metro, light rail, BRT, train, or air transport.

⁴ Coordination across institutions or unilateral action.

⁵ Residential; mixed-use; commercial; historic; public space and infrastructure; and general industrial or industrial parks.

⁶ Integrated transportation network or independent corridor.

⁷ Tax increases to support infrastructure expansion; concessions for green space, areas for project staging and construction, and affordable housing.

⁸ The degree to which transportation can be self-financed by the development.

⁹ Taking advantage of existing regulations or creating new instruments, plans or authorities.

¹⁰ In the planning, implementation, or operation.

¹¹ The twelve (12) cities are Curitiba (Brazil), Santiago (Chile), Bogota (Colombia), Mexico City (Mexico), Washington D.C. (United States), London (United Kingdom), Copenhagen (Denmark), Bilbao and Madrid (Spain), Hyderabad (India), Nanchang (China) and Tokyo (Japan).

- **Bilbao (Spain):** a case with successful alignment across local, regional, and national interests, allowing for the use of land to help shape urban TOD-related regeneration efforts.
- **London (England):** a case analyzing the experience of King's Cross Station and its surrounding area, where a private consortium with national public management successfully transformed a derelict, low-density neighborhood.
- **Tokyo (Japan):** a case study exploring land use in Tokyo's metropolitan area, including the use of land readjustment mechanisms and creative

financial approaches as catalyzed by public-private partnerships.

Each of the five cases include qualitative interviews with the managers who were involved in the planning, implementation, execution, and monitoring of the projects. The intent is to offer information and insights not readily available in the literature, and to provide a synthesized analysis to assist in structuring strategies and proposals for the implementation of TOD projects in Brazil and elsewhere.

Source: Mantinov. Double exposure engineer are measuring distance in drawing using pencil and ruler and city harbor at night. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



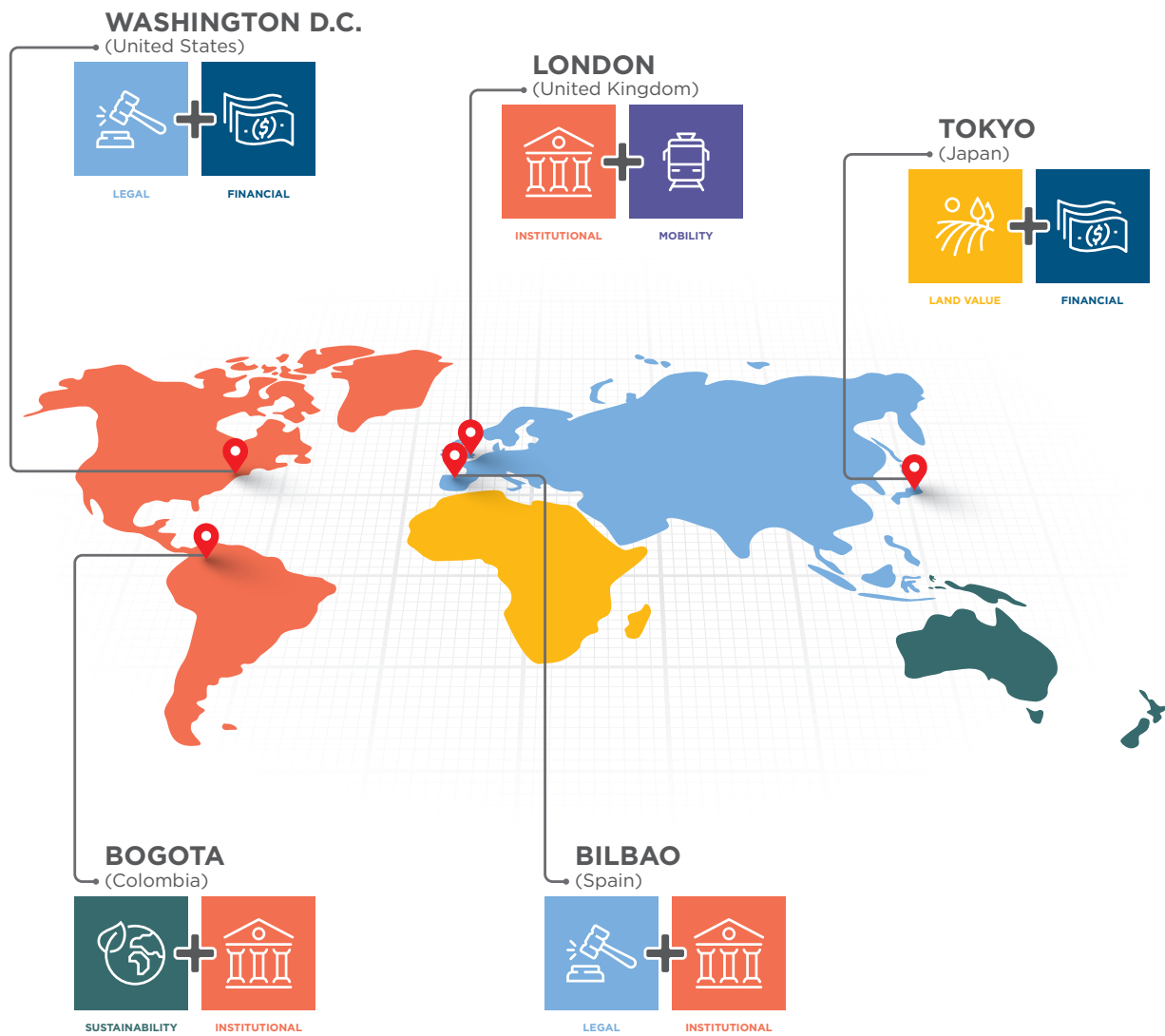
THE SIX DIMENSIONS OF TOD PROJECT FEASIBILITY

The identification of global best practices for TOD was based on the following six fundamental dimensions of TOD:

- **Institutional:** identifying the political barriers and regulatory mechanisms available to help catalyze the TOD planning process. Key stakeholders were identified at different levels of government from both the public and private sectors—including cooperation agencies, civil society, companies, real estate funds, etc—alongside institutional frameworks and cross-institutional mechanisms for cooperation.
- **Legal:** identifying the laws, rules, regulations, and other pertinent legal documents at various levels of government that regulate the sectors involved in TOD, with a particular emphasis on urban planning, housing, transportation, and mobility.
- **Land use:** analyzing the integration across land use and transportation network planning required to enhance a TOD project's viability. The creation of public land banks and the need for affordable housing both fall under this category.
- **Financing:** identifying the economic and financial instruments—both public and private—necessary to mobilize resources for TOD project financing, including government-led land value capture.
- **Mobility:** analyzing the relationship between urban development policies and efforts to develop an integrated and intermodal transportation system, with a particular emphasis on Mass Rapid Transit (MRT) systems, which serve as essential pillars for TOD projects to achieve sustainable urban growth.
- **Sustainability:** identifying pertinent environmental, social, and economic issues, with a particular emphasis on connecting TOD strategies with mitigation policy efforts to help reduce greenhouse gas (GHG) emissions.



↓ **FIGURE** - CITIES FEATURED FOR THEIR INNOVATIVE TOD TOOLS AND MECHANISMS



Source: Developed by the authors

Bogota

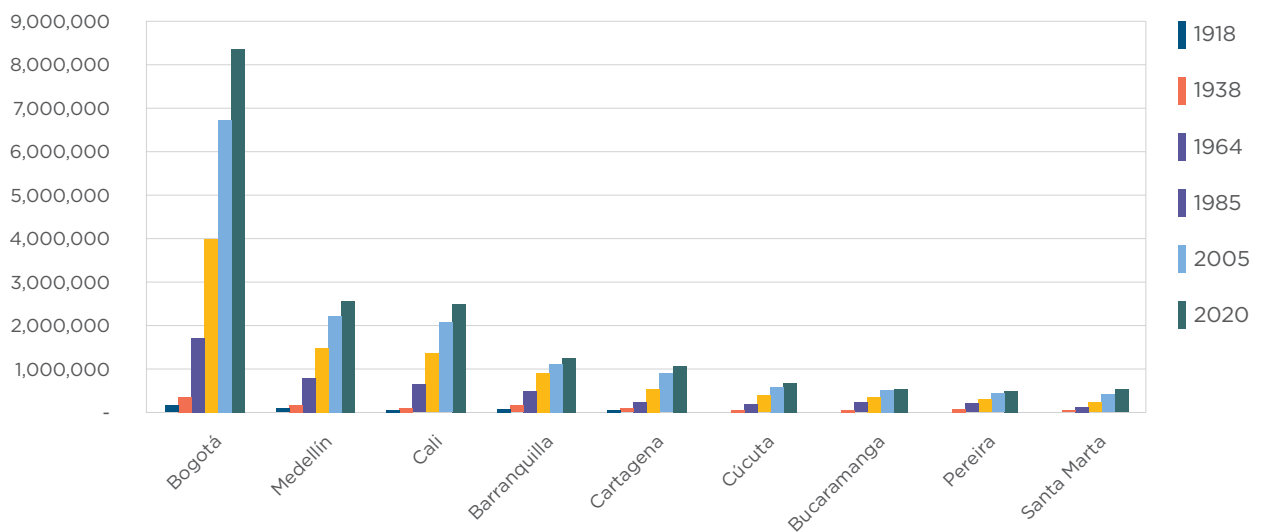


BOGOTÁ

Bogotá is Colombia’s largest city, with a population of more than 8 million (2018) and an average population growth rate of 1.37% per year¹². The city’s

population has grown exponentially over the past several decades, reaching an estimated 8.4 million inhabitants in 2020 (SDP, 2018).

↓ GRAPHIC – THE POPULATION OF BOGOTÁ AND COLOMBIA’S LARGEST CITIES (1918-2020)



Source: Developed by the authors based on data available at://www.sdp.gov.co/sites/default/files/demografia_proyecciones_2017_0.pdf

As a result of its population growth and role as the nation’s capital, a mass rapid transit system was necessary to more effectively connect the city’s population (Suzuki, Cervero and Iuchi, 2013). In the early 2000s, Bogotá introduced one of the world’s most efficient transit systems¹³—the TransMilenio Bus Rapid Transit (BRT) system—in response to the city’s population growth, low building densities, and increasing sprawl¹⁴.

We thus approach the Colombia TOD narrative from three perspectives:

- Bogotá’s BRT system (TransMilenio).
- Bogotá’s first metro line (PLMB), to be implemented by the Empresa Metro de Bogotá S.A. (the Bogotá Metro Company).
- Bogotá’s TOD-related environmental strategies

¹² National Department of Statistics (DANE).

¹³ Before the implementation of the TransMilenio system, the average commute was one hour and ten minutes; the average speed was only ten kilometers per hour during peak hours; 70% of the air pollution in the central corridors was generated by traffic (partially a result of old, low-efficiency vehicle usage); and accidents were frequent (Echeverry et al., 2005).

¹⁴ Between 1997 and 2016, the land area of Bogotá and its 20 surrounding municipalities increased by 67.6%, from 37,864 to 63,452 hectares (IDOM, 2018).

OVERVIEW OF TOD IMPLEMENTATION IN COLOMBIA

**MOBILITY**

BRT (TransMilenio) + Bogota Metro

**SUSTAINABILITY**

Through its Ministry of the Environment and Sustainable Development, the Colombian government promotes policies, regulations, programs, and NAMAs¹⁵ that seek to reduce GHG emissions, supporting urban development and sustainable mobility.

**LEGAL**

Urban regulations are established in laws and decrees based on development plans and planning at the regional, municipal, and district levels, and, in some cases, at the micro-scale on a district unit level.

Instruments analyzed:

- Territorial Planning Law (1997)¹⁶
- National Development Plan - Transportation (2010-2014)
- National Development Plan (2019)
- Bogotá Mobility Master Plan
- Territorial Ordinance Organic Law, 2011
- Bogotá Land Use Plan (2004) (Decree 190, Plan de Ordenamiento Territorial – POT)
- Zonal Planning Units (ZPU)

¹⁵ NAMA - Nationally Appropriate Mitigation Action – is a mechanism that allows developing countries to obtain donor support for low carbon initiatives, such as waste management plans and or transportation sector improvements. <http://ferramenta.ghgprotocolbrasil.com.br/index.php?r=news/view&id=264831>

¹⁶ Law 388 of 1997 defines territorial planning as “a set of political-administrative actions and physical planning efforts in order to provide efficient instruments to guide territorial development and to regulate its use and transformation.” The law also defines the zoning plans as, “... the set of objectives, guidelines, policies, strategies, goals, programs, actions, and norms adopted to guide and manage the physical development of the territory and its land use.”



INSTITUTIONAL

Currently, there are different institutional entities for planning at different territorial scales. Institutions at the national level serve to develop the general planning policies and strategies through which departmental and municipal entities are governed.

Key planning entities:

- National Council for Economic and Social Policy
- National Planning Department
- Ministry of the Environment
- Bogotá District Department of Planning
- Bogotá District Department of Mobility



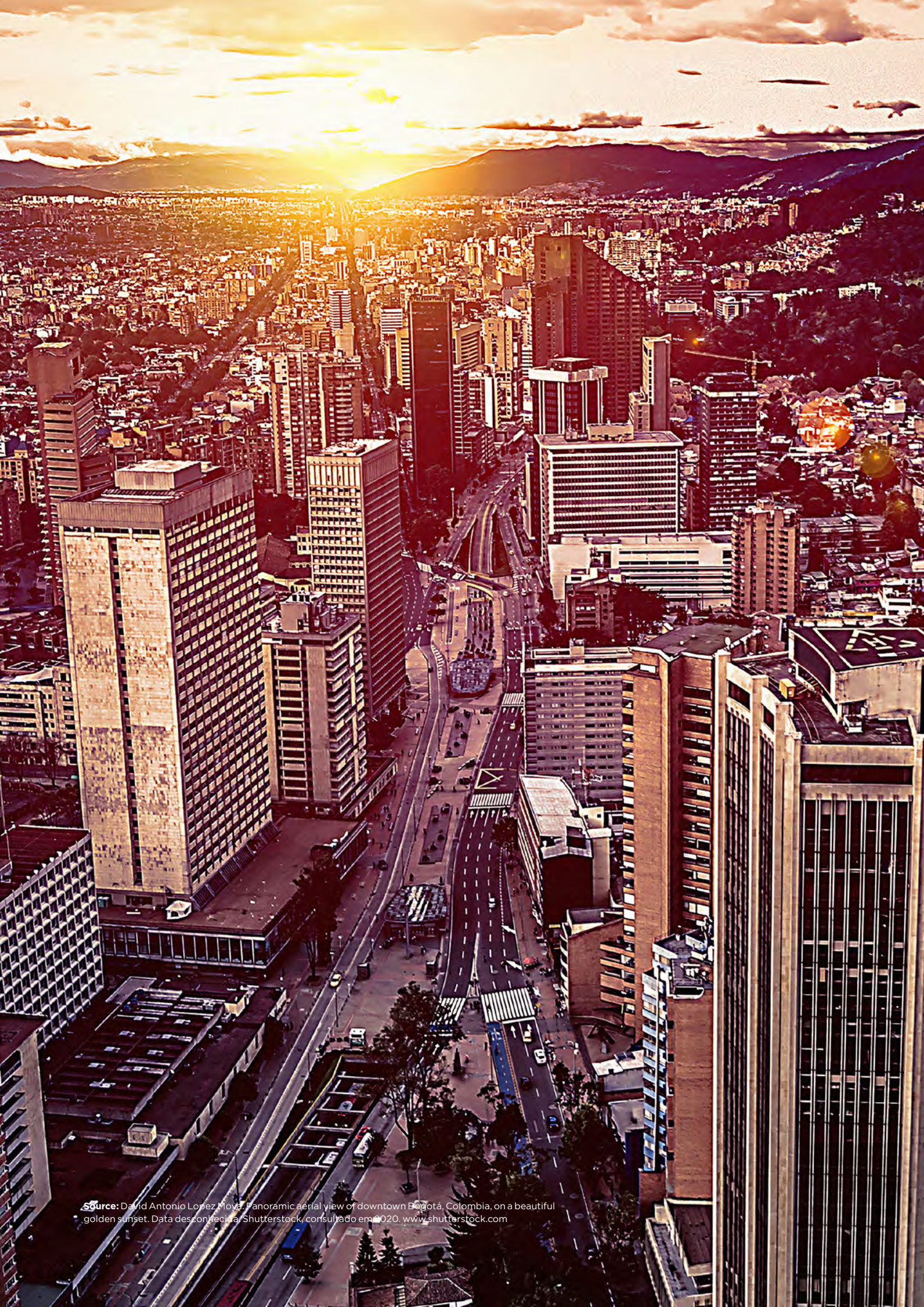
FINANCIAL

Land value capture was implemented using the following instruments:

- Land value tax
- Capital gains
- Urban mandates
- Public space cessions
- Promise of future ownership
- Auction
- Areas of opportunity

Source: m_leal3. Sunset view of Bogota from the Simon Bolivar Park. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com





Source: David Antonio Lopez Moya. Panoramic aerial view of downtown Bogotá, Colombia, on a beautiful golden sunset. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

ENTITIES THAT PARTICIPATE IN BOGOTA'S PLANNING PROCESSES ACROSS ALL LEVELS OF GOVERNMENT



NATIONAL LEVEL

- National Planning Department
- Ministries of Transportation, Housing, Environment, and the Interior
- National Council on Economic and Social Policy

technical entity that implements public policy and its manifestation in plans and government projects.

formulates, coordinates and executes public policies, plans and projects in each of its areas of focus.

coordinates and guides the entities responsible for economic management and social security.

Technical Department of the Commission for COT Management:
responsible for coordination across institutions at the federal level

REGIONAL LEVEL

- Provincia de Cundinamarca

has the autonomy to regulate regional affairs related to urban planning and economic development.

DISTRICT AND DEPARTMENTAL LEVEL (The case of Bogota)

- District Department of Planning
- District Department of Mobility
- District Department of Finance
- District Department of the Environment
- District Department of Housing

responsible for coordinating and overseeing the development and execution of local and district-level development plans include the POT.

supervises transportation companies in addition to developing and shaping policy for the mobility system.

ensures that Bogota has the financial resources to make investments that improve the quality of life of its inhabitants.

manages, operates, and maintains urban projects and infrastructure in coordination with district and regional entities.

formulates urban and rural land management policies to increase the productivity of land and facilitate access to decent housing. It also coordinates the following entities:

Metro Company of Bogota:
created to coordinate infrastructure and renovation efforts for the city's metro lines.

TransMilenio and SITP:
manages, organizes and plans the BRT service.



Bogota's Urban Redevelopment Company:
manages, facilitates, and executes real estate integration and/or land readjustment to help recover and transform derelict areas.

Metrovivienda:
promotes the construction and acquisition of affordable housing to benefit disadvantaged populations.

The case of TransMilenio

As noted above, Bogotá's first¹⁷ BRT line was launched in 2000¹⁸. Dubbed TransMilenio, it was integrated both with the city's existing public transit system—urban bus routes—as well as with other complementary transport services that serve to connect the system with the larger metropolitan region¹⁹ (Suzuki, Cervero and Iuchi, 2013). Today, it consists of 143 stations along 11 corridors, circulating more than 2.2 million passengers per day along its 113 kilometers of track with an average speed of 25.2 km/h²⁰. The city's Department of Mobility estimates that 59 percent of TransMilenio's 2 million users transfer to other forms of public transit and 26 percent transfer to private transportation services (District Department of Mobility, 2017). The system has a basic fare of \$0.67; transfers to other lines or modes cost an additional \$0.015. Nine of the eleven TransMilenio lines provide connections to other modes²¹, only one of which, however, is a direct transfer²². Global BRT Data estimates that the system generates on average \$308.42 million USD in annual revenues²³.

The TransMilenio system notably serves as a benchmark²⁴ (both domestically and internationally) with regards to key passenger statistics

such as passengers transported and travel time²⁵, including, for example, for the Mio BRT system (Western Mass Integrated) in Santiago de Cali (CCAP, 2012). Despite its global renown, however, TransMilenio failed to incorporate TOD strategies into its implementation (Suzuki, Cervero and Iuchi, 2013). The system achieved its travel time reduction goals, yet its impact on densification and development remains controversial. There has only been limited development in the areas around the TransMilenio stations, for example, as compared to development in other parts of the capital (Suzuki, Cervero and Iuchi, 2013). Locating stations in the middle of highways created challenges for pedestrians; and urban planners initially ignored strategies that involved private development—such as zoning changes or infrastructure investments—which, in turn, failed to catalyze investment around the stations themselves.

Despite its land use challenges, it is important to note that the TransMilenio system increased access to and the provision of affordable housing. As part of the Metrovivienda program, for example, the government first purchased land in areas where it was planning to build stations and only subsequently built out the necessary public infrastructure. The land was later sold at

¹⁷ Phase I opened in December 2000, totaling 42 km; Phase II added another 42 km to the network (Suzuki et al., 2013). Phases 3 and 4 are currently under construction (SDP, 2018).

¹⁸ In the 1990s, Colombian presidents were in support of expanding metro and bus infrastructure. Elected mayors from Bogotá followed suit; yet any solution required substantial financial resources. City officials unveiled the TransMilenio project in 1999 after a new national government rejected the possibility of a metro for Bogotá (Echeverry et al., 2005).

¹⁹ The TransMilenio design notably imitated existing systems in Curitiba (Brazil) and Quito (Ecuador), but the system boasted a number of innovative strategies, including its financial management, flexible operating contracts, a separation of concessions for feeder buses and regular buses, payment per kilometer instead of per passenger, definition of right-of-ways, and use of exclusive bus lanes; among others (Echeverry et al., 2005).

²⁰ Source: www.transmilenio.gov.co. Accessed on: 8/4/2020.

²¹ Integration between different transportation modes. <https://repositorio.ufsc.br/handle/123456789/127423>

²² Transfers refer to passengers making one or more vehicle changes during their journey. (HORN, 2004 apud POLAT, 2012)

²³ Calculated using 2018 rates and demand. https://brtdata.org/location/latin_america/colombia/bogota. Accessed on: 8/4/2020.

²⁴ TransMilenio transformed Bogotá's physical infrastructure and had an effect on the city's land use, productivity, road fatalities, crime rates, and health (Bocarejo et al., 2013).

²⁵ The system reduced average travel time by 32 percent (Center for Clean Air Policy—CCAP, 2012)



Source: Gabriel L. Guerrero. Transmilenio system bus at Shaio station on Suba avenue, Bogotá, Colombia. Fevereiro, 2020. Shutterstock, consultado em 2020. www.shutterstock.com

higher prices to recover infrastructure costs—and the sale was accompanied by a mandatory rent ceiling²⁶.

The TransMilenio system served in many ways as a lesson for the city of Bogotá. Developed in ad-

vance of a more coordinated municipal development strategy, the learnings have inspired efforts to more effectively integrate transportation and urban development, perhaps most notably with the Bogotá Metro (BM), which is intended to be integrated with the TransMilenio system.

²⁶ New affordable housing was also developed along the outskirts of the city, such as Porvenir and Nuevo Usme, among others.

THE TRANSMILENIO SYSTEM IN NUMBERS³⁰

11

Corridors³⁴

2014

308,42

Annual fare revenue
(millions of USD)³⁶

2020

657.602,700

Annual fare revenue
(millions of USD)⁴⁰

2018

59%

Public Transit³¹
(modal distribution)

2010

2000

Year the system was
opened to the public

SIM

Fare integration
within the system³⁷

2014

4,3

Operational efficiency (IPK)⁴¹

2018

26%

Private Transport³²
(modal distribution)

2010



Transmilenio S/A
(Transportation agency)

49.000

Peak load
(passengers per hour per direction)³⁸

2018
demanda aprox.

112,9

Length of the system (km)⁴²

2014

15%

Non-motorized transport³³
(modal distribution)

2010

0.67

Base fare (USD)³⁵

2016

2.192.009

Daily demand
(passengers per day)³⁹

2018

25,2

Operating speed (km/h)⁴³

2018

27 https://brtdata.org/location/latin_america/colombia/bogota. Accessed on: August 4, 2020.

28 Percentage of all trips on a typical workday that occurred on public transit.

29 Percentage of all trips on a typical workday that were taken on private transport.

30 Percentage of all trips on a typical workday that occurred using non-motorized modes.

31 The number of bus corridors making up the system. A corridor is a section of road or contiguous roads, served by one or more bus routes of a minimum length of 3 kilometers, which has a segregated or exclusive bus lane. If the segregated bus lane is along the curb, one of the following must be present: (1) pre-boarding fare collection; (2) dynamic traffic light priority; (3) boarding on a low or high platform; (4) brand and logo.

32 Standard fare for single adult travel; if the system does not have fare integration, the fare is that of the trunk line. In US dollars. Exchange rate from December 29, 2017.

33 Estimate of the total value of the fare revenue collected each year, calculated based on the average fare of the user and annual passenger trips.

34 Fare integration within the system allows electronic integration between buses; passengers can transfer between services for a limited period in open spaces (not necessarily in terminals) with a ticket/card. The passenger validates the ticket/card with each new trip without paying for the transfer or paying reduced rate.

35 Maximum number of passengers per hour per direction along the bus segment with the highest load. Note that it is different from the maximum number of passengers embarking by direction during peak hours.

36 Daily boarding of passengers in the system. Linked trips (eg if a passenger is transferred) are counted once.

37 Annual passenger boardings in the system. Linked trips (eg if a passenger is transferred) are counted once.

38 Passenger boardings per day (departure) by bus per daily kilometers, also known as the passenger per kilometer index (PKM).

39 Total length of all corridors in the system. Data in kilometers.

40 Average bus speed, including time spent at stations. Data in km/h.

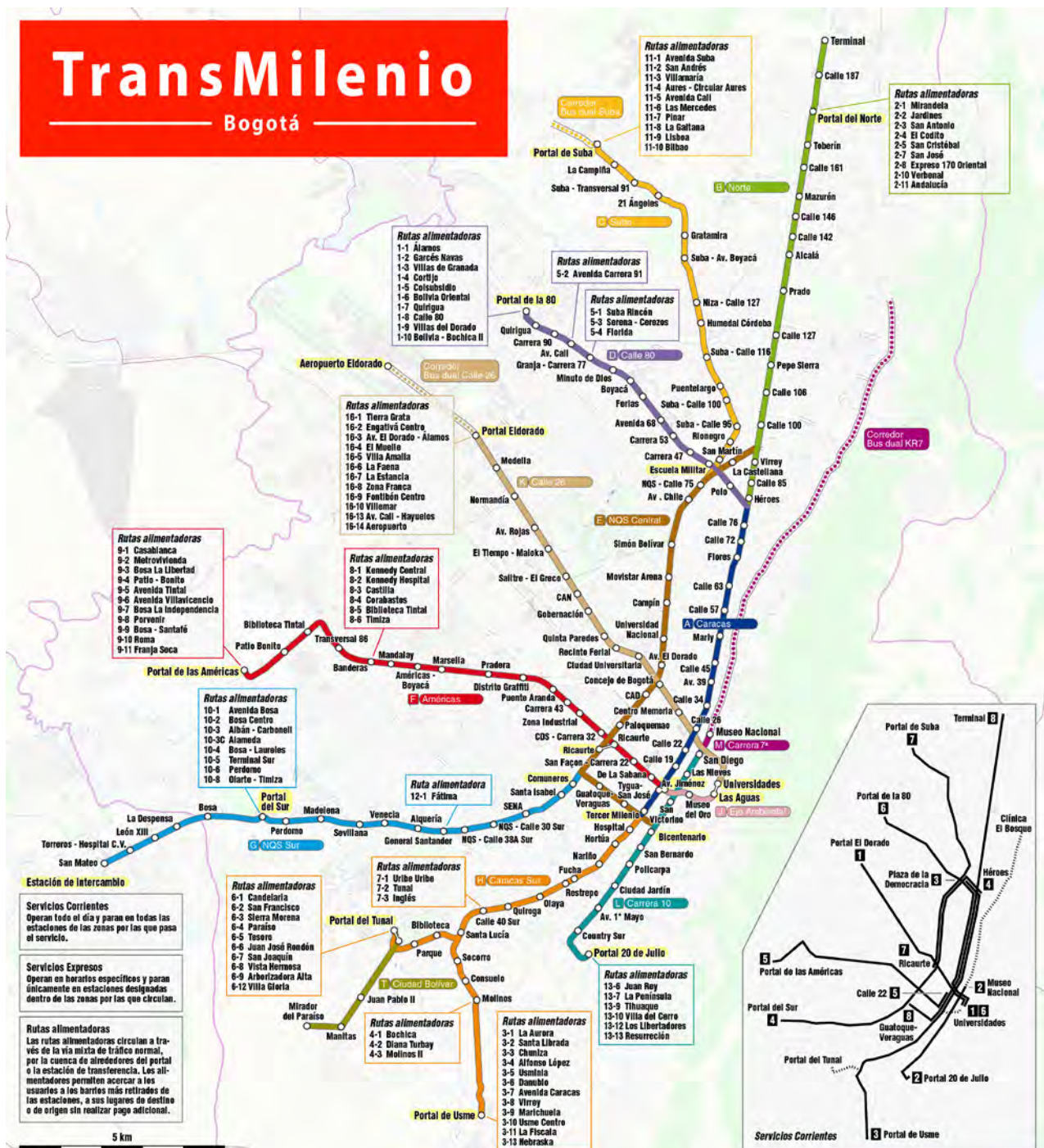


Source: Dario Fuentes. Urban overview shot of the main road traffic, City Center, with the view on Cinemateca and public transportation TransMilenio. Outubro, 2019. Shutterstock, consultado em 2020. www.shutterstock.com

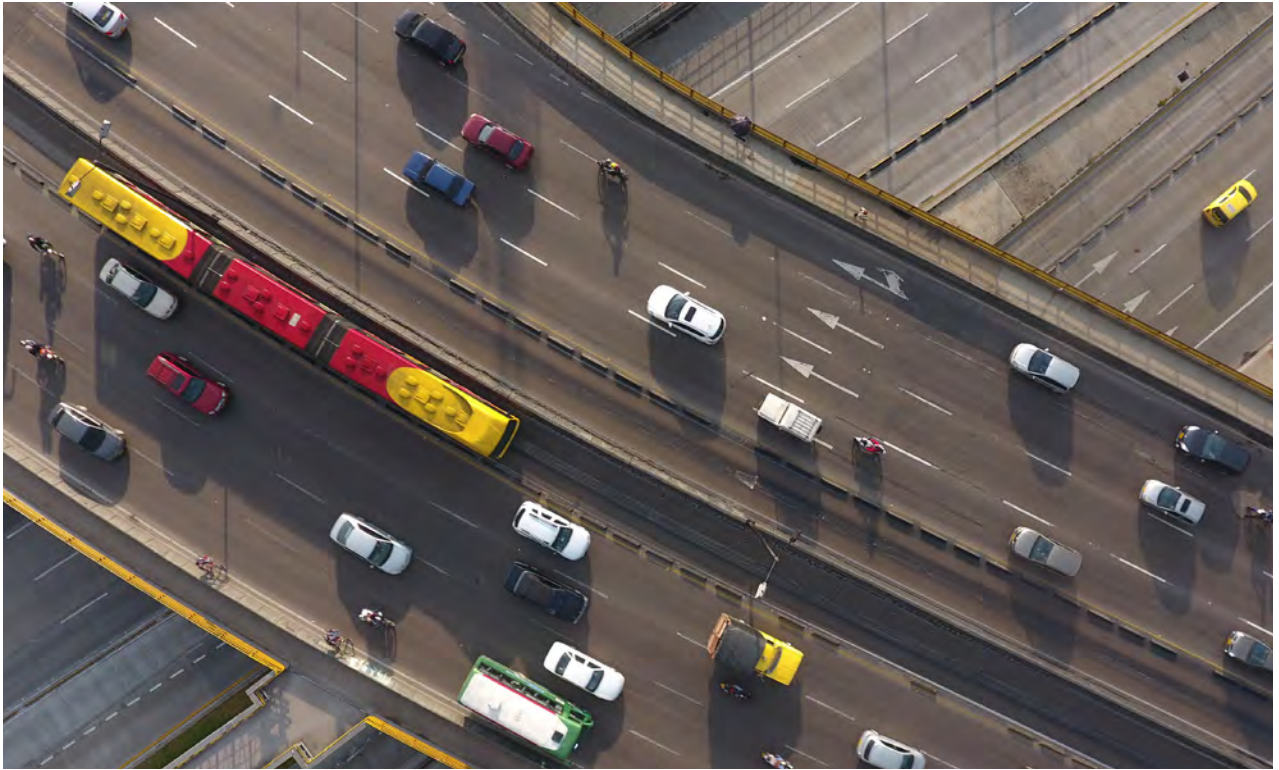


Source: Jess Kraft. TransMilenio bus passes through downtown Bogota, Colombia. Abril, 2016. Shutterstock, consultado em 2020. www.shutterstock.com

MAP OF BOGOTA'S TRANSMILENIO SYSTEM



Source: Maximilian Dörrbecker, based on data from OpenStreetMap.



Source: skykid787. Different view of the city of Bogotá, its streets and main roads. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



Source: Matyas Rehak. Station of TransMilenio bus system in Bogotá. Setembro, 2015. Shutterstock, consultado em 2020. www.shutterstock.com



Source: EGT-1. Public bus called TransMilenio, this system is the one that more number of people transports in the city of Bogotá. Abril, 2020. Shutterstock, consultado em 2020. www.shutterstock.com



Source: Gabriel L. Guerrero. Autopista Sur, one of the main avenue to leave Bogotá, in the south of the city. Dezembro, 2019. Shutterstock, consultado em 2020. www.shutterstock.com

The Bogotá Metro Company

Established to plan, develop, and operate the Colombian capital's metro lines, the Bogotá Metro Company (BMC) is also responsible for leading the renovation and redevelopment process along the metro's corridors. It can notably also propose—up until the project's implementation—new mechanisms to add value to TOD-related projects in proximity to its stations (DÍAS; HERRÁN, 2019).

One of BMC's main challenges is the formulation of regulations that encourage private sector participation, not only in the project's design and construction phases, but also in the system's operation and management. To do so, business models need to be competitive with other business opportunities in the Bogota area (DÍAS; HERRÁN, 2019). The metro project receives 70% of its financing from the national government and 30% from the District of Bogotá (the municipality) (DÍAS; HERRÁN, 2019). Yet under the legal framework of the "Ley de Metros y el Tranvía" (COLOMBIA, 2015), any Colombia operating model that receives national support must be financially self-sustaining through fare revenue. The BMC has thus designed a number of land value capture strategies to recover the value of the public investment. The Company has announced, for example, that it will auction construction rights and will charge fees to capture the value increases resulting from the public investment. To support these efforts, District Decree 823 from 2019 closed pertinent gaps in the city's most recent POT to allow for the implementation of land value capture strategies

as part of TOD development along the metro's corridors (World Bank, 2020).

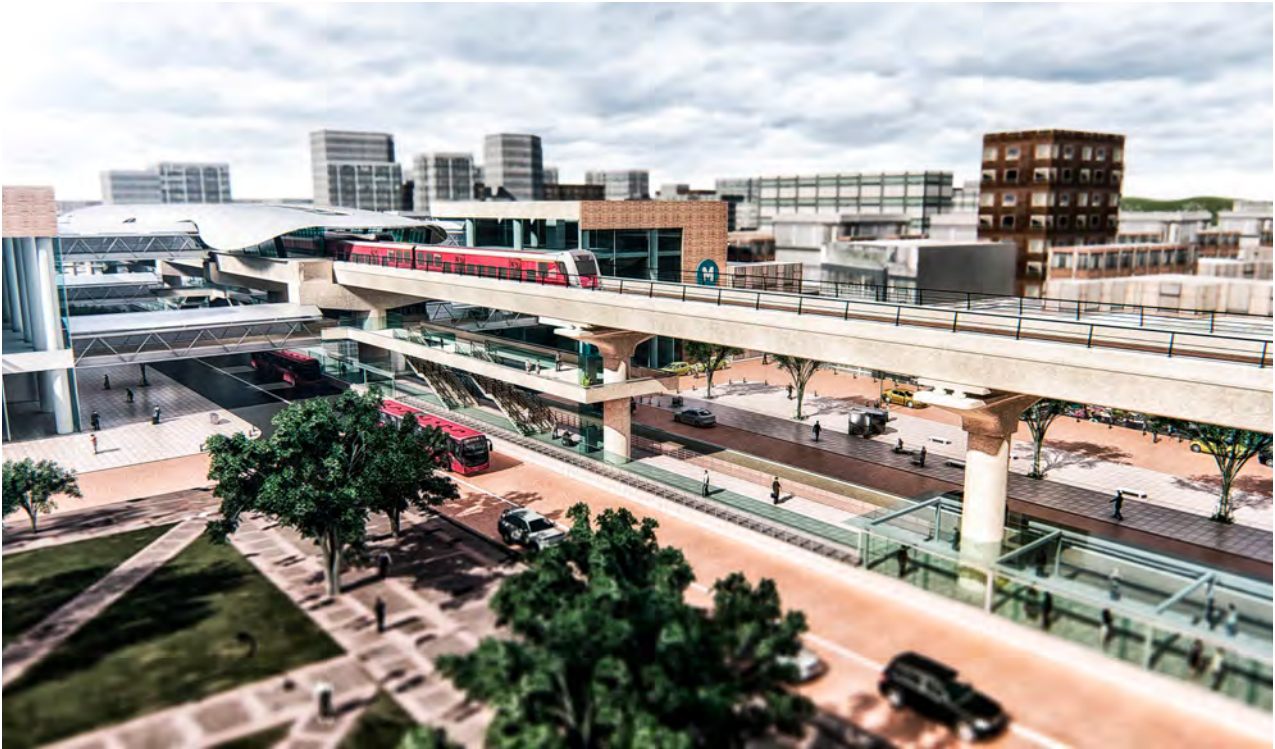
Experts have notably expressed concern about the risks inherent in land value capture strategies in this case in particular. The presence of cultural heritage buildings, existing companies, and tall buildings, for example, reduce opportunities for new investments and development, and, along with it, the potential for effective land value capture (World Bank, 2020). Nonetheless, recent estimates (taking into account these pre-existing conditions) suggest that the first two "test" stations can generate more than \$36.38 million and that the corridor itself can generate more than US \$446 million over a 20-year period (Bank World, 2020).

The project is expected to be completed in 2045, including pre-construction, construction itself, and more than 20 years of operation. Users, in turn, should benefit from the system by 2025. The metro will be 24km in length with 16 stations—10 of which will be integrated with the TransMilenio system⁴¹—and will operate 23 trains, each with a capacity of 2 million passengers. The system is anticipated to serve 1 million passengers per day.

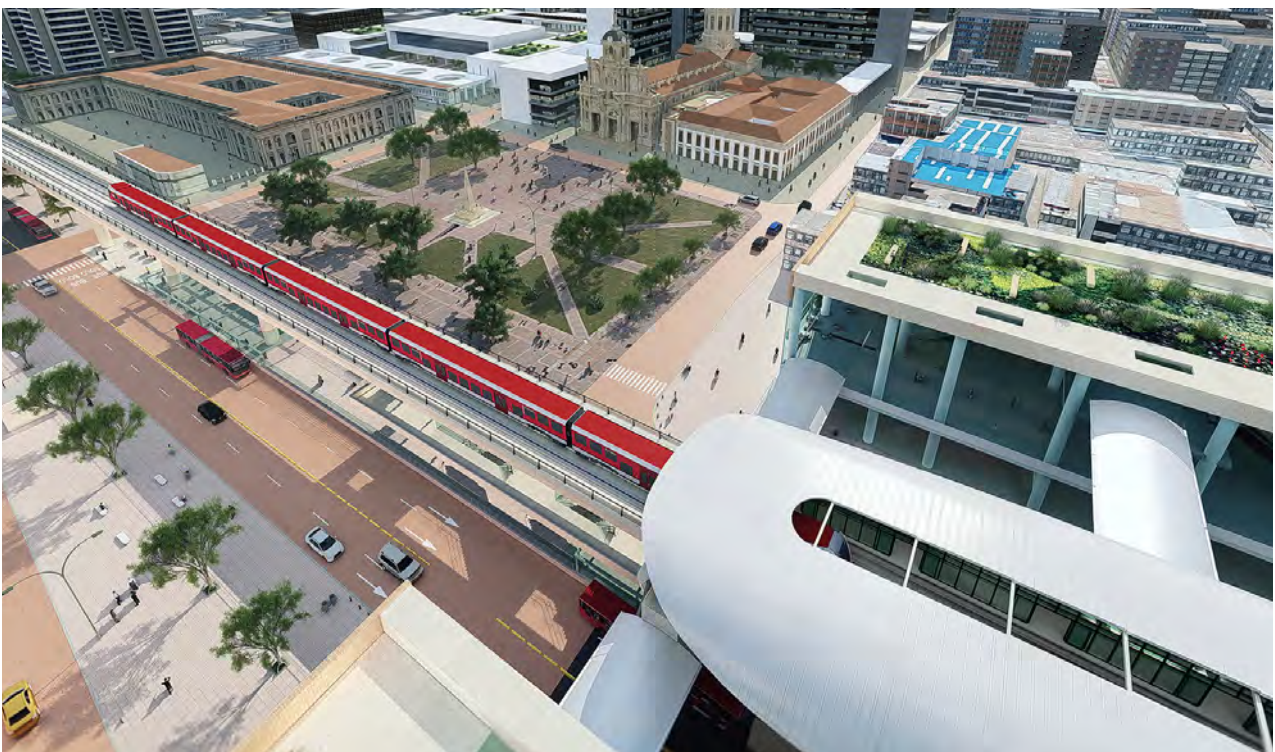
While doubts still remain regarding the metro system's implementation, it is clear that Bogotá learned from the challenges associated with its TransMilenio system; and that the capital is striving to better integrate its new transportation project with existing modes and to catalyze development along the system's corridors.

⁴¹ <https://ceiri.news/colombia-primeira-linha-de-metro-de-bogota-sera-construida-por-consorcio-chines/>

PROPOSAL FOR BOGOTA'S METRO SYSTEM



Source: Bogota Metro Company



Source: Bogota Metro Company



Source: Bogota Metro Company



Source: Bogota Metro Company

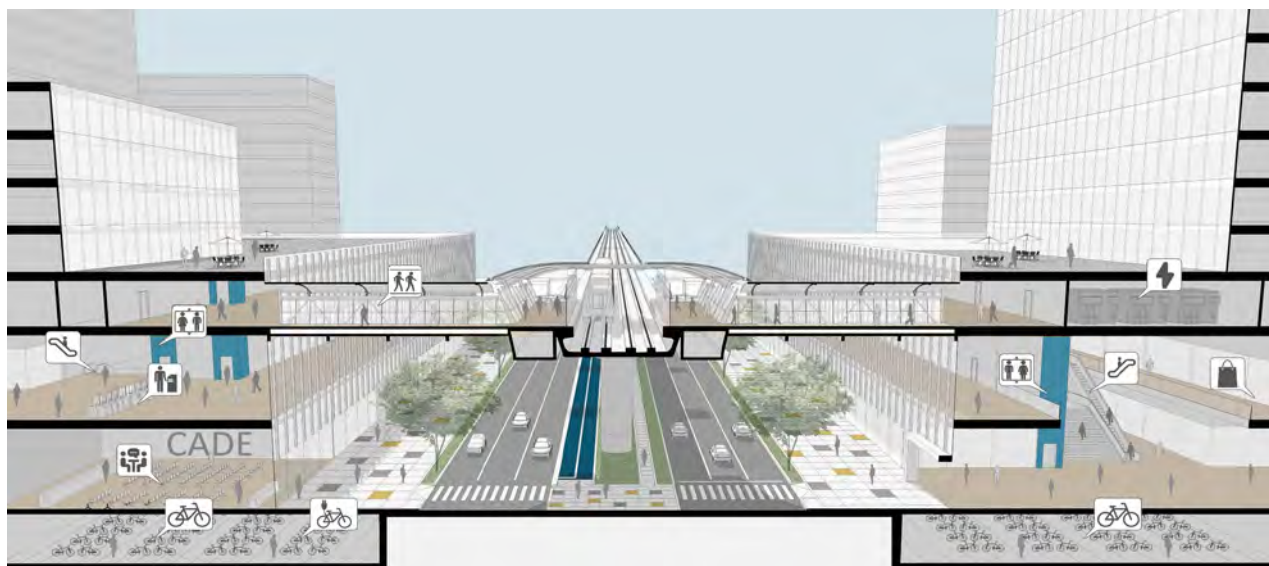
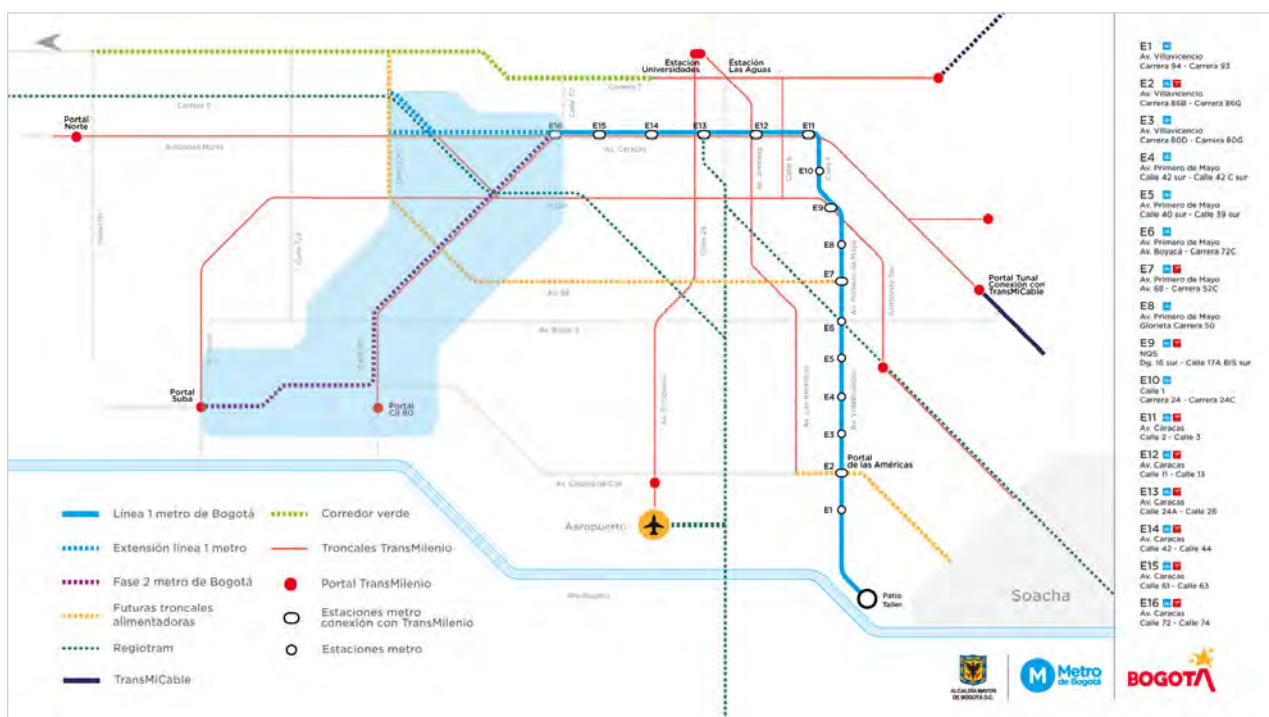


Foto: Empresa Metro de Bogotá



Source: Bogota Metro Company

Environmental strategies for TOD adoption in Colombia

The Ministry of the Environment and Sustainable Development is responsible for developing policies, regulations, programs, and other related actions to reduce GHG emissions. One of the notable initiatives instigated by the Ministry is the Colombian Low Carbon Development Strategy—a program that aims to couple economic growth and development with a reduction in GHG emissions in projects over the short, medium, and long terms. To achieve that, the following instruments are applied:

- **NAMAs:** Nationally Appropriate Mitigation Actions can be defined as public sector policies aimed at catalyzing private sector-driven, low-carbon initiatives that help the country to comply with its GHG reduction commitments.
- **Ciudad⁴² (Findeter), NAMA and NAMA TAnDem:** Ciudad leads and coordinates the NAMA processes. It also offers financial support for TOD projects

in partnership with Findeter, a development bank that emerged in 2011 with the purpose of being a strategic partner to public and private entities for key infrastructure and sustainability projects by offering technical and financial assistance and expertise. TAnDem, meanwhile, is a NAMA focused on active transportation and demand management⁴³ to improve the quality of life in more than 19 Colombian cities. It works to mitigate climate change impacts through increasing bicycle use and encouraging more responsible car use. Pertinent measures include:

- Parking management schemes
- Traffic calming zones
- Bicycle parking at multimodal hubs
- Bicycle parking in public and private buildings
- Bicycle infrastructure development
- Public bike-sharing systems

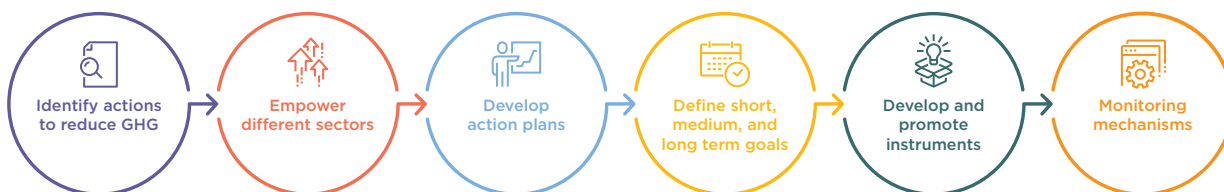
Difficulties in the process

Although Ciudad represents an important advancement in institutional capacity to implement TOD projects, there is still a dearth of legal tools necessary to facilitate, catalyze, and promote high-impact urban regeneration projects (IDOM; CCAP; FINDETER, 2018).

⁴² Ciudad (Spanish acronym for “Center for Urban Transit-Oriented Development Interventions”) is the Colombian government agency that directs and coordinates NAMA’s implementation.

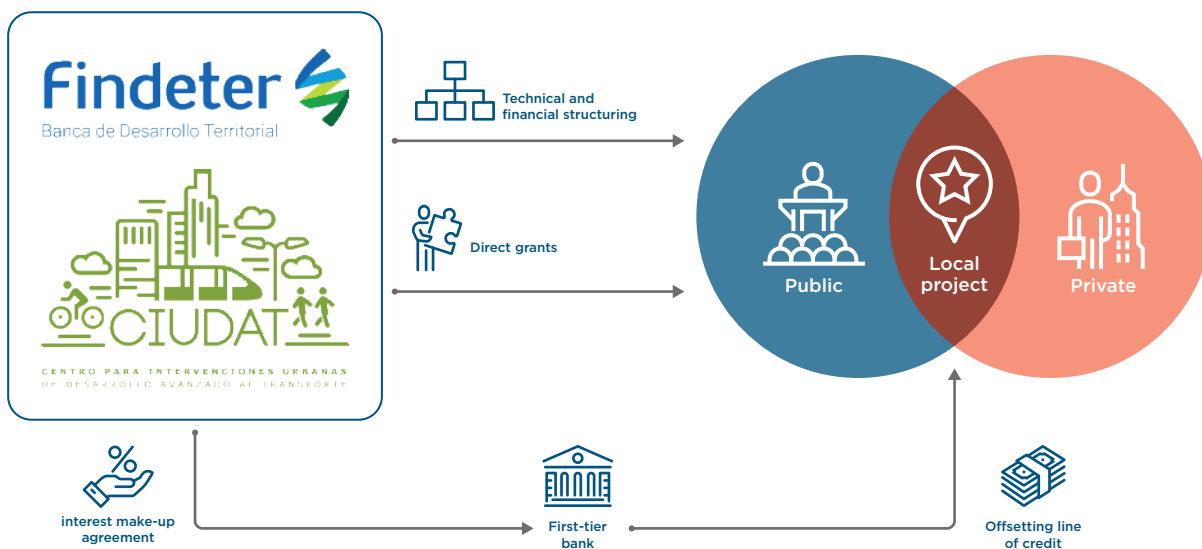
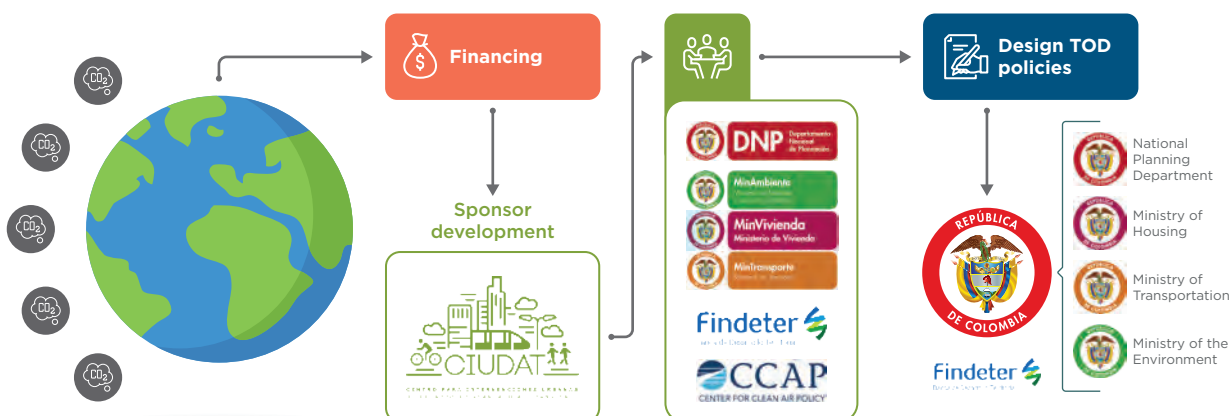
⁴³ https://www.findeter.gov.co/publicaciones/403159/nama_tandem/

↓ **FIGURE - SPECIFIC OBJECTIVES OF THE ECDBC**



Source: Ministry of the Environment and Sustainable Development

↓ **FIGURE - IMPLEMENTING NAMA THROUGH CIUDAT**



Source: Developed by the authors with data from CIUDAT, Findeter

Ciudad conditions for financing

As the agency responsible for channeling national and international resources and support, Ciudad determines the criteria for TOD project financing in Colombia based on an analysis of impact, opportunity, and poverty indicators. In order for municipalities to access the agency's financing mechanisms, they need an agreement with Findeter to connect with key public and private stakeholders. Funding from the agency can be used exclusively for the following:

- Technical expertise offered either by Ciudad staff or a consultancy identified by the agency
- Non-reimbursable resources and credit for infrastructure investment

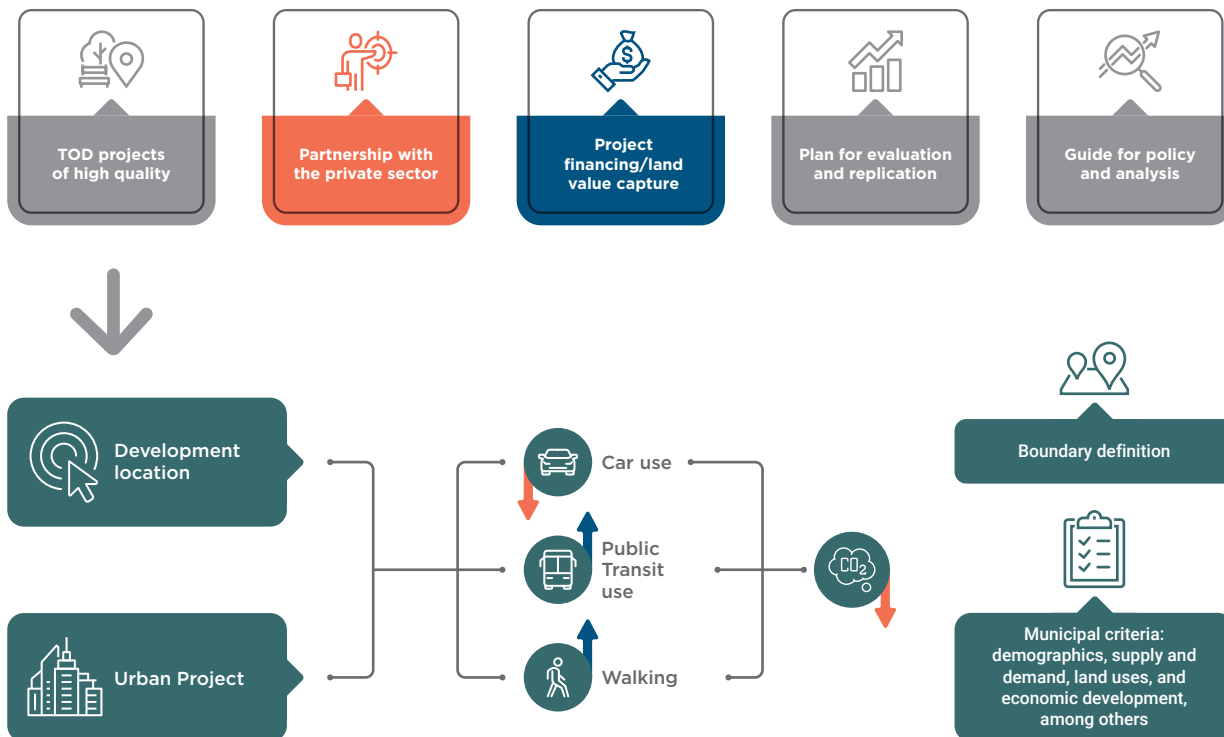
It is important to note that withdrawal from the program requires the return of all support granted up until the time of withdrawal. Furthermore, the methodology for allocating TOD-related subsidies is based on a municipality's poverty indicators⁴⁴ and its credit quality.

Challenges

By 2018, analyses and pre-feasibility proposals had been developed for three medium-sized cities: Cali, Manizales, and Pasto. All three were deemed high opportunity for the TOD and NAMA implementation. Yet challenges emerged during pre-feasibility processes, particularly connected with a city's scale and poverty indicators. Medium-sized cities with extensive suburban peripheries often discourage urban densification and renewal. Further, such cities often lack an integrated transport system, reducing TOD project-related impacts (IDOM, CCAP, FINDETER, 2018).

⁴⁴ *Índices de Pobreza Multidimensional* (multidimensional poverty indicators) are measured based on the following indicators: quality of education, and conditions for children & youth, health, work, and housing, as well as access to services. Families are considered multidimensionally poor when deprived of at least 33% of the indicators. https://www.dane.gov.co/files/investigaciones/condiciones_vida/pobreza/2018/bt_pobreza_multidimensional_18.pdf

↓ **FIGURE** - OBJECTIVES OF THE ECDBC.



Source: Elaboração própria com dados da CIUDAT, Findeter

Contributions of the case

The case of Bogotá shows more generally that the pursuit of expanding an integrated mobility system in a manner that is sustainable over the long term and improves accessibility and quality of life is a constant challenge. The city's pending metro system offers a key opportunity to implement a TOD pilot plan, requiring an integrated approach that applies strategic regulatory instruments at different scales. Such a project could have significant benefits for a large percentage of the population at different socioeconomic scales. Pilot projects notably serve as an opportunity to optimize adaptation for the Latin American context and to better understand how institutional and regulatory approaches and instruments can be effectively applied.

The planned metro system in particular offers a unique opportunity to supplement Bogotá's existing transportation system. The time is right to avoid the same mistakes made as part of the TransMilenio project—and the city has thus far demonstrated its commitment to doing so. Support for TOD is very much in line with Bogotá's land use planning goals as outlined in its POT and Mobility Plan, and transit-oriented development can also help to achieve the goal of becoming a more sustainable city by increasing both density and transportation efficiency.

The city has notably undertaken a series of steps to adopt a land use strategy that is more effectively coordinated with the pending metro system. These steps can serve as key lessons for other cities striving to implement TOD projects:

- The City Council commissioned the BMC to help shape and structure the development around the new metro stations in collaboration with existing government entities. This, in turn, ensures that both transportation and development are integrated into the full project—and that the principles and priorities of both are addressed.
- The city has adopted a series of laws over time that facilitate and encourage land value capture strategies to help guarantee the financial viability of projects by offering tools to capture part of the property value increases catalyzed by public investment.
- As required by law, Bogotá adopted a master plan to help better coordinate and shape its land use strategies.
- Finally, current efforts are focused around stations that are better prepared for development, indicating an understanding of the differences and nuances among TOD typologies as well as a more strategic, coordinated approach that takes into account the existing characteristics and unique conditions of each station.



Source: EGT-1, Bogotá Cable car. With a view towards the city center. Date unknown. Shutterstock, consulted in 2020. www.shutterstock.com

Washington

Source: Jon Bilous. Bike lanes on Pennsylvania Avenue and the United States Capitol at night, in Washington, DC. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



WASHINGTON DC

In 2019, Washington, D.C.'s population was approximately 705,000 within the District itself and approximately 6.2 million within its larger metropolitan area¹. In addition to its residents, more than 1 million individuals travel into the District on weekdays for work, particularly from the city's Maryland and Virginia suburbs. The District sees an annual population growth of approximately 13,000 people, and boasts a density of 4,445 inhabitants/km².

Washington is considered a strong reference case because of its TOD-related successes achieved over the course of 50 years – harkening back to the beginnings of its subway system. Over that time period, the city has developed and implemented a number of strategies related to financing mechanisms and the creation of government planning entities that have helped to spark urban renewal and generate both economic and environmental benefits.

Historical context

Over the years, a variety of district and federal entities have worked to guide and shape

Washington DC's growth. The L'Enfant Plan² of 1791 created the city's characteristic mesh of diagonal and orthogonal paths crisscrossing the municipality according to a system of specific points of reference, such as the National Capitol. A century later, a new urban plan—the McMillan Plan³—established a system of parks and the district's core of monuments in addition to its public road system.

In addition to following the guidelines laid out in the L'Enfant and McMillan plans, the city's urban planners boosted its development through the introduction of a public transit system in the 20th century. Thanks to a number of initiatives in the 1970s, the metro's construction⁴ attracted higher population densities in proximity to its stations as perhaps best exemplified by the construction of the Rosslyn station, part of the Rosslyn-Ballston⁵ corridor in Arlington (Virginia). Begun in 1972, work on the station was completed seven years later, with the opening of the Orange Line to Ballston. Today, it is considered one of the best TOD examples of United States, receiving an award in 2017 from the American Planning Association⁶.

¹ Source: U.S Census Bureau, Population Division, 2019.

² Pierre L'Enfant was the Frenchman responsible for the original planning of Washington DC in 1791. The construction of the American capital, however, lasted from 1800 to 1871: http://arquiteturaesustentabilidade.weebly.com/uploads/2/9/2/3/2923945/tc737_parte_05c.pdf

³ The McMillan Plan - formally titled "The Report of the Senate Park Commission. The Improvement of the Park System of the District of Columbia" envisaged eliminating the Victorian landscaping along the National Mall. It also allowed for the construction of museums, cultural centers and large memorials. Today's placement of the Lincoln Memorial, the Ulysses S. Grant Memorial, Union Station, and the US Department of Agriculture building are a direct result of this plan, which even today continues to guide DC's urban planning https://en.qwe.wiki/wiki/McMillan_Plan.

⁴ The Washington Metro, known as Metrorail, opened on March 27, 1976. Its 91 stations and 6 lines are managed by the Washington Metropolitan Area Transit Authority (WMATA). The metro is integrated with Metrobus buses (also under WMATA management) - <https://mapa-metro.com/pt/Estados%20Unidos/Washington/Washington-Metrorail-Mapa.htm#:~:text=0%20metr%C3%B4%20de%20Washington%2C%20also%20C3%A9m,%2C%20Blue%2C%20Yellow%20and%20Silver>.

⁵ The Rosslyn-Ballston corridor resulted from effective urban planning, which supported greater density and a mixture of land uses in areas around the Rosslyn, Clarendon, Courthouse, Virginia Square and Ballston metro stations. The undertaking, which involved an intensive effort over the course of 12 years, connected already prosperous residential neighborhoods with public transit, jobs, schools, parks, shops, and services. <https://projects.arlingtonva.us/planning/smart-growth/rosslyn-ballston-corridor/>

⁶ <http://www.pgplanning.org/DocumentCenter/View/9199/Article-on-Arlington-County-SGJRB-Corridor-9-18>

Transit Oriented Development

In 1997, Washington, D.C. underwent a significant economic crisis, as characterized by slow job growth and an on-going struggle to attract new development and investment, which, in turn resulted in a drop in revenues and the growth of poverty and crime, particularly in low-income neighborhoods.

It thus became essential to formulate and implement a new development strategy that was oriented towards the private sector and relied on TOD strategies to boost the urban revitalization process. NoMa (North of Massachusetts Avenue) is one of the best-known projects resulting from this strategy, boasting a significant impact on the District of Columbia.

Source: Pigprox. Cherry blossom festival at Thomas Jefferson Memorial in Washington DC, United States. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



Source: SevenMaps. NoMa-Gallaudet U Station. Washington DC Metro map. Maio, 2015. Shutterstock, consultado em 2020. www.shutterstock.com

OVERVIEW OF WASHINGTON'S TOD IMPLEMENTATION



MOBILITY

Metro + Bus + BRT + Lightrail



SUSTAINABILITY

Projects involving the District Department of Transportation (DDOT) are required to be in accordance with the rules of the Sustainability Plan, whose Sustainable Policies and Processes⁷ include mandatory, sustainability-related local and federal laws.



LEGAL

Oriented around the transit system's expected growth, the following laws and policies guide land use and planning.

Instruments analyzed:

- Comprehensive Plan of Washington, DC⁸: the core of the family of D.C. plans.
- Small Area Plans (SAP): NoMa case study.

⁷ <http://ddotsites.com/documents/environment/>. Accessed on August 13, 2020.

⁸ District Department of Transportation (December 2006). Comprehensive Plan of Washington DC. Available at: <https://planning.dc.gov>



INSTITUTIONAL

The District Department of Transportation⁹ is the most important entity for the integration of projects within the District, guiding the city's growth according to planned public transit projects. Other relevant institutions include:

Local planning entities:

- D.C. Office of Planning: department of small and local business development¹⁰.
- D.C. BID Council¹¹.
- National Capital Region Transportation Planning Board (TPB)¹².
- National Capital Planning Commission (NCPC)¹³.
- D.C. Sustainable Transportation (DCST)¹⁴.
- Washington Metropolitan Area Transit Authority (WMATA)¹⁵



FINANCIAL

Land value capture is the principal mechanism used in projects associated with the District's metro system. The city's TOD projects are usually catalyzed by public-private partnerships.

Tools analyzed

- BID¹⁶ (Business Improvement District) creation and tax collection
- Public funds
- Tax incentives
- SAD (Special Assessment District)

⁹ The DDOT manages and maintains the city's transportation infrastructure. It has a division for planning and sustainability with broad strategic objectives as defined in MoveDC (the city's mobility plan) in order to guide multimodal project development.

¹⁰ District planning offices work together with their peers in neighboring municipalities to design solutions at the metropolitan and regional scales.

¹¹ Association of Washington DC's eleven Business Improvement Districts (BIDs). The body helps to manage and improve its neighborhoods which house 70% of the DC's workers and 40% of the city's tax base.

¹² Plays an important role in transportation planning, such as for highways, traffic, walking, and cycling. It also plays a role in obtaining sector-related federal funding for the District.

¹³ The federal government's central planning agency for the Capital Region.

¹⁴ "The DCST organizes business advocacy and government entities to make DC a global leader with frequent, rapid, safe, affordable, and comfortable transportation to, from, and around DC job centers." <https://dcstcoalition.org/>

¹⁵ WMATA operates and manages all activities related to the city's metro and bus systems. The agency successfully managed the development of the TOD projects along the Rosslyn-Ballston Corridor and other TOD projects through its Joint Development Program first implemented in 1976.

¹⁶ Currently, there are eleven BIDs in Washington DC: Adams Morgan Partnership, Anacostia, Capitol Hill, Capitol Riverfront, Downtown D.C, Dupont Circle, Georgetown, Golden Triangle, Mount Vernon Triangle, NoMa/Union Market, Southwest.

The Case of NoMa

Historical Context

The construction of the New York Avenue-Florida Avenue-Gallaudet University metro station (known more simply as the Noma-Gallaudet U station) was the result of a partnership between local landowners, the Federal Government, and the Washington Metropolitan Transit Authority (WMATA). It was the first ‘infill’ station built by WMATA between two existing stations, closing a gap of 2 miles between Union Station and Rhode Island Avenue¹⁸. Although located just north of Union Station, close to the city’s downtown, the NoMa of the 90s consisted of empty railway cargo yards, abandoned buildings, warehouses, and vacant lots. The consolidation of railway companies, however, eliminated the need for cargo staging areas. According to a WMATA study conducted in 1999, 5,600 people were living between 800 and 1,200m from the New York Avenue/Florida Avenue intersection boasting an average income of \$23,396. 24% of residents lived in poverty¹⁹ and 50% didn’t own a car, meaning there was an increased need for public transit alternatives.

District planners identified NoMa as a priority for redevelopment given its large amount of under-utilized land and proximity to the city’s core²⁰. A 1998 plan entitled “The Economic Resurgence of Washington, DC: Citizens Plan for Prosperity in the 21st Century,” identified NoMa²¹ as an area to be developed as a “new mixed-use information technology, communications media, arts and entertainment, and housing district²².” In the same year, the District’s Department of Housing and Community Development (DDHCD) created the New York Avenue Task Force to support the area’s economic development²³.

The Task Force (TF) received \$350,000 from the city to produce a feasibility study that examined the economic opportunities and benefits potentially arising from a new metro station at the intersection of New York and Florida Avenues, thus connecting the NoMa neighborhood with the Metrorail network and the region more generally²⁴. The study predicted that investing in the station could create 5,000 new jobs and attract \$1 billion in investments and development²⁵. The TF introduced the “NoMa” moniker in order to give the area a stronger identity and later evolved into the Action 29-New York Av-

¹⁸ Washington Metropolitan Area Transit Authority. New York Avenue-Florida Avenue-Gallaudet University Station Access Improvement Study. June 2010. <https://www.wmata.com/initiatives/plans/upload/NY-Ave-FL-Ave-Gall-U-Station-Access-Improvement-Study-Final-Report.pdf> (accessed on 8/13/2020).

¹⁹ The average annual income for the district at that time was \$30,727; 17% of the city’s residents were below the poverty level. Source: “Infrastructure Financing Options for Transit-Oriented Development.” EPA. Environmental Protection Agency, May 7, 2015. <https://www.epa.gov/smartgrowth/infrastructure-financing-options-transit-oriented-development> (accessed 8/13/2020).

²⁰ WMATA 2010.

²¹ Action 29 created a public-private financing mechanism to build the new Metrorail station on the Red Line, near New York Avenue and Florida Avenue NE, enabling a large area of land and empty and underutilized buildings to be developed to support the creation of thousands of new jobs and new housing opportunities.

²² In addition to this plan, other concurrent plans also identified the area as an excellent location for redevelopment efforts.

²³ EPA 2015.

²⁴ EPA 2015.

²⁵ EPA 2015.

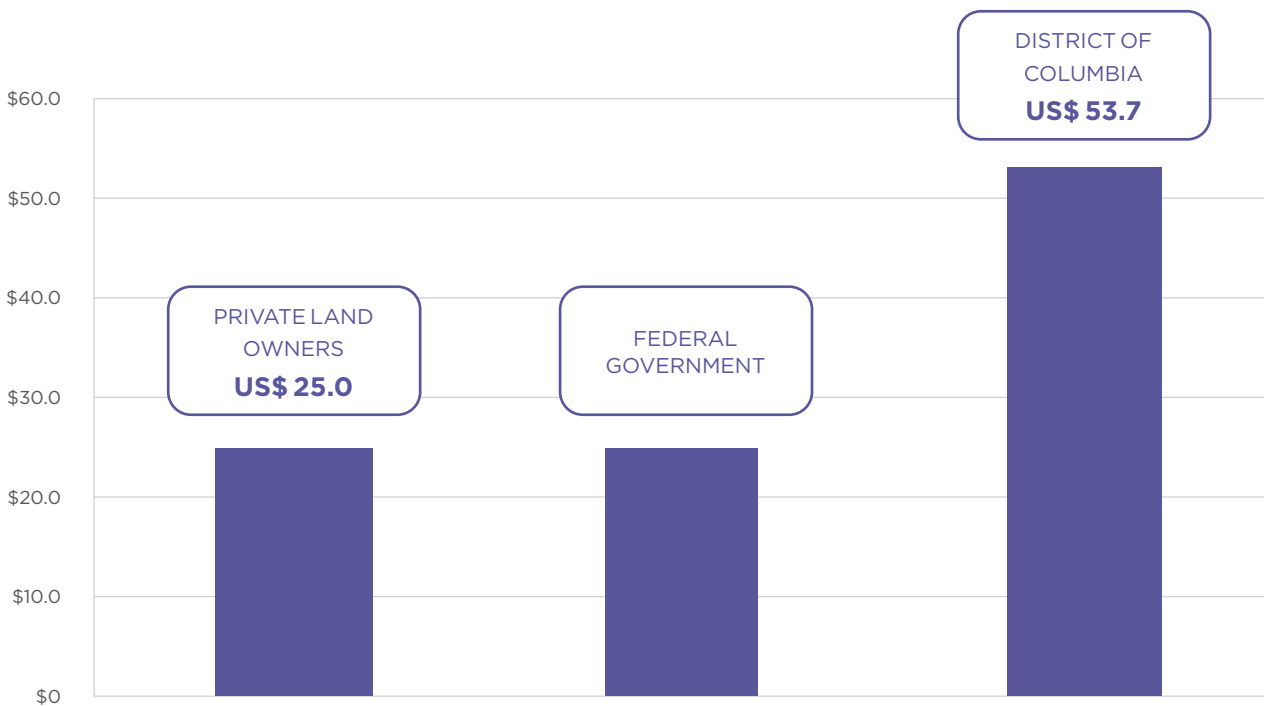
ene Metro Station Corporation (see box), which included representatives from the private sector, community leaders, and environmental activists²⁶. TF concluded that the new metro station was crucial to NoMa’s redevelopment—and could be achieved at a reasonable cost.

Public-private partnership

The NoMa station is the first Metrorail station to be built with a combination of public and private funds²⁷. The expected project cost for its con-

struction was over \$75 million (ultimately exceeding \$100 million). By the end of the 1990s, the District was facing financial constraints²⁸ and could not continue the project without external financial assistance. The project was subsequently built via a single public-private partnership, combining funds from private landowners (see graph and box below), the District of Columbia, and the federal government²⁹. Each party initially agreed to pay \$25 million (or a third of the total costs), with the District of Columbia responsible for any surplus costs.

↓ **GRAPHIC - COST OF THE NEW YORK AVE/FLORIDA AVE-GALLAUDET UNIVERSITY METRO STATION IN MILLIONS.**



Source: WMATA, 2010

²⁶ WMATA 2010.

²⁷ WMATA 2010.

²⁸ As a result of the city’s financial situation, Congress took control of the District’s government through the National Capital Revitalization and Self Government Act, which transferred control of various functions of the city to a Commission appointed by the Control Board. Source: "Appendix: The D.C. Revitalization Act: History, Provisions and Promises." Brookings. <https://www.brookings.edu/wp-content/uploads/2016/07/appendix-1.pdf> (accessed 8/15/2020)

²⁹ In addition to funds for construction of the station, other federal assistance came in the form of government agreements to build offices in the area. This included the commitment of \$100 million for the building of the headquarters for the Alcohol, Tobacco and Firearms Agency, which previously had its offices scattered around the city. The headquarters would be placed on land belonging to the municipality in front of the proposed station, and would house 1,100 employees. Another \$100 million was committed to the construction of new offices for the US Securities and the Exchange Commission.

SPECIAL ASSESSMENT DISTRICT

In December of 1998, after lengthy negotiations, private landowners agreed to contribute \$25 million to the project through a 30-year special tax on commercial properties³⁰. A memorandum of understanding was signed between the Mayor of Washington, DC, Anthony Williams, and the landowners with the following terms³¹:

- (i) The District would issue \$25 million in bonds to be paid out via special tax revenue. The funds raised through issuing bonds would be directed towards the construction of a new metro station near the intersection of New York and Florida Avenues.
- (ii) A Special Assessment District (SAD) would be created to include all commercial properties that would directly benefit from the metro station.
- (iii) Special taxation would apply to all tax-paying, non-residential properties within the SAD.
- (iv) The value of the special tax would be calculated based on the current assessed value of the property and would not fluctuate over time. The percentage would be calculated to ensure that there would be enough revenue to pay back the bonds.
- (v) The District agreed to work with landowners to explore other innovative financing techniques, including Tax Increment Financing (TIF)³².

The remaining funds for the \$104 million project would come from the District of Columbia and the federal government. In 2001, the District's Council passed the New York Avenue Metro Special Assessment Authorization Emergency Act to create the SAD in order to allow the District to collect the tax. The assessment district was defined as commercially-zoned parcels that were within 2,500 feet of the entrances to the station but not within 1,250 feet of Union Station³³. The tax was charged and collected on top of existing property taxes. The District started collecting the taxes in 2002.

³⁰ WMATA 2010.

³¹ Source: FHWA Office of Innovative Program Delivery and AASHTO Center for Excellence in Project Finance. "New York Avenue-Florida Avenue-Gallaudet University Metro Center: A Case Study" s.d. http://www.transportationfinance.org/pdf/funding_financing/funding/local_funding/New_York_Avenue_Case_Study.pdf (Accessed 8/13/2020).

³² Tax Increment Financing (TIF) is a municipal financing mechanism that considers the future valuation of properties to determine the investment, securitization, and property tax based on said valuation in order to obtain the resources necessary to make the investment feasible. In the securitization process, a local development body (District TIF) issues debt security backed by future tax collection, and promotes investments in the TIF implementation perimeter (Maleronka and Hobbs, 2017).

³³ WMATA 2010.



Source: Chris Grafton (@grafton360). Washington DC Metro. Data desconhecida. Unsplash, consultado em 2020. www.unsplash.com

As WMATA moved forward with the implementation of the station, efforts were made to ensure both continued public and private support³⁴. WMATA hired the North Capitol Area Business Association (NCABA) to help engage the local com-

munity in the area's planning and development. NCABA was a non-profit organization without financial motives and provided a direct two-way communication link with the people who would be most affected³⁵.

³⁴ WMATA 2010.

³⁶ WMATA 2010.

THE ACTION 29 – NEW YORK AVENUE METRO STATION CORPORATION

The Action 29 - New York Avenue Metro Station Corporation was created in 1999. It represented the private sector's and the local community's perspectives throughout the planning of the NoMa initiative and served as one of the fundamental tools in the process of building the new "NoMa - Gallaudet Station U".³⁷ The Action 29 Corporation represented not only landowners (who contributed \$25 million in special taxation for the construction of the station), but formed a broader advisory council that supported the entire process from start to finish made up of the private sector actors (entrepreneurs, landowners, and real estate developers), civil society representatives (neighborhood leaders and local communities), and public sector actors (WMATA, D.C. and US officials)³⁸.

↓ FIGURE – IMAGES OF PUBLIC SPACE AND BUILDING IMPROVEMENTS AROUND THE NOMA-GAULLAUDET U STATION.



Source: www.nomabid.org/mapsstudies/ [Acesso em: 08/12/2020]

At the time of its creation, its main objective was to ensure the involvement of all key stakeholders in the construction of the new metro station and to boost various activities to help foster the neighborhood's economic and social development. The Action 29 Corporation hosted a monthly meeting with all stakeholders which yielded excellent results: public hearings ensured that the community always had discussions and input into the urban design.

The Action 29 Corporation's efforts were concluded in 2005. Two years later, private land and business owners established the NoMa Business Improvement District to help promote the area, plan public and private improvements, and to keep the place attractive, clean, safe and protected (see box below)³⁹.

³⁷ Action 29's Board of Directors included the project's main developers and landowners; other large local business leaders, including the CEOs of Verizon, XM Satellite Radio and Black Entertainment Television (BET); senior elected and appointed WMATA, District, and federal government officials; neighborhood and community leaders from a variety of professional fields, including small business, education, real estate, community economic development, community services, affordable housing, public health, and religion; and local environmentalist groups, such as the Washington Area Bicyclist Association. Source: Weiss, Marc. "Report for the OECD and the Government of Wales on the NoMa Strategic Economic Development Initiative in Washington, D.C." May 2008. <https://globalurban.org/OECD%20NoMa.htm> (accessed on 9/1/2020).

³⁸ EPA 2015.

³⁹ Weiss, Marc. "Report for the OECD and the Government of Wales on the NoMa Strategic Economic Development Initiative in Washington, D.C." May 2008. <https://globalurban.org/OECD%20NoMa.htm>

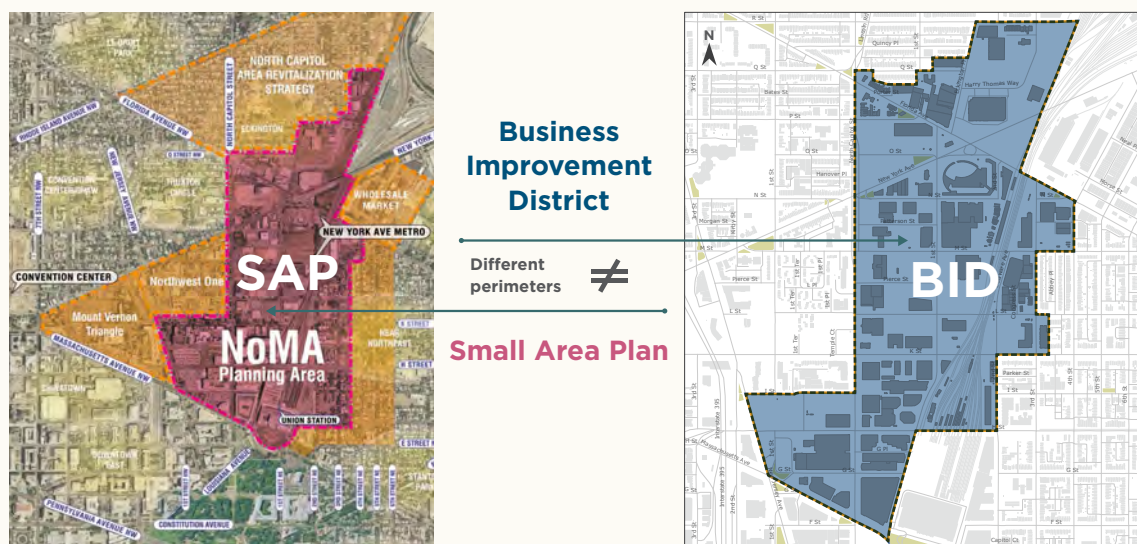
NOMA BID

The NoMa Business Improvement District (BID) was created by the District of Columbia’s Council and Mayor in March 2007. The BID is financed through a special tax collected from the owners within a 35-block area. The business and land owners on the BID’s board determine how these funds will be spent on management, conservation, or infrastructure projects for the neighborhood.

The BID works with D.C. government agencies, developers, architects, and community groups, among others, to bring the best urban design and planning practices to NoMa; the neighborhood is structured so as to encourage sustainability and walkability and to create a space that is welcoming and vibrant. The BID monitors a wide range of economic and real estate data, such as residential, commercial, and retail development. It also promotes initiatives to improve public safety and public sidewalks in addition to operating a comprehensive marketing program to drive and maintain public interest in the neighborhood.

It is worth noting that one of the main measures proposed to promote the development of NoMa was the creation of a TOD ‘area of influence,’ which, as shown below, doesn’t need to be fully identical with the eventual BID⁴⁰.

↓ **FIGURE – IMAGE COMPARING THE PERIMETERS IN THE SMALL AREA PLAN AND THE BID’S PLAN**



Source: NoMa’s website. Available at: www.nomabid.org/mapsstudies/ [Acesso em: 10/02/2020]

⁴⁰ A Small Area Plan refers to a plan for a specific area of the city which presents a cohesive set of characteristics, such as, for example, redevelopment opportunity or potential for TOD implementation. SAPs cannot contradict the Comprehensive Plan. Available at: <https://www.denvergov.org/content/denvergov/en/community-planning-and-development/planning-and-design/how-we-plan/small-area-plans.html> and <https://ggwash.org/view/72880/should-dc-council-members-be-more-intimately-involved-with-zoning-and-development> (accessed 11/9/ 2020)

The Economic Impacts of NoMa

Work on the station began in late 2000 and was concluded by November 2004⁴¹. Developers started showing interest in lots in the NoMa area even before the District's approval of the final plan, launching a virtuous economic cycle that has lasted nearly two decades.

NoMa was built out with a diverse array of employment centers, activity centers, points of interest, and residential units⁴². In terms of development, it is dominated by residential moderate-density, production/technical employment, commercial medium-high density, and mixed-use areas⁴³.

An economic analysis by RKG Associates as commissioned by the Washington Urban Lab and NoMa BID⁴⁴ estimated that total employment, earnings, and gross economic output associated with projects in the NoMa Station Impact Study Area⁴⁵ were as follows:

- **Economic Output** - \$4.7 billion in total economic output was generated from both buildings and jobs across all sectors starting in 2004 (\$2.2 billion in cumulative construction output and \$2.5 billion in permanent output in 2014).

- **Construction Spending** - \$1.7 billion in direct construction spending, not including improvements to parking lots and infrastructure.
- **Labor Earnings** – Since 2004, the total labor earnings generated by construction activity have been over \$1.1 billion. In 2014, permanent labor earnings amounted to almost \$1.9 billion.
- **Employment** - Approximately 14,338 direct, indirect and induced jobs were created between 2004 and 2014 as catalyzed by NoMa construction spending. An additional 15,168 permanent jobs were created, resulting in a total impact of 29,506 jobs.

According to the report, “from 2015 to 2019, projected annual municipal revenues (not including one-time revenues such as construction and other permits or certain recurring revenues like parking fees) were estimated to increase from \$68 million to \$152 annually⁴⁶. Overall, during the period from 2006 through 2019, the NoMa Station Impact Study Area was expected to yield nearly \$1 billion in total cumulative revenue to the District⁴⁷.”

In addition to the economic result, the study found that the construction of the NoMa- Gallaudet U Metro Station resulted in approximately \$330 million in total cumulative revenue for the District from 2006 to 2014⁴⁸.

⁴¹ Travel increased considerably after the station's opening: between November 2004 and October 2005, travel increased by approximately 177%, mostly arriving or leaving on foot (WMATA, 2010).

⁴² WMATA 2010.

⁴³ During the time station implementation was moving closer toward design and construction, Metro was also developing a new station architectural standard, intended to be used for all future stations. The standard emphasized a lighter, more-open feel than the original station designs. The New York Avenue station was the first station to which the new standard was applied (WMATA, 2010).

⁴⁴ NoMa – Gallaudet U Metro Station: Success Built on Transit. RKG Associates. November 2014. https://www.nomabid.org/wp-content/uploads/2017/09/MetroAnniversaryReport_RKG.pdf (accessed on 8/12/2020).

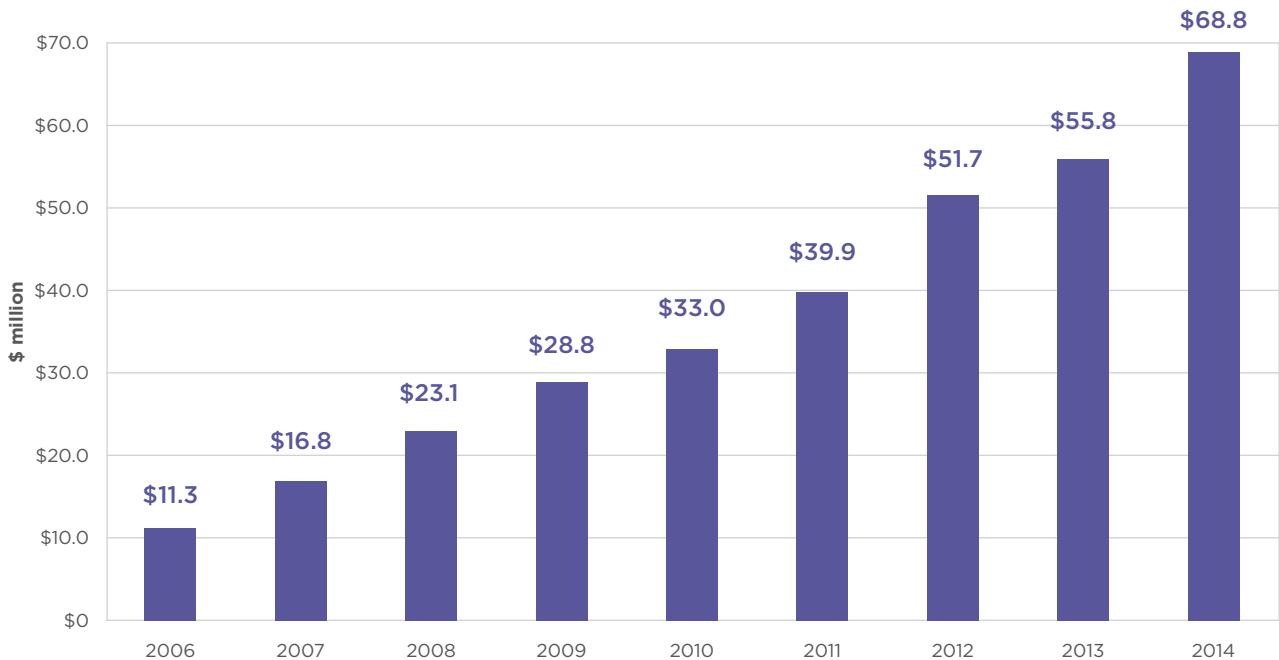
⁴⁵ The NoMa Station Impact Study Area defined by RKG Associates was comprised of the area north of K Street NE, contained within the boundaries of NoMa's BID. This location was considered the most heavily influenced by the NoMa - Gallaudet U Metro Station. The area found within the NoMa BID which is south of K Street was excluded because it saw significant development before 2004 and is well-served by Metrorail public transit, MARC, light rail and Amtrak terminals via Union Station.

⁴⁶ RKG Associates, 2014.

⁴⁷ RKG Associates, 2014.

⁴⁸ RKG Associates, 2014.

↓ **GRAPHIC - TOTAL ESTIMATED MUNICIPAL REVENUES-IMPACT STUDY FOR THE AREA AROUND THE NOMA STATION (2006-2014)**



Source: RKG Associates 2014

The steady increases in property assessments and associated taxes reflect both the addition of improvements and the value appreciation of unimproved properties within the study area. Real property taxes were the single largest source of tax revenues to the District, and were estimated to equal approximately \$11.3 million in 2006, increasing to \$45.7 million in 2014. Total cumulative real estate property tax revenues generated during this period were estimated to equal \$247 million, or 74% of cumulative total tax revenues. Additionally, the District collected: (i) \$41 million in cumulative sales tax revenues; \$7.3 million in estimated annual revenues in 2014; and (ii) \$27 million in cumulative resident income taxes; \$11 million in estimated annual revenues in 2014⁴⁹.

Conclusions and contributions of the case

NoMa is one of the most-cited case studies to exemplify successful applications of transit-oriented development with good reason: the case boasts large-scale transformation with sustained success. NoMa’s experience notably shows the value of engaging in meaningful partnerships and offers a number of innovative institutional and financial instruments that could be applied to other similar contexts. Albeit a model on a number of different fronts, its key contributions include the following:

49 RKG Associates, 2014.

- **Clear communication of intentions and goals**

The long-term plans adopted as part of the project notably allowed for effective coordination of land use and mobility priorities. Yet it is important to note that all levels of government showed a commitment to the region beyond implementing strategic plans themselves; the federal government, for example, agreed to build the headquarters for the Bureau of Alcohol and Firearms in the area⁵⁰, and the District of Columbia took the risk of potential cost overruns upon itself. This offered an additional level of stability to more effectively attract private investment.

- **Stakeholder partnerships**

As outlined above, the project incorporated a wide array of stakeholders throughout its full lifecycle. This included direct outreach to local community members and close coordination with the private sector. As part of this engagement, local government officials notably communicated the potential value of the project, including the likely land value increases resulting from transit investments. It was further clear, in turn, that transit improvements were only possible through private participation⁵¹. The result was a greater willingness by the private sector to contribute financially and otherwise to ensure the project's success⁵².

- **Innovative instruments**

The special assessment districts that were approved as part of the project offered both an innovative method through which the private sector could contribute financially to the project, while maintaining an interest in its continued success over time, as well as a mechanism for immediate execution of the project through bonds backed by anticipated future revenue from property taxes⁵³. This method of land value capture joins an array of institutional innovations (including such organizations as Action29 and the NoMa BID) to make NoMa a model for many subsequent TOD efforts.

While the NoMa case study offers insights that could be applied broadly for a wide array of TOD projects, the district's full model can perhaps best be applied to cases in which there is an existing strong real estate market (NoMa had the benefit of its close proximity to the center of Washington, DC) and with a regulatory structure that allows for the implementation of special tax districts, such as NoMa's special assessment districts⁵⁴. In the case of the latter, it is important to note that the heightened transaction costs associated with special districts can best be justified in the context of large infrastructure projects, or projects with high costs.

⁵⁰ FHWA Office of Innovative Program Delivery and AASHTO Center for Excellence in Project Finance. "New York Avenue-Florida Avenue-Gallaudet University Metro Center: A Case Study." Undated. http://www.transportation-finance.org/pdf/funding_financing/funding/local_funding/New_York_Avenue_Case_Study.pdf (accessed August 13, 2020).

⁵¹ Ibid.

⁵² Weiss, Marc. "Report for the OECD and the Government of Wales on the NoMa Strategic Economic Development Initiative in Washington, DC." May 2008. <https://globalurban.org/OECD%20NoMa.htm> (accessed September 1, 2020).

⁵³ FHWA.

⁵⁴ Washington Metropolitan Area Transit Authority. New York Avenue-Florida Avenue Gallaudet University Station Access Improvement Study. June 2010. <https://www.wmata.com/initiatives/plans/upload/NY-Ave-FL-Ave-Gall-U-Station-Access-Improvement-Study-Final-Report.pdf> (accessed August 13, 2020).



An aerial photograph of Bilbao, Spain, showing a mix of modern and traditional architecture. The image is overlaid with a semi-transparent blue filter. A large white wave-like line curves across the bottom half of the frame. The word "Bilbao" is written in a clean, white, sans-serif font in the upper-middle section.

Bilbao

Source: Madrugada Verde. Aerial view of Bilbao, Spain towards the Nervion river, Zubizuri bridge and promenade. Date unknown. Shutterstock, accessed in 2020. www.shutterstock.com



BILBAO, SPAIN

A port city in northern Spain, Bilbao has a population density of 8,461¹ people per kilometer with a total population of 346,843² within the municipal boundaries; 900,000 when considering the full metropolitan area (Revista of Public Works, 2017). The city's impressive density is the result of a series of revitalization initiatives undertaken during the 1990s, resulting in what was dubbed the "Mecca of Urbanism" (Masbounji, 2001) in a little less than a decade (Rodríguez and Abramo, 2008).

The municipality has in fact become a global model for urban change catalyzed by large-scale, strategic projects centered around railway and/or port infrastructure (Rodríguez, 2001). These interventions were also notably accompanied by changes to urban planning-related governance and regulations, incorporating new stakeholders and instruments to help shape development in the target areas of opportunity.

In order to better understand Bilbao's outcomes, however, it is important to understand the city's historical context prior to the interventions in question. As the capital of the Bizkaia province in the Basque Country, Bilbao has long been a commercial hub due to its strategic position for maritime trade, "protected by the mountains and by the river Nervion's estuary³" (Reis, 2011).

Spain's Industrial Revolution at the end of the century brought with it a period of great prosperity. Several industries were installed along the water, including a number of steel companies drawing on the iron ore reserves of the nearby bilbaine mountains (Reis, 2011). World War I served to further boost Bilbao's industrial activity and the city quickly became one of Europe's main steel hubs. It was the steel sector, however, that suffered the greatest setbacks in the 1970s as a result of a crisis that affected the entire metropolitan region (Serra, 2011). And the situation was further aggravated by the great flood that hit the city in the 1980s (Garrido Martínez, 2004).

Deindustrialization caused mass unemployment, albeit partly mitigated by service sector growth⁴ (Rodríguez and Abramo, 2008). The city also found itself facing safety challenges (as instigated by ETA terrorist attacks), and environmental concerns (high rates of industrial and transportation-related pollution and a failure to sanitize its waterway).

As early as the late 1970s and 1980s, the city's political leadership decided that Bilbao needed change; resultant efforts were focused on both economic revitalization and improvements to the city's built environment. These were the first policies aimed at a comprehensive strategic vision for the Bilbao metropolitan area. The urban revitalization process centered around the integration of the following three elements:

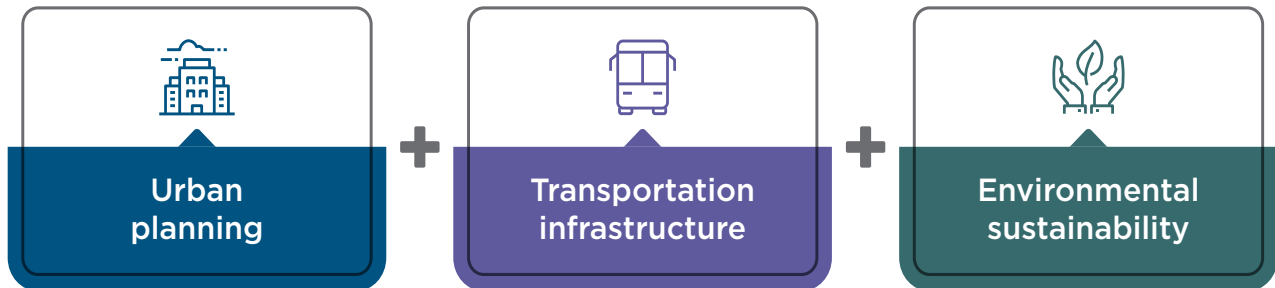
¹ https://www.eustat.eus/municipal/datos_estadisticos/bilbao_c.html

² <https://datosmacro.expansion.com/paro/espana/municipios/pais-vasco/vizcaya/bilbao>

³ "A river valley flooded by the sea, due to either a collapse in coastal lands or an increase in sea level" (Reis 2011).

⁴ "Between 1975 and 1996, the metropolitan region lost almost 50% of its industrial employment and the metropolitan area's industrial employment share was reduced from 46% to 23%. The collapse in employment was mainly concentrated in basic industry and in metal-related industries, which had accounted for more than 70% of metropolitan industrial employment in 1975" (Rodríguez and Abramo, 2008).

THE THREE STRATEGIC AXES OF BILBAO'S TRANSFORMATION



Source: Developed by the authors

This case study will focus on innovations in urban planning and management, including:

- A joint vision across all levels of governments (local, state and national) for improvements to urban planning, including both the regulatory instruments applied and the Strategic Plan for the Revitalization of the Bilbao Metropolitan Area.
- The creation of a public company and a public-private partnership as mechanisms for the management, promotion, and financing of major projects.
- Successful projects in Abandoibarra, Ametzola, and Variante Sur Ferroviária.
- Public sector financing for the construction of transportation infrastructure and sanitation projects. The price per square meter in one of the areas of opportunity in the city's Abandoibarra district was 650 Euros in 1993; six years later, that number rose to about 2,700 Euros (Otaola, 2001). This case study thus highlights the logic of land value capture for public investments and the instruments (both regulatory and institutional) that enable its execution.

Source: Migel. View of the banks of the river Nervion. Data unknown. Shutterstock, accessed in 2020. www.shutterstock.com



OVERVIEW OF BILBAO'S TOD IMPLEMENTATION



MOBILITY

Metro (opened in 1995 with two lines in the shape of a “Y”) + light rail (opened in 2004, connecting the historic center with the new economic center).



SUSTAINABILITY

- Reclamation of industrial areas
- Improvements to the river and surface water
- Construction of new waste treatment and collection facilities



LEGAL

Spain's urban regulatory framework is composed of a hierarchy of plans that are required to be compatible. Municipalities hold the power to determine land uses and to establish key urban planning parameters. In the case of Bilbao, the 1989 PGOU was the first to outline 'high priority' areas for intervention. Albeit not subsequently incorporated into the 1995 PGOU (which established a new land use structure), the existence of more detailed area plans nonetheless allowed the revitalization process to begin before its 1995 approval.

Instruments analyzed:

- 1989 and 1995 General Plan for Urban Zoning (Plan General de Ordenación Urbana—PGOU)
- 1989 Infrastructure Agreement
- 1992 Strategic Plan for the Revitalization of Metropolitan Bilbao
- 1994 Metropolitan Bilbao's Partial Territorial Plan



INSTITUTIONAL

Two institutions were created to support both the development of urban planning instruments and to implement Bilbao's revitalization projects: **Bilbao Ría 2000** and **Bilbao Metropoli-30**.



FINANCIAL

Bilbao is one of the first cases in Europe to spark urban renewal by self-financing major urban, environmental, and social projects. Land value capture strategies to recuperate public investments proved instrumental in doing so.

Bilbao Ría 2000 was tasked with finding financing sources and mechanisms outside of traditional public budgets, including land donations from the national government in redevelopment areas and land value capture.



PLANNING STRATEGY IN BILBAO

LEGISLATIVE TOOLS APPLIED IN THE BILBAO REGENERATION PROCESS

1989

General Plan for Urban Zoning (Plan General de Ordenación Urbana—PGOU)

In the wake of the aforementioned crises and the damage caused by floods, the city Bilbao produced its first PGOU. This document was the first of its kind to offer plans for the renewal of the city's blighted areas, many of which had been affected by company closures. There was recognition that it would be necessary to stem urban decline in addition to catalyzing economic development along the river (Rodríguez and Martínez, 2001). Thus, the document includes the first outlines of 'areas of opportunity' to later serve as anchors for TOD:

- Abandoibarra: 35 hectares along the banks of the river and in the city center. The region was to be converted into a new tertiary center for the city (Rodríguez and Martínez, 2001).
- Zorrotzaurre: a blighted, mixed use area, with industrial, port and residential uses—and an extension of the Abandoibarra region.
- Ametzola/Eskurtze: an area occupied by a freight railway trench. The goal was to create a new residential and tertiary commercial center.
- Abandoned mining areas of Miribilla and Morro: more than 90 hectares intended for residential uses.

This first version of the PGOU was limited to partial and fragmented urban projects, based on trends dominant in the late 1980s. Although there were calls for a more comprehensive plan, the PGOU is very much focused on the city's center and lacks the necessary attention for surrounding neighborhoods (Rodríguez and Abramo, 2008).

1989 1989-1992 Infrastructure Agreement

Following the 1989 PGOU, the state and national governments signed a pact to improve the city's transportation infrastructure. Linked with the Cities Policy adopted by the Ministry of Public Works and Transportation in the early 1990s, the cross-institutional agreement prioritized integrating transportation, urban planning, and environmental priorities.

The Infrastructure Agreement outlined a number of projects, including the expansion of the port—both its area as well as its associated rail and road infrastructure. This allowed for the dismantling of existing inland port facilities; the reclaimed land was transferred to the various municipalities to be repurposed. The port's first phase of expansion was completed in 1995 at a cost of 264 million Euros. The second phase, estimated at 149 million euros, started in 1997 and was completed in 2004.

1992 1992 Strategic Plan for the Revitalization of Metropolitan Bilbao⁵

Bilbao's revitalization proposal was inspired by the 1988 Barcelona Strategic Plan (Carmo, Montrezor and Venitucci, 2017). Its goal was to make the city: "open, diverse, integrated, modern, creative, social, and cultural" (Bilbao Metropoli-30, 1990). To achieve this, aggressive marketing tactics were applied to renew use and attract new resources (Carmo, Montrezor and Venitucci, 2017).

Part of this process was the creation of the Bilbao Metropoli-30, as outlined below. Tasked with coordinating and assisting the strategic plan's implementation, the association played a fundamental role in projecting a vision for the metropolitan area's future⁶.

While the transformation of Bilbao may seem like a fully planned process, according to engineer Pablo Otaola Ubieta, general director of Bilbao Ría 2000 from 1993 to 2000 and manager of the Zorrotzaurre Management Commission from 2004 to 2017, it was actually one of consensus and coordination. The Strategic Plan proposed interventions across a wide array of areas, from infrastructure to economic development to cultural renewal. It also brought together public and private sector actors to help plan the city's future. (Revista de Obras Públicas - ROP, 2017).

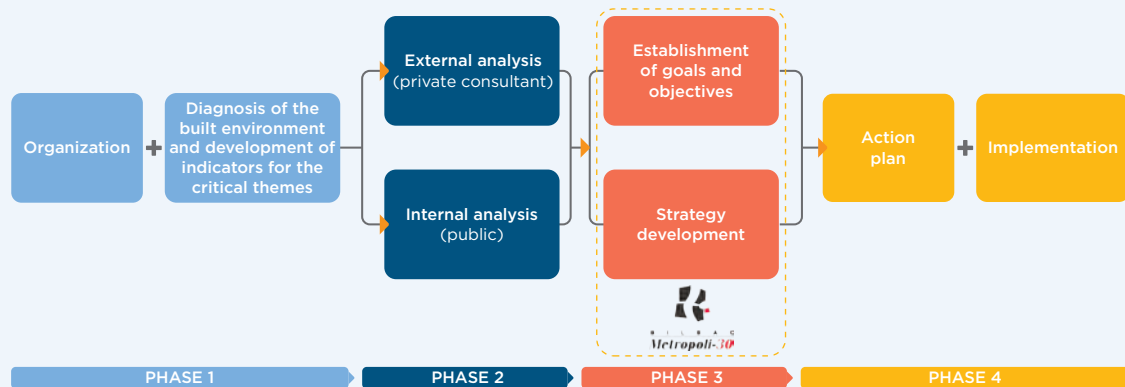
⁵ <https://www.bm30.eus/fines-y-objetivos/planificacion-estrategica/plan-estrategico-de-revitalizacion/>

⁶ The metropolitan region of Bilbao, made up of 35 municipalities, was previously considered an institution (El Gran Bilbao); it is currently one of the functional areas as defined by the Basque Country Ordinance Guidelines. The Diputación de Vizcaya is in charge of integrating planning and mobility in the area according to the Partial Territorial Plan of Bilbao Metropolitana. Plans developed at lower levels of government follow the land use regulations and guidelines established at this regional level.

The plan was divided into four phases⁷:

- I. **Exploration and identifying critical themes:** Detailed studies were conducted for all intervention areas by around 100 professionals from different sectors, including representatives from both the public and private sectors. Seven critical themes were identified, which served as a basis for the plan's development and execution: (i) investment in human resources; (ii) services in a modern industrial region; (iii) mobility and accessibility; (iv) environmental regeneration; (v) urban regeneration; (vi) cultural centrality; and (vii) public-private cooperation. (Fernandez Güell, 2000)
- II. **Analyzing critical themes:** This phase involved developing a deeper understanding of the threats, opportunities, strengths, and weaknesses present within each of the critical themes, according to the SWOT framework: Strength, Weakness, Opportunities, Threats (Fernandez Güell, 2000).
- III. **Goals, objectives, and strategies:** Short-, medium-, and long-term objectives were stipulated, including strategies to help Bilbao achieve global prominence. One of the most ambitious goals envisioned the transformation of the city into a "cultural metropolis," as catalyzed by the construction of the Guggenheim Museum. An eighth critical theme—social action—was added at this stage in the plan (Fernandez Güell, 2000).
- IV. **Action plan:** The plan was implemented in the fourth phase, with the help of public-private partnerships and administrative frameworks (Fernandez Güell, 2000). The plan's eight main guidelines are as follows (Reis, 2011):
 - Invest in human resources in order to support a modern educational system.
 - Transform the city's global image into an advanced service economy with modern industry.
 - Improve the transportation system, including construction of the metro, port improvements, expansion of the airport, and improved connections to large roads and highways with the goal of making Bilbao more easily accessible from other European destinations.
 - Environmental regeneration, including air quality improvements and executing the Águas da Ría Regeneration Plan.
 - Urban regeneration through the rehabilitation of abandoned industrial spaces and deteriorating old neighborhoods.
 - Invest in anchor projects, such as the Euskalduna Palace, and several paths, bridges and parks, to develop an image associated with art, culture, and leisure.
 - Develop multiple strategies for coordination across the public and private sectors.
 - Social actions aimed at more efficient resource management and the gradual reduction of structural exclusion.

STRATEGIC PLAN FOR THE REVITALIZATION OF THE BILBAO METROPOLITAN REGION (1992)



Source: Developed by the authors with data from PERBM 1992

1994 Metropolitan Bilbao's Partial Territorial Plan

The plan's initial proposal was to repurpose lands along the river with obsolete industrial, port, or railway uses or with precarious housing situations for new productive or residential uses (DU-VMA, 1994). The recovery of these derelict areas was an opportunity to promote urban growth in city's historically dynamic areas (Leira and Quero, 1992).

Nervi3n Avenue, one of the city's main avenues, was to serve as the transformation's catalyst. It would be executed with a mix of public investments, European funds, and profits generated by the sale of redeveloped land (land value capture). It would be managed by Bilbao R3a 2000, which had already started work in two areas of opportunity: Ametzola and Abandoibarra. The estimated cost to finance the project was around 430 million Euros (excluding land prices).

After several studies and preliminary projects, the official plan was finally presented in 1997. Economic challenges and a lack of agreement across institutions ultimately forced the team to consider alternative approaches (Rodr3guez and Abramo, 2008).

1995 General Plan for Urban Zoning (Plan General de Ordenaci3n Urbana—PGOU)

The guidelines outlined in the 1992 Strategic Plan were officially adopted with the approval of the 1995 PGOU. The Plan included new land uses to support Bilbao R3a 2000's urban regeneration efforts. Nonetheless, several projects had already been started prior to the PGOU's approval, based on existing Special Interior Reform Plans.

Although still in force, the 1995 PGOU is already being reformed to better respond to current needs. The process of reforming the document began in 2013 with a participatory urban diagno-

**Source:**

(left) <https://willyuribe.wordpress.com/2011/11/13/el-skyline-de-bilbao/>

(right) Erlantz P.R. Views of the Abandoibarra promenade next to the river in Bilbao, Spain. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

sis, followed by the process of general information plans, completed in 2015. The new version will take effect in the first quarter of 2021 and will guide Bilbao for the next 15 years, pending City Council approval⁸.

The new PGOU's⁹ proposals include:

- Strengthening the role of the river as a central structural axis.
- Structuring urban development efforts to achieve complex, inclusive, safe, and sustainable neighborhoods and urban spaces based on:
 - Mixed-use
 - Creating and strengthening urban centralities and/or decentralized neighborhoods.
 - Planning for inclusive and safe urban environments.
 - Sustainable mobility.
- Responding to urban demands, while minimizing their effects on the environment, including:
 - Consolidating the current urban environment.
 - Continuing urban regeneration and renewal processes, particularly in line with the provisions of the 1995 General Plan (Zorrotzaurre, Bolueta, Peñaskal, Abando Estación, Olabeaga, Punta Zorrotza, Elorrieta)
- Organizing open space:
 - Developing an open space network, with a total area of approximately 310 hectares. The resulting average access would be 7.64 inhabitants/m².
 - Managing an important rural public park (approx. 1,478 hectares), including integrating it with the Green Belt.
 - Strengthening large urban parks.

⁸ <https://www.deia.eus/bizkaia/bilbao/2020/01/30/bilbao-propone-viviendas-pgou-excluir/1014809.html>

⁹ http://bilbao.net/cs/Satellite?c=BIO_Noticia_FA&cid=1279185280604&language=en&pageid=3000005562&pagename=Bilbaonet%2FBIO_Noticia_FA%2FBIO_Noticia



KEY ACTORS IN TRANSPORTATION IN BILBAO

Strategic planning was one of the great innovations of Bilbao's urban policies in the 90s. It became necessary, however, to move from planning to action; a feat which was achieved through technical expertise from City Hall and through the creation of two key institutions: Bilbao Metropoli-30 and Bilbao Ría 2000.

1991 Bilbao Metropoli-30 (BM30)

A public-private association created in 1991, BM30 is responsible for the planning and promotion of revitalization projects in the Bilbao metropolitan area. It was created by the 1992 Strategic Plan as a mechanism for stakeholder participation. The objective, at the time, was to bring together public institutions (municipalities, *diputación*¹⁰, and the Basque government), the region's main companies (Iberdola, Petronor, IDOM), banks (BBVA, Kutxabank), communications companies (El Correo, Deia), transportation companies (Renfe), and universities (Deusto, UPV), among others.



In 2001, there were 133 public and private institutions represented as part of the association (Rodríguez and Abramo, 2008). That same year, BM30 presented a new proposal: Bilbao 2010. The goal was to build on the success of the previous plan—to make urban, social, and environmental interventions profitable for the ensuing decade and to convert Bilbao into a “global city” (BM30, 2001). To this end, the proposal identified four key areas: (i) active and committed leadership, (ii) people and their values, (iii) knowledge and innovation, and (iv) networking and development of city networks (Rodríguez and Abramo, 2008).

One of the main functions of the BM30 is to promote and improve Bilbao's global image. Over the last 30 years, the association has thus hosted a number of exhibitions, meetings, and technical studies, and disseminated information about proposed and completed projects.

1992 Bilbao Ría 2000 (BR2000)

Created in 1992, Bilbao Ría 2000 is a public company that combines representatives from the Ministry of Transport and Public Works, the Basque government, the *diputación foral*¹¹ of Bizkaia, and the Municipality (Ayuntamiento) of Bilbao. It is a pilot project for a new approach to urban planning in Spanish cities— one that can quickly and flexibly take advantage of European Union aid for Bilbao's urban, environmental, and economic regeneration efforts (Ubieta, 2017).



¹⁰ The city's corps of deputies.

¹¹ The Provincial Council of Bizkaia (*diputación foral*) is the government of the territory of Bizkaia, one of the main institutions of the Autonomous Basque Community - <https://web.bizkaia.eus/eu/aldundia-ezagutu>

BR2000's assets consist of land provided by state institutions or companies. Its mission is thus to finance infrastructure and urban services through land value capture.

BR2000 works on municipal projects within the metropolitan area of Bilbao in the fields of urban planning, transportation, and the environment, along both banks of the river. The company has 20 individuals on its Board of Directors, and, to ensure consensus and lend strength to its outcomes, decisions are made unanimously. Council participants include representatives from all levels of government as well as public institutions such as Renfe (passenger and freight rail), Sepes (responsible for public land management), and the National Institute of Industry (INI).

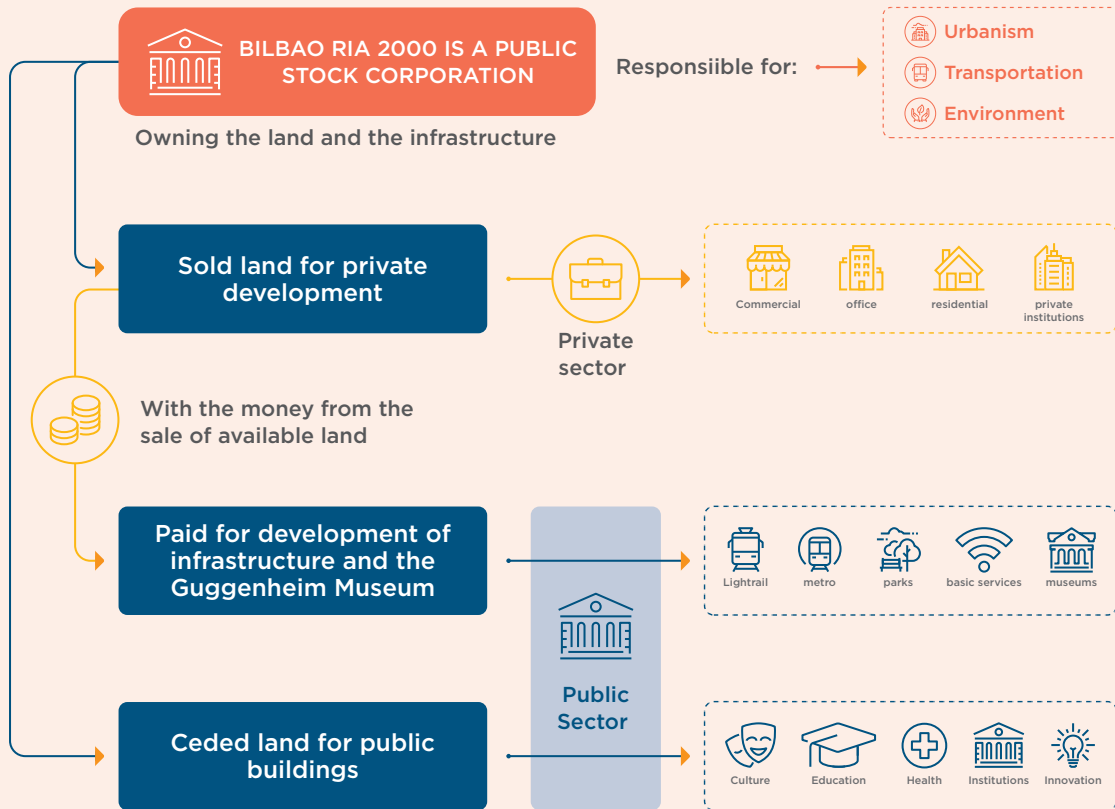
BR2000 initially received a financial contribution of 2 million Euros from each municipal participant, but the intent thereafter was for the organization to receive its financing from other sources:

- The parties that were part of BR2000 donated land in areas targeted for transformation efforts
- Municipalities were responsible for land use changes as outlined in the PGOU
- Based on the land use changes, BR2000 sold certain land parcels targeted for mixed-use development to private developers
- The resultant funds collected from the sale of land were then invested in the construction of sanitation and transportation infrastructure and public space.
- Approximately 10 percent of the financing for the projects came from European structural funds (Feder and Urban). The remaining 90 percent, showing the organization's self-financing prowess, was obtained through the sale of land (Ubieta, 2017).



Source: Ramon Espelt Photography. Moyua subway station, designed by Norman Foster. Maio, 2019. Shutterstock, consultado em 2020. www.shutterstock.com

BR2000's performance



Source: IDOM

Approximately 65% of BR2000's funds are used for urban projects, with the remaining 35% set aside for other projects, which have, for the most part, already been carried out, including the Variante Sul Ferroviária, the Bilbao tram, the Renfe station in Santurzi, and metro in Bansurto (Ubieta, 2017).

Bilbao's La Vieja neighborhood—previously one of the city's most run-down districts—serves as model case study for the organization. The recovery plan spanned multiple administrations and BR2000 collaborated on several projects in the area for a total cost of 20 million Euros, obtained through land value capture efforts in Abandoibarra (Ubieta, 2017).

KEY BENEFITS AND CHALLENGES ASSOCIATED WITH BM30 AND BR2000

BENEFITS:

- **Social:** land value increases captured as part of the projects were invested in public works and infrastructure, including affordable housing, building rehabilitation in the city's historic center, and transportation infrastructure, improving overall quality of life. BM30's strategic vision enabled the construction of numerous regional facilities, including museums, auditoriums, libraries, universities, cultural centers, etc.
- **Economic:** the (self-financed) infrastructure investments along the river were catalysts for economic growth in the metropolitan region. Bilbao managed to leverage the urban transformation of the city to attract both tourists and industry.
- **Environment:** GHG emissions were reduced through: (i) improvements to public transit associated with fewer private vehicle trips; (ii) the conversion of industries to tertiary uses; (iii) construction of pedestrian bridges across the estuary to encourage bicycle use and walking; (iv) the construction of urban parks ("green lungs"); and (v) the improvement in waste management systems, among others.



PROCEED ▶



Source: Ratikova. View to the centre of Bilbao. Junho, 2015. Shutterstock, consultado em 2020. www.shutterstock.com

CHALLENGES:

- Efforts towards profit maximization based on the short-term benefits of some projects have led to speculation in some areas of the city. It is the responsibility of public institutions to provide the necessary mechanisms to control, to the extent possible, such outcomes.
- Some projects have been sidelined as a result of their peripheral locations or more limited commercial potential. Instruments to ensure public participation are important to establish a balance between economic viability and community interests.
- As a metropolitan region without representation from each municipality, efforts to coordinate PGOU's across all municipalities in alignment with the Strategic Plan proved challenging.
- Since public participation is mandatory as part urban planning processes in Spain, a lack of consensus on land use strategies resulted in delays for some municipalities.
- Construction delays and land use readjustments have meant that some medium-term projects have become long-term ones.



Source: Toniflap. Girl playing with paint in Casilda Iturrizar Park, Bilbao. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



The cases of Abandoibarra - Ametzola - Variante Sur

One of the keys to BR2000's success was the combination of long-term plans and strategies with short-term actions. It was thus possible to carry out interventions to help citizens quickly visualize the project's essence without losing sight of its end goal (Ubieta, 2017). That was the case with the Abandoibarra-Ametzola-Variante Sur joint project.

Projects were divided into phases, the first of which was most important to help shape public opinion. Work began in **Abandoibarra**¹² in 1998 on access and pedestrian routes to the Euskalduna Palace (opened the following year) and on the first stretch of the main avenue.

The demolition and reconstruction of the Ribera pier, the urbanization of Abandoibarra Avenue and Ribera Park (which connects the Guggenheim Museum with the Euskalduna Palace), and the construction of the Pedro Arrupe pedestrian walkway are other key initial actions taken as part of the planned interventions (Bilbao Ría 2000 - Revista 1, 2000).

Abandoibarra also boasts a mixture of land uses—one of TOD's key characteristics—combining leisure, business, culture, and residential uses,

and 115,000 m² of open space. The region has a good public transit system, with connections via tram and metro to the rest of Bilbao.

Architect Cesar Pelli developed the plans for the area's regeneration and a number of buildings were designed by renowned architects, including Frank O. Gehry, Ricardo Legorreta, Robert Krier, Alvaro Siza, and Robert Stern, as well as Spanish architects Carlos Ferrater, César Portela, Rafael Moneo, Luis Peña Ganchequi, Federico Soriano, and Eugenio Aguinaga (Ubieta, 2017).

Due to its emblematic nature, the Guggenheim Museum has become in many ways a symbol of Bilbao's transformation process. Designed by Frank Gehry and inaugurated in October 1997, the building serves as proof that cultural policy can be an instrument for urban regeneration (Bianchini and Parkinson 1993; Kearns and Philo, 1993; Gómez, 1998). The construction of the museum cost an impressive \$144 million Euros—paid for fully by public funds (Rodríguez and Abramo, 2008).

The Euskalduna Palace, meanwhile, also plays an important role in this regard. Since the opening of the Guggenheim Museum, the Palace has played a fundamental role in attracting tourism as a complement to the museum (Rodríguez and Abramo, 2008).

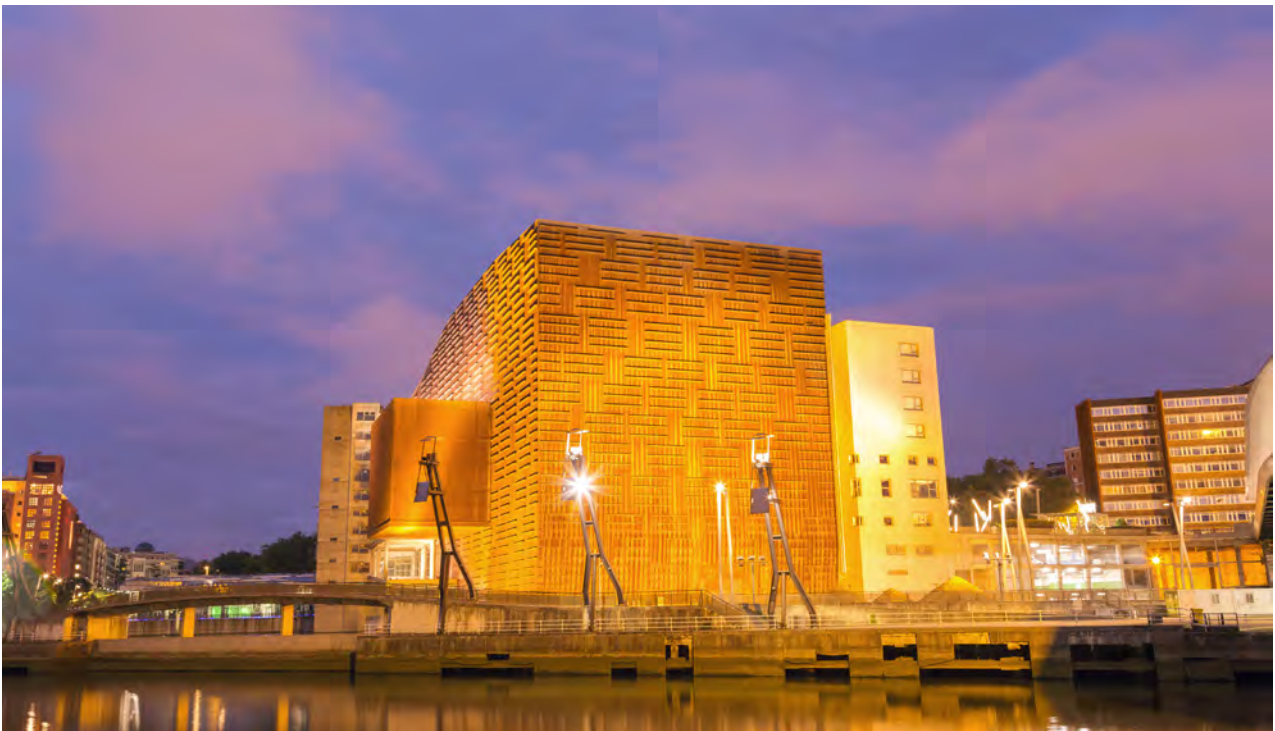
¹² A 35-hectare industrial enclave in the residential and tertiary heart of Bilbao along the edge of the river. Almost all of the land (95%) belongs to companies and public entities such as Renfe, INI, the Port Authority and the Ayuntamiento de Bilbao. It served as the starting point for the Bilbao Ría 2000 interventions.

↓ **FIGURE** - GUGGENHEIM MUSEUM



Source: Iakov Filimonov. Guggenheim Museum Bilbao. Julho, 2015. Shutterstock, consultado em 2020. www.shutterstock.com

↓ **FIGURE** - EUSKALDUNA PALACE



Source: javitrapero.com. Euskalduna conference centre and concert hall. Julho, 2017. Shutterstock, consultado em 2020. www.shutterstock.com

↓ **FIGURE** – PEDRO ASSUPE PEDESTRIAN BRIDGE IN ABANDOIBARRA



Source: ICM. Pedro Arrupe bridge and Iberdrola Tower. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

One of BR2000's first interventions, the area in **Ametzola** targeted for regeneration included three railway stations with 110,000 m² of unused cargo belonging to Renfe and Feve. The project invested about 90 million Euros to build a better connection between the southern area of Bilbao and the city's center, removing the physical barrier of railway lines (Ubieta, 2017).

Development slowly gained steam after the gradual removal of derelict buildings along with some remaining freight railway tracks, and some small workshops. The Ametzola area is thus

in many ways an example of a comprehensive recovery involving various spheres of activity, including urban planning, transportation, architecture, landscape architecture, and more (Castellano, 2004¹³).

A 36,000 m² park was also constructed as part of the mixed-use project, boasting more than 400 trees from differing species. Considered a true "green lung", the park was designed by Javier López Chollet and Marta Dalmau who had won a design competition organized by BR2000 (Ubieta, 2017).

13 https://www.bizkaia.eus/fitxategiak/04/ondarea/Kobie/PDF/6/Bilbao_regeneracion_kobie_7_IV_-_%20LUGARES%20DE%20INTERVENCION%20Y%20ADAPTACION%20URBAN%20DST.pdf?hash=d6d6e0eb68cee15ddb08324489d7be37

Transit Oriented Development

Around 900 residential buildings were built, as well as new streets and public spaces, public parking lots, and a new underground station that offers access to the intercity urban train. Including planning and execution, the full Ametzola revitalization project took approximately 15 years.

The 1995 Special Plan for Ametzola provided the legal framework for the TOD project associated with the new underground train station in the district, outlining land uses and regulations for the project area.

The municipality of Bilbao, in concert with BR2000 and the Special Plan, used a PGOU mechanism to convert a largely industrial area defined by its railways into a residential area with 1,731 houses and a large urban park adjacent to a public transit station (Castellano, 2004).

The construction of the underground (regional and urban) passenger train station attracted new residents and, as a result, new customers for both existing businesses and new ones that emerged as demand grew. And, beyond the economic benefits, the conversion of the freight hub to a park also improved air quality and helped to reduce the environmental impact of the district.

↓ **FIGURE - AMETZOLA PARK**



Source: Bilbao Ría 2000



Ametzola, beginning of the 1990s

15 years later



Ametzola, 2007

Source: bilbaopedia.info

↓ **FIGURE** – AVENIDA DEL FERROCARRIL AND AMETZOLA PARK



Source: Bilbao Ría 2000

It is important to note that Bilbao Ría 2000 was an organization dependent on funds largely self-generated from housing projects, and thus only undertook projects for which there would be a guaranteed surplus—to help support new projects and proposals. Even so, the new residential areas in the district consisted of 17 percent affordable housing units.

The Ametzola and Abandoibarra projects were both part of the umbrella Variante Sur Ferroviaria project, which aimed to reorder the railway system for both passengers and goods (Rodríguez and Abramo, 2008) by building four new suburban stations and engaging in a number of other re-

talization projects¹⁴. The goal was to integrate the railway, metro, tram and bus systems in order to improve both accessibility to the southern parts of the city and the overall quality of the region's public transportation system.

The vision of the project was thus to better take advantage of the train system as a means of urban transport. Before BR2000's interventions, the railway served as a barrier: the line that passed by Abandoibarra and Uribarte isolated the Ensanche de Ría and the freight railway trench along the Avenida del Ferrocarril in Ametzola created an urban obstacle between the Basurto, Rekalde, and Ensanche neighborhoods (Bilbao Ría 2000¹⁵).

¹⁴ The work included the construction of the new stations in Ametzola, Zabálburu, Autonomía and San Mamés, the remodeling of the Abando and Olabeaga stations, and the creation of the new Avenida do Ferrocarril on the covered route (Memoria Bilbao Ría 2000, 2001).

¹⁵ <http://www.bilbao2000.org/ria2000/cas/zonas/zonas.aspx?primeraVez=0>

The Variante Sur Ferroviária project cost around 120 million Euros (Ubieta, 2017), financed through the sale of re-urbanized land in the Abandoibarra and Ametzola areas (Rodriguez and Abramo, 2008)—value that was unlocked in part

by eliminating the railway barriers and the railway system’s integration with the city’s metro system. The railway thus became a tool for urban development, abandoning its prior role as a barrier to regeneration (BR2000).

↓ **FIGURE - PROPOSED CHANGES TO THE RAILWAY SYSTEM.**



Source: OpenStreetMap

Contributions of the case

This case study mainly revolves around two key components: the institutional structures created for the development and execution of Bilbao's urban regeneration projects and the related legal and financial instruments applied in developing a new land use structure for the areas associated with the redesign and expansion of the public transportation system.

The successful implementation of several plans and projects is due, in large part, to the continuity of the plans themselves, regardless of changes in government or political positions. This long-term vision, as shared across the different institutions and levels of government was fundamental to the success of the revitalization process.

In the case of Bilbao, great social, economic, and environmental crises were necessary to catalyze the creation of an institution capable of integrating strategies (mobility, urban, social planning, etc.) and identifying areas of opportunities for TOD. Many projects would likely not have been executed without the leadership Bilbao Ría 2000, requiring clear institutional leadership in moments of crisis. The creation of the company thus streamlined processes and facilitated the economic viability of projects.

It is important to note that many of the projects that were carried out, including the Guggenheim itself, faced strong public opposition. The projects were still executed as the 2006 Land Use Law requiring public approval for projects had not yet been passed. A key lesson learned is thus the need to clearly and effectively communicate the social benefits and impacts of projects to ensure that public opposition doesn't preclude the execution of key projects aimed at positive urban transformations.

Several cities have notably tried to replicate the Bilbao experience, relying on the construction of iconic landmarks (like the one built by Frank Gehry) to catalyze urban regeneration in times of economic or social crises. Yet the solution is never so "simple". In the case of Bilbao, landmarks

were just the tip of the iceberg in a series of measures, including land uses changes along the river and the reorganization of the city's entire public transportation network (metro, bus, tram, etc.).

Bilbao's efforts over the last several years serve as the beginning of a new stage of urban development and planning, boasting a high degree of consensus and collaboration across institutions at different levels of government (local, regional, and national). The main recommendations from the case thus include:

- Improving the flexibility and efficiency of interventions.
- Developing a Strategic Plan which includes policies and strategies related to urbanism, transportation infrastructure and urban services, and the improvement and protection of the environment.
- Adopting a strategic and entrepreneurial management model.
- Creating a private company with capital and public participation as an instrument whose main objectives include: (i) prioritizing interventions, (ii) sales of land and public properties, and (iii) management of public funds for investments.
- Managing demands and collaboration efforts across different levels of public institutions—one of the backbones of successful large urban projects. Bilbao has dubbed this consensus-based urban planning.
- Self-financing of infrastructure through land use changes and strategic interventions, helping to balance public budgets.
- Balancing highly profitable projects with social projects, such as affordable housing, through integrated operations.
- Identifying additional support; European cooperation funds financed 10% of the BR2000's total investment.

It is also necessary to stress some challenges as observed in the process, however. BR2000 anticipated that projects in strategic areas could be fully supported by capturing land value increases from the sale of land to private individuals: the idea was a win-win relationship (maximizing gains for everyone when considering environmental, social, and economic terms). In practice, however, self-financing is a myth: public investment is needed (public funds, funds from international organizations, refinanced loans, and private funds, among others) to catalyze any urban development. In this case, land value capture on its own was not sufficient to develop large-scale projects.

It is also important to note that large-scale projects of this type tend to promote gentrification. It is thus the responsibility of the public sector

to anticipate such developments and to protect the local population from removal, in addition to establishing land reserves or mechanisms to ensure the development of affordable housing, resources, and quality public spaces.

One of the weaknesses of the Bilbao model was the absence of risk for the private sector; there is less at risk when purchasing already-urbanized land. An ideal situation would involve more private sector risk earlier in the process, and joint investment in infrastructure and services.

Finally, the lack of public participation in the project design process meant that profitability and financial viability drove land use changes in some cases. Further, the projects' larger-scale interests were sometimes treated as secondary to capital gains maximization or short-term land appreciation.

Source: Botond Horvath. Nice view on the famous city of Bilbao, Spain. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



London





LONDON

The population of London and its metropolitan area totaled 9,176,530¹ in 2019, making it the UK's largest urban center. London is configured to be a regional center connected with all of England, as supported by its growth and development along the banks of the river Thames. It is also the third largest city in the Europe and one of the world's most important financial centers.

London is thus a city that requires multimodal connectivity both at the national and international levels. And, in the 1980s—with the goal of maintaining London's role as a global pole—the city began a process of identifying areas for renewal that could serve as catalysts for development, helping to manage the city's growth, while improving its global connectivity. TOD principles have played an important role in these efforts and King's Cross Station and its surrounding area offer an effective example of their implementation.

King's Cross consists of 25.8 hectares near a historic railway station located between Camden and Islington—two central London neighborhoods. Despite its promise, the area had become derelict during the city's era of deindustrialization, with a plethora of disused buildings and struggling inhabitants facing rampant unemployment and public health problems (Gasco, 2019)².

The urban regeneration strategy applied was based on the premise that despite characteristics and circumstances that are unique in each location, there are common, overarching objec-

tives that can improve overall quality of life. To achieve those objectives, sustainable communities need to meet the following conditions (ARUP, 2004)^{3,4}

- Good streets, parks and places where people can meet.
- Good schools, shops, jobs and services.
- Safe, well-managed and maintained
- Affordable and market housing
- Well-connected by public transport
- Places where people are proud to live

To achieve the above necessitates actions and interventions tailored to local circumstances, including legal agreements for land value capture, sustainable strategies, and financially viable proposals (Argent, 2001).

Further, the goal of the plan was not solely the transformation of the immediate area surrounding King's Cross, but that the effort also might serve as a replicable model at the local and even national levels.

Today, the project, dubbed King's Cross Central, encompasses a total of 80 hectares and ranks as one of the greatest examples of brownfield⁵ redevelopment in the center of a capital city. And, with both train and metro stations (St. Pancras International and Kings Cross St. Pancras), the area is also recognized for its incomparable transportation connectivity at the local, regional, national, and international levels (Gasco, 2019).

¹ Office for National Statistics (ONS).

² Gasco, Anna. 2019. 'King's Cross London, New piece of old London. The Grand Project'. Em *The Grand Project: Understanding the Making and Impact of Urban Megaprojects*, edited by Kees Christiaanse, Anna Gasco, and Naomi C. Hanakata, 453-510. Nai 010 Publishers.

³ ARUP (Abril, 2004). *King's Cross Central – Regeneration Strategy*. Disponível em: <https://www.kingscross.co.uk/media/37-regen-strategy.pdf>.

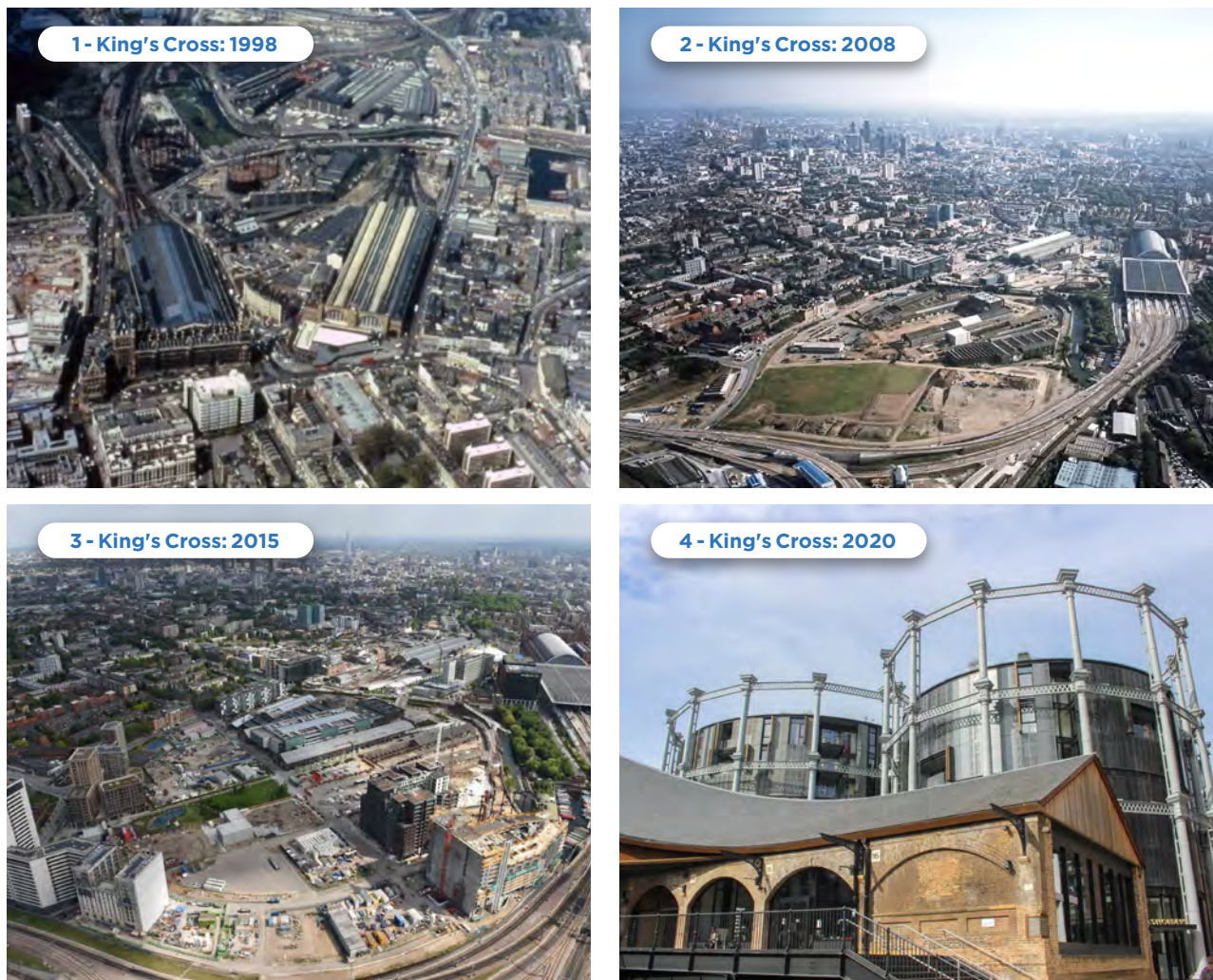
⁴ John Prescott, Prince's Foundation "Traditional Urbanism" Conference, November 2003

⁵ A term used to refer to a site in a city previously used for industrial uses and which therefore potentially still contains of dangerous, polluting, or contaminating substances.

The success of this case study can be linked to two driving factors. The first is the strong influence exerted by government entities throughout the process, offering a stability that ensured the project's feasibility and help-

ing to identify solutions that benefited all parties. The second was the complex collaborative process undertaken for the area's design process, including extensive stakeholder participation, incorporating the local population.

↓ **FIGURE** - AREA AROUND KING'S CROSS BEFORE AND AFTER RENOVATION



Source: (1-3) LCR; (4) CK Travels. Coal Drop's Yard and Gas Holder Park accommodation, King's Cross, London. Agosto, 2020. Shutterstock, consultado em 2020. www.shutterstock.com

OVERVIEW OF TOD IMPLEMENTATION IN LONDON



MOBILITY

Metro + train + BRT + taxi + HS1 (high speed train offering a connection with Paris).



SUSTAINABILITY

Green Transportation⁶: a mobility strategy that aims to change the population's mode choice. The plan's goal is for 80% of the population to use active transportation or public transit by 2041 and for zero GHG emissions by 2050.



LEGAL

With regards to urban planning policies and regulations, TOD principles are in compliance with the London Plan, which, in turn, complies with national planning policies. In the case of King's Cross, a law was created to dictate financing for the projects, which is intended to be applied in similar initiatives in the future.

Instruments analyzed:

- National Planning Policy, 2019⁷
- The London Plan, 2011⁸
- Planning and Compulsory Purchase Act, 2004⁹
- Section 106 Agreements¹⁰
- Mayor's Transport Strategy, 2018¹¹

⁶ Greater London Authority. (November, 2019). Green Transport. Available at: <https://www.london.gov.uk/what-we-do/transport/green-transport>

⁷ National Planning Policy Framework (NPPF): outlines the government's planning policies for England and the way they are expected to be applied.

⁸ The London Plan: a special development strategy for London and its surrounding metropolitan region.

⁹ Planning and Compulsory Purchase Act: establishes Local Development Milestones and Local Development Documents.

¹⁰ Section 106 (S106) Agreements: legal agreements between local authorities and developers linked to planning permissions and obligations. They incorporate public-private financing principles.

¹¹ Mayor's Transport Strategy 2018: aims to change the way people choose to travel and sets goals related to the environment.



INSTITUTIONAL

There are three levels of government responsible for planning initiatives and regulations in the city of London. There are two designated bodies responsible for the renovation and operation of the railways.

Key planning entities

- The governments of the boroughs that make up Greater London. Each has its own Council; the Camden Council is responsible for King's Cross.
- The Greater London Authority (GLA), divided into two: the London Assembly and the Mayor of London, with the latter responsible for the London Plan.
- Department for Transport (DfT)¹²
- London and Continental Railways Limited (LCR)
- Transport for London (TfL)¹³



FINANCIAL

For several decades, attempts in the UK to implement land value capture mechanisms have failed due to strict rules and laws. The Planning Law managed to institute some taxes and agreements as presented below only in 1990.

Instruments analyzed

- Business Rate Supplement (BRS)
- Public infrastructure taxes
- Section 106 agreements
- Taxes on the development of commercial property

¹² Responsible for the planning of and investments in transport infrastructure in the United Kingdom. The DfT works with agencies and partners to support transportation networks for people and freight.

¹³ The local government agency responsible for most issues related to London's transportation systems. Its role is to implement strategies and to provide transportation services.

ENTITIES INVOLVED IN THE LONDON PLANNING PROCESSES AT ALL LEVELS OF GOVERNMENT



GOVERNANCE LEVEL 1 – LOCAL ENTITIES: BOROUGH GOVERNMENTS

Greater London is made up of 32 boroughs, each of which is governed by a Council. The Camden Council approved the Master Plan for the regeneration project of the area surrounding King's Cross Station in 2006. This level of government is responsible for approving plans and developments and for providing all of the pertinent documentation.



GOVERNANCE LEVEL 2 – METROPOLITAN ENTITIES: GREATER LONDON AUTHORITY

The London Assembly is responsible for overseeing project tasks and ensuring that commitments are met. In planning matters, the Assembly supports the policies proposed by the Mayor as part of the London Plan.

LONDON ASSEMBLY

The Mayor of London is responsible for the development and formulation of the London Plan, but also for Local Development Plans, thus ensuring compliance with the objectives specified by the legislation.

MAYOR OF LONDON

GOVERNANCE LEVEL 3 – MINISTRY OF HOUSING, COMMUNITIES & LOCAL GOVERNMENT

The Ministry of Housing, Communities and Local Government is tasked with creating housing and employment and training the local population.



**Ministry of Housing,
Communities &
Local Government**

LONDON'S PLANNING STRATEGY



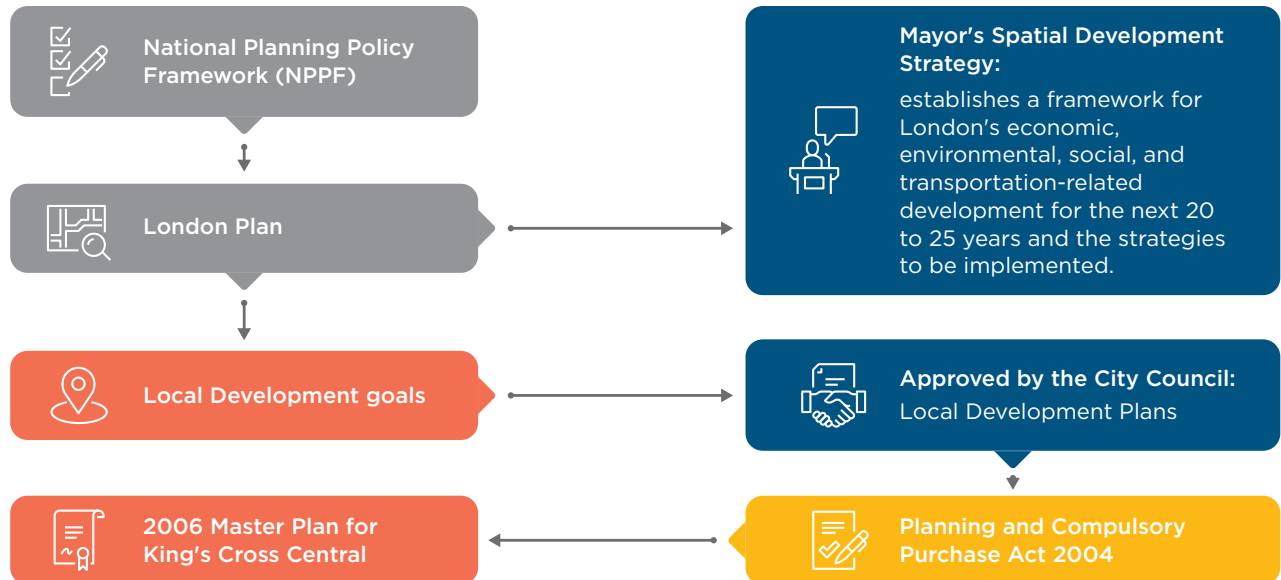
LEGAL:

Urban design plans in English cities face the peculiarity of being subject to regulations and approvals from different institutions. TOD projects are guided by the Master Plan. This allows for flexibility in land use to ensure that the necessary changes are made based on a project's needs.



Source: Charles Bowman. St. Pancras station clocktower reflected in a pond in Pancras square. Janeiro, 2019. Shutterstock, consultado em 2020. www.shutterstock.com

Planning hierarchy for London and its metropolitan region



The Case of King's Cross Central

Regeneration plans for King's Cross were first developed in the mid-1980s. Due to the UK's economic recession in the 1990s, however, none of them advanced. Ultimately, two factors contributed to finally making the regeneration a reality: the decision in 1996 to direct the first British high-speed rail project to St. Pancras Station; and the ranking of King's Cross as one of 38 Areas of Opportunity in the 2004 London Plan, as prepared by the GLA (Gasco, 2019).

Developers were chosen through an open selection process that included the criteria of a par-

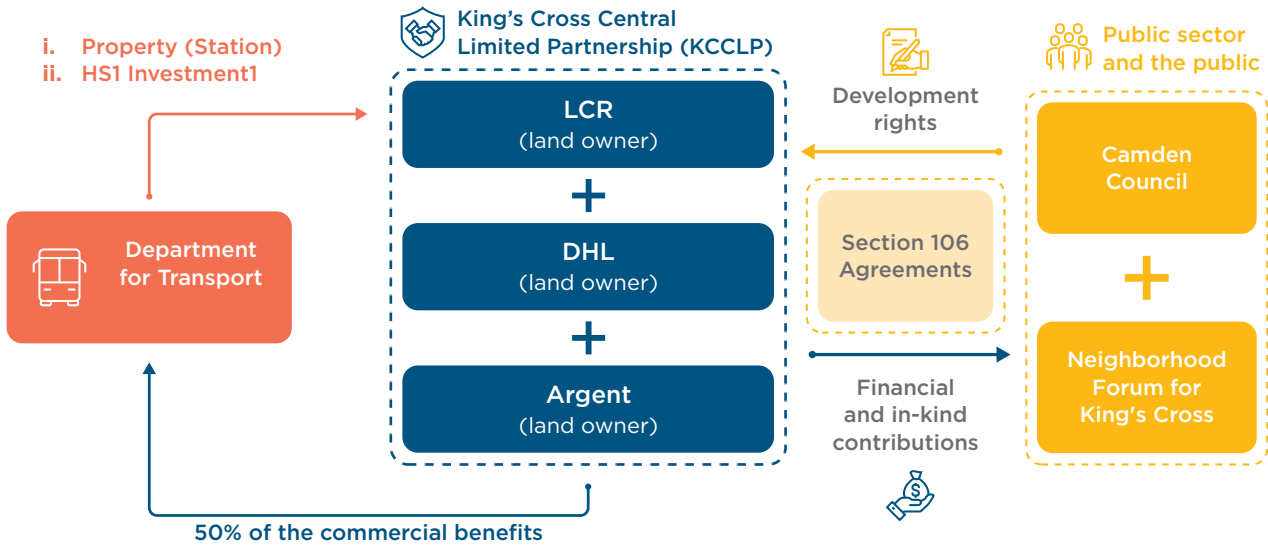
ticipatory approach and the ability to work with different actors. Based on this, in 2000, the then owners of the area selected UK real estate developer Argent as a partner. Then began what many describe as an economic and political process—beyond just the drawing of a master plan.

The first version of a plan for the area of King's Cross Central was delivered to the Council of Camden four years later; consent was given in 2006 and development began in 2008. The latter came after Argent, LCR¹⁴ and DHL¹⁵ formed a formal partnership: King's Cross Central Limited Partnership (KCCLP).

¹⁴ London and Continental Railways Limited (LCR) was established in 1996 as a private consortium for the construction and operation of HS1 – a high-speed rail system that aimed to help spur regeneration in central London. Since 2009, LCR is owned by the national government, since the costs of building the system exceeded the initial forecast, requiring acquisition.

¹⁵ DHL Supply Chain (formerly Exel) is the world's leading supplier of logistics contracts and an owner of land in the King's Cross Central area.

THE PARTICIPANTS INVOLVED IN THE KING'S CROSS CENTRAL MASTER PLAN



Source: Based on the World Bank 2017.

It took six years to develop a plan in partnership with landowners, local governments, and community groups. The GLA, responsible for planning large developments in the city, appointed the Camden Council to lead the process at King's Cross. That resulted in the Camden King's Cross Team, which played a crucial role in the negotiations to ensure that the area's development included benefits for the local community, including residential units that were accessible for different socioeconomic groups, community facilities, public space, and employment centers (Gasco, 2019).

Community engagement started as early as 2001, led by the Camden Council and Argent. The 'Principles for a Human City'¹⁶ were pub-

lished the same year to serve as a basis to instigate the discussion with the local community. The document's 10 principles were used to shape the overall "sense of place" at King's Cross and to create the necessary conditions to maximize long-term social value. They include:

1. A robust urban framework
2. A lasting new place
3. Promote accessibility
4. A vibrant mix of uses
5. Harness the value of heritage
6. Work for King's Cross, work for London
7. Commit to long-term success
8. Engage and inspire
9. Secure delivery
10. Communicate clearly and openly

16 Argent St. George. (July, 2001). Principles for a Human City. Ed. n° 3. Available at: [https://www.kingscross.co.uk/media/Principles_for_a_Human_City.pdf]

According to Roger Madelin, chief executive of Argent between 1987 and 2016, the ten principles deliberately avoid any debate or ideas about architectural style. They instead sought to create a framework from which the urban pattern could evolve and be built based on the strong historical character of King's Cross. 'Parameters for Regeneration' was later published to explore how the principles could be physically manifested in space. This type of process reinforces the legitimacy urban plans and guarantees their sustainability by helping to reduce potential opposition from community groups or local authorities.

Thus began the transformation of an area that, despite its central location and natural accessibility, had lost its industrial function and value, with its railway infrastructure and viaducts serving instead as a physical barriers. It is worth mentioning in this context that several historic buildings were preserved and reintegrated into the urban fabric. Nonetheless, the decision to remove some buildings, albeit not registered as heritage sites, still faces criticism from parts of the population.

The project includes a proposal for a flexible mixture of uses intended to adapt over time, expected to be completed by 2025. In fulfillment of TOD principles, the entire development is located

within walking distance from King's Cross and St. Pancras stations. People have priority over cars, there are shared routes for pedestrians and cyclists, and active transportation is encouraged in the form of pavement that conveys the continuity of the pedestrian circulation network.

Uses were meticulously distributed throughout the area of intervention through the provision of anchor activities to ensure the area's liveliness even in those areas farthest from public transit. Ground floors are occupied, largely, by restaurants and retail activities, ensuring flows of people.

The King's Cross development covers 80 ha, with 2,200 housing units, and a total cost of £2.5 billion. The project included:

- 705,135+ m² of total constructed area focused around a mixed-use program.
- 455,200 m² of offices; 195,000m² of residential; 46,000m² of trade; 47,200 m² of hotels; 74,800 m² of health, education and cultural facilities; and 32,000m² dedicated to leisure. 40% (11ha) of the total 80ha is dedicated to public space.
- 20 historic buildings/structures, 50 new buildings, 10 new public spaces, and 1km along the edge of the Regent's Canal.

↓ **FIGURE – KING'S CROSS LAND USE PLAN.**



Source: LCR

All of this was only possible with a financial model that was not only feasible, but well-designed and well-negotiated and that included commitments from both the public and private sectors. A Public-Private Partnership (PPP) served as the chosen framework for the TOD implementation in this case. Section 106 Agreements from the 1990 Planning Act¹⁷ regulates PPPs, which can require, for example, that owners and developers make a financial commitment (either fixed or recurring) or offer in-kind support in the local interest (such as affordable housing or community facilities) in exchange for development permits.

In the case of King's Cross, Section 106 agreements established flexible land uses across

floors, providing the conditions for consortium members to respond to market changes and other conditions as the regeneration process evolves.

When the process began in 2006, Argent entered into a joint collective ownership acquisition and development agreement with LCR and DHL. Depending on the land's valuation (which was to be determined after approval from the planning commission and the completion of the Channel Tunnel Rail Link), Argent had the option to either purchase the land outright or to enter into a long-term, 50/50 partnership. Argent chose the latter option in 2007, which resulted in the KCCLP and eased the development process (World Bank, 2017)¹⁸.

¹⁷ Section 106 of the Town and Country Planning Act 1990 (S106) is a set of separately negotiated planning obligations. The Section 106 agreements for King's Cross cover the requirements necessary to remove any negative impacts of development in great detail.

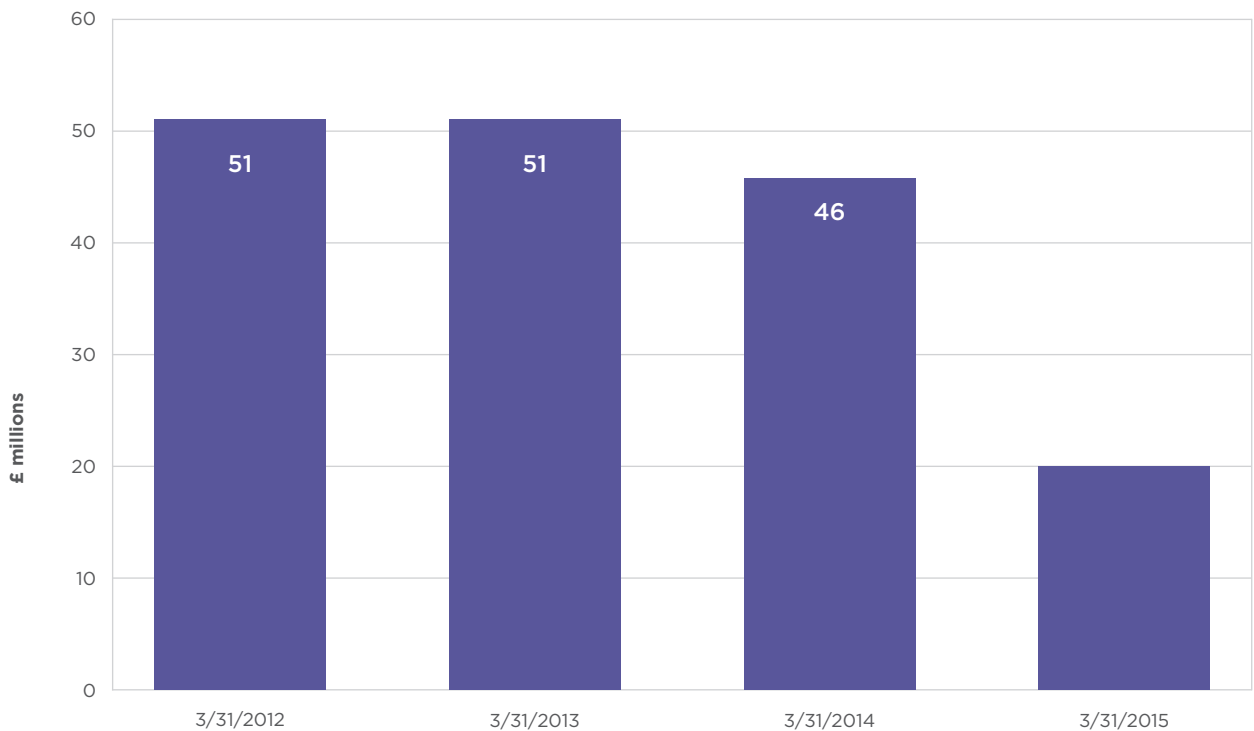
¹⁸ World Bank, 2017. Railway Reform: Toolkit for Improving Rail Sector Performance. Case Study: London King's Cross. https://ppiaf.org/sites/ppiaf.org/files/documents/toolkits/railways_toolkit/PDFs/RR%20Toolkit%20EN%20New%202017%2012%2027%20CASE8%20LONDON.pdf

The agreement was structured so that Argent’s financial returns increased as the land’s market value increased, thus embedding an incentive to improve the land’s value (World Bank, 2017).

This framework was designed to ensure a financial return upon fulfillment of the agreement by all actors. As part of the financial arrangements for the construction of the high-speed

rail system (HS1), the Department of Transport offered subsidies, guaranteed securities, and gave development rights to LCR for the areas around King’s Cross and Stratford. In addition, the British government donated public lands near London’s main stations to help finance the HS1 infrastructure through real estate. LCR also provided loans for KCCLP, as shown below:

↓ GRAPHIC – LCR LOANS FOR THE KCCLP



Source: World Bank 2017

As part of the British government’s 2015 deficit reduction program, LCR sold its KCCLP shares to Australian Super in 2016 for £371.1 million—a 67% stake, with the remaining 33% belonging to Argent King’s Cross (Gasco, 2019). The Argent King’s Cross Limited Partnership subsidiary is notably the only developer and asset manager at King’s Cross, making it the central decision maker. This has generated criticism from the local com-

munity, as control of the area has passed fully into the hands of the private sector.

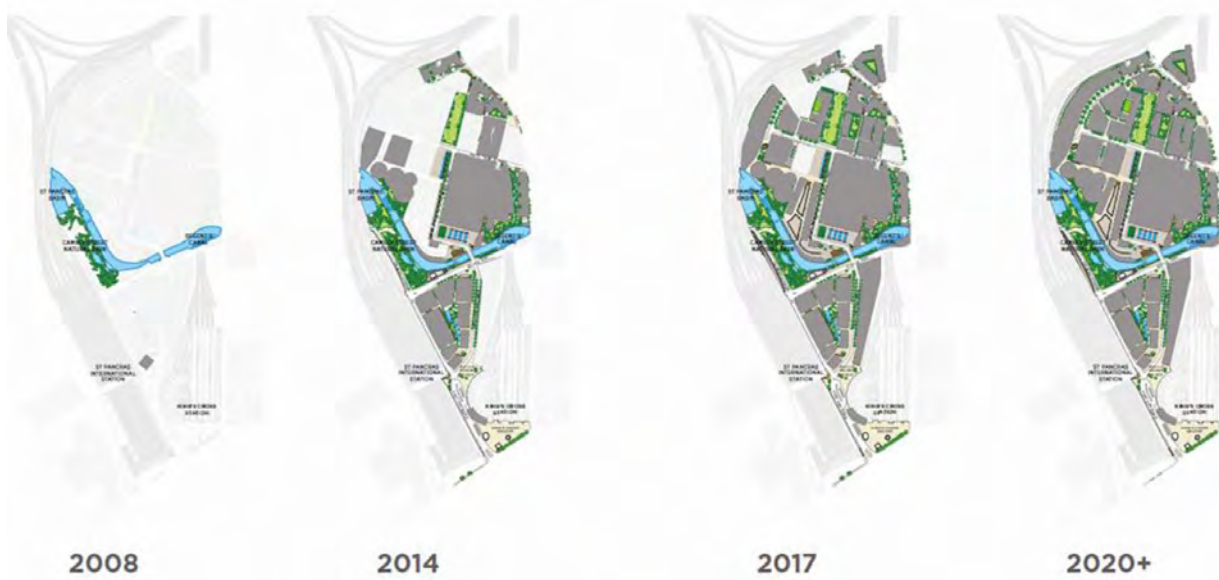
LCR was successfully able to recover its value through capital appreciation. In March 2014, more than 57% of the regeneration project had been completed or committed. LCR started seeing financial returns at that point—a total of £85.1 million for the fiscal year ending in March 2014.

The public railway company’s profit was £48.9 million for the fiscal year ending in March 2016 (World Bank, 2017).

The developer, meanwhile, settled on a mixed land tenure strategy: both leasing and ownership. The initial idea was to keep the land as property and to rent the buildings; yet the KCCLP ultimately decided to sell some lots—around 10% of the total area. Leases vary from short to long term, ranging between 125 and 999 years. Owners are mostly big companies; Google, for example, acquired a million square meters and transferred its headquarters to King’s Cross Central.

The project notably included different forms of negotiation, such as the construction of the 27-story building dubbed Urbanest—the only tall building in the development. The private student housing developer agreed to lease and to build early in the process, if allowed to build higher (Gasco, 2019). Support of the British Telecom Pension Fund (BT), meanwhile, guaranteed the building’s financial stability over the long run.

In 2020, an estimated population of 50,000 studied, lived, or moved around King’s Cross. The below image presents the project’s phases of development, providing an overview of its evolution over at least 12 years.



When the London Plan identified King's Cross as one of its Areas of Opportunity, the provision of affordable housing was included as a key element needed in order for a project to secure planning permission. In the case of King's Cross, however, the initial forecast that 42% of the housing units would be affordable has not been met, generating public discontent. This was the result of cuts in government subsidies for affordable housing in early 2015, which legally allowed Argent to reduce the number of affordable units. Ultimately

the company intends to provide approximately 2,000 housing units total, 33% of which will be affordable (Gasco, 2019).

Currently, King's Cross and St. Pancras stations serve six metro lines and 17 bus lines; the area offers connections to five airports within a one-hour radius, three of which have direct connections and one of which is international (to Paris). It is thus the most important multimodal station in London. Bicycle and pedestrian infrastructure, thanks to effective public space design, allows access for thousands of users, contributing significantly to a reduction in GHG emissions.

Source: Wannadit Umpuch. King's Cross. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



Positive outcomes

- In 2016, King's Cross attracted 50% more food and drink consumers than in 2015.
- In the same year, a total of 325,000 people attended 125 scheduled events.
- 30,000 people are expected to be working and 7,000 are expected to be living in King's Cross Central by the project's completion.
- The amount collected from real estate fees¹⁹ has almost doubled since the beginning.
- Crime rates have decreased dramatically accompanied by an increase in the sense of safety.
- The project is not perceived as a "walled-off center," but as a cozy, community-centered project.
- There is evidence of local job creation as driven by the local training center and recruitment.
- Young professionals living in the wider area have demonstrated changes in attitudes, aspiring to higher-level jobs.

SourceData provided by the consultant contracted by the developer (Gasco 2019).



Source: Cowardlion. King's Cross railway station is a Central London railway terminus on the northern edge of the city. Maio, 2018. Shutterstock, consultado em 2020. www.shutterstock.com

¹⁹ All local businesses and residents pay a real estate service fee to KCCLP for the maintenance of streets and squares, and for public events.

KING'S CROSS STATION AS A TOD EXAMPLE

The changes to King's Cross greatly improved the quality of the urban landscape and the area's public space, incorporating broader sustainability principles. The importance of increasing energy efficiency, ensuring water reuse, and recycling building materials, for example, were compiled into a practical guide—Principles for a Human City—written by one of the plan's main developers (Argent, LCR and Exel).

Principles for sustainability:

- Encourage energy efficiency
- Encourage recycling of materials
- Dynamic use of heritage buildings
- New forms of transportation
- Encourage use of public transit
- Maintenance and renewal
- Coordination of infrastructure provision
- Local Agenda 21

The project also prioritized using low-impact materials to renovate buildings and public squares and reducing construction waste.



Source: Sandor Szmuto. King's Cross empty square. Maio, 2020. Shutterstock, consultado em 2020. www.shutterstock.com



Source: Tottoto. King's Cross & St. Pancras Station. Julho, 2019. Shutterstock, consultado em 2020. www.shutterstock.com



Source: Ron Ellis. The Granary Square is a new regeneration development with a dazzling ensemble of painted geometric shapes coordinating the scattered buildings. Agosto, 2013. Shutterstock, consultado em 2020. www.shutterstock.com

NEW SUSTAINABILITY PROPOSALS CONNECTED WITH TRANSPORTATION

In addition to the sustainability proposals and TOD principles applied to projects like King's Cross, there are currently a number of additional sustainability efforts underway in the City of London.

Green Plan: The London Mayor's Green Transport Plan outlines an intensive commitment to reducing GHGs by mobilizing the population to make at least 80 percent of trips by public transit, by bicycling, or by walking by 2041.

The ambitious plan aims to turn London into a city with zero mobility-related emissions by 2050. Compliance with the project is slated to begin with a zero-emission zone in the city's center in 2025 in partnership with companies such as TfL (Transport for London).

To meet this challenge, the following strategies are being adopted:

- Walking and cycling.
- Low emission bus zones.
- Taxis without emissions.
- Electric vehicles.
- Toxicity charge.
- Ultra Low Emission Zone.
- Electric, hybrid, and hydrogen buses.



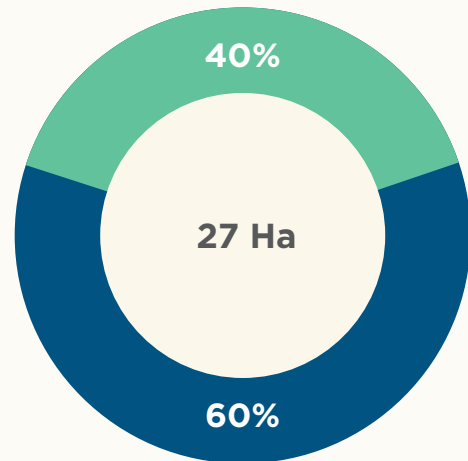
Source: Zhang Shen. Electric bus that has been discharged. Date unknown. Shutterstock, accessed in 2020. www.shutterstock.com

LAND USE -- KING'S CROSS



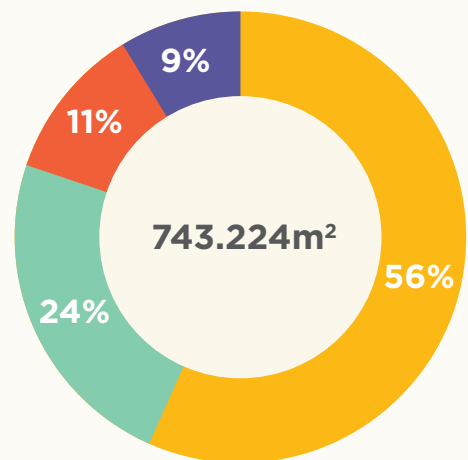
Source: LCR

Following community consensus, the planning scheme solidified the land use percentages.



- Public space
- Espaço construído

Necessary uses, and a base percentage for each, were determined.



- Culture/Education/Hotel/Leisure
- Retail
- Residential
- Office

BENEFITS

The outline of existing global best practices began with an analysis of six fundamental dimensions of TOD projects:

- **Social:** as part of the land use plan and in accordance with Section 106, companies contributed over £2.1 million to the Camden Council to help support public infrastructure development, generated between 24,000 and 27,000 jobs, and built both market-rate and affordable housing units.
- **Economic:** the annual benefits for Londoners, by way of financial contributions from companies seeking planning permission, are estimated to be between £100 and £200 million (\$155 million to \$309 million) per year (Special Planning and Development Committee of the Assembly of London 2008).
- **Environment:** the project has resulted in easy access to public transit, helping to reduce individual vehicle usage and to promote active mobility.

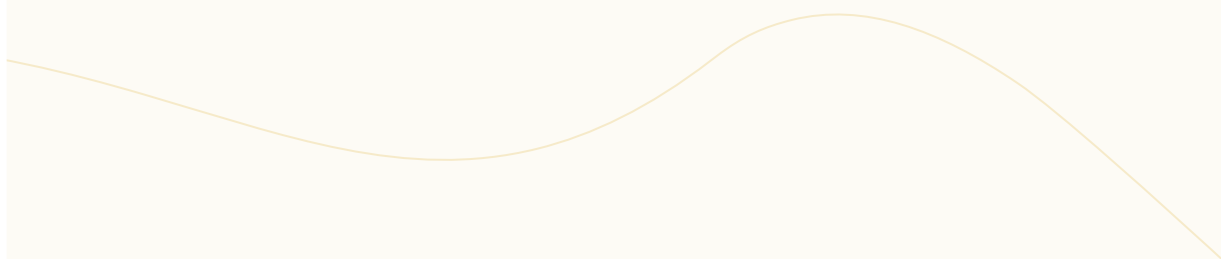


OTHER MECHANISMS FOR LAND VALUE CAPTURE

Business Rate Supplement (BRS): this mechanism applies to all commercial buildings in the metropolitan area that rent space for more than £70,000 per year, set at 2% per taxable pound. This system raised over £1.6 billion to build the Crossrail 1 (or Elizabeth Line), equivalent to 37% of the value needed for the line.

Mayoral Community Infrastructure Levy (MCIL): a tax levied on new building permits in the city center and on the Isle of Dogs, with the exception of health-related uses. While this mechanism has not been as successful as expected, it raised £382 million in 2017.

Taxes on the development of commercial property: a new surplus value tax to be collected from shops, offices, and high-end residential units within approx. 900m of a train station.



Contributions of the Case

The King's Cross Central case offers a number of lessons that can be applied in other areas with similar characteristics. Drawing on the project's experience, albeit not yet completed, one can outline a series of fundamental elements of successful urban projects, especially those requiring large infrastructure investments. Good planning—with the involvement of all stakeholders in all phases of planning and design—is crucial for success and to ensure sustainable interventions.

It is also important that governments be able to take advantage of the opportunities inherent in large infrastructure investments. This includes not only the ability to revitalize once-obsolete areas, but also in the possibility of recovering part of the amount invested through capturing associated increases in the value of private lands.

In the case of King's Cross, the idea to connect and recover underused spaces in strategic locations can be traced back to as early as 1980, but it was only the possibility of a high-speed rail connection that helped to secure funding for the project. This highlights the benefits that can be captured when infrastructure and property development cycles align (TfL 2017)²⁰.

Further, despite the challenges resulting from the presence of pre-existing properties in the area (including heritage and low-rise buildings), the project was successful in integrating the area's old architecture with contemporary buildings and in building low-rise structures at higher densities.

Public-private partnerships as well as public participation made it possible to clearly identify market needs and the instruments necessary to make the proposals viable. The long-term implementation, meanwhile, helps to increase land values, thus ensuring that public space investments and quality of life prevail over private interests.

Flexibility is essential for this to happen effectively, as a number of factors can change over time, affecting the original development models. In the case of King's Cross, the planning permission process allowed the project to adapt to new conditions while addressing spatial needs, such as key routes, public spaces, historic preservation, maximum and minimum height requirements, and development zones. Under this framework, government policy doesn't regulate the conditions of each individual space or building but rather permits small adjustments to land use planning (Gasco, 2019).

Projects at the scale of King's Cross require efficient urban management and private sector participation in urban development. Active participation from the public sector, meanwhile, aside from guaranteeing the project, can help to increase the efficiency and speed of projects. The Camden Council helped to ensure a faster project execution by serving as the main interlocutor with other government entities and with the local population.

The chosen model, meanwhile, allowed for faster financing for infrastructure and land development. It is important to emphasize the goodwill of public companies and their efforts to promote

²⁰ Transport for London, 2017. Land Value Capture. https://www.london.gov.uk/sites/default/files/land_value_capture_report_annexes_transport_for_london.pdf

projects in the process of reaching a fair agreement; in this case the terms for the urban interventions and the State's resultant expected profits were clearly outlined to ensure their viability in the construction and operation of the project. The King's Cross Section 106 agreement served as the roadmap for regulating all financing, construction, and operations for the project.

This agreement managed to combine all initiatives and objectives that were to be met both by developers and by the public sector.

Finally, the economy itself was improved as a result of improvements to the area's multimodal connectivity, with greater access by public transit, by foot, or by bicycle. This, in turn, resulted in positive ripple effects for both current and future inhabitants and businesses in the region.

Source: 4kclips. St. Pancras International train station in London at Christmas Time. Dezembro, 2016. Shutterstock, consultado em 2020. www.shutterstock.com



Tokyo



Source: Sean Pavone. Tokyo, Japan skyline at Sumida Ward. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



TOKYO, JAPAN

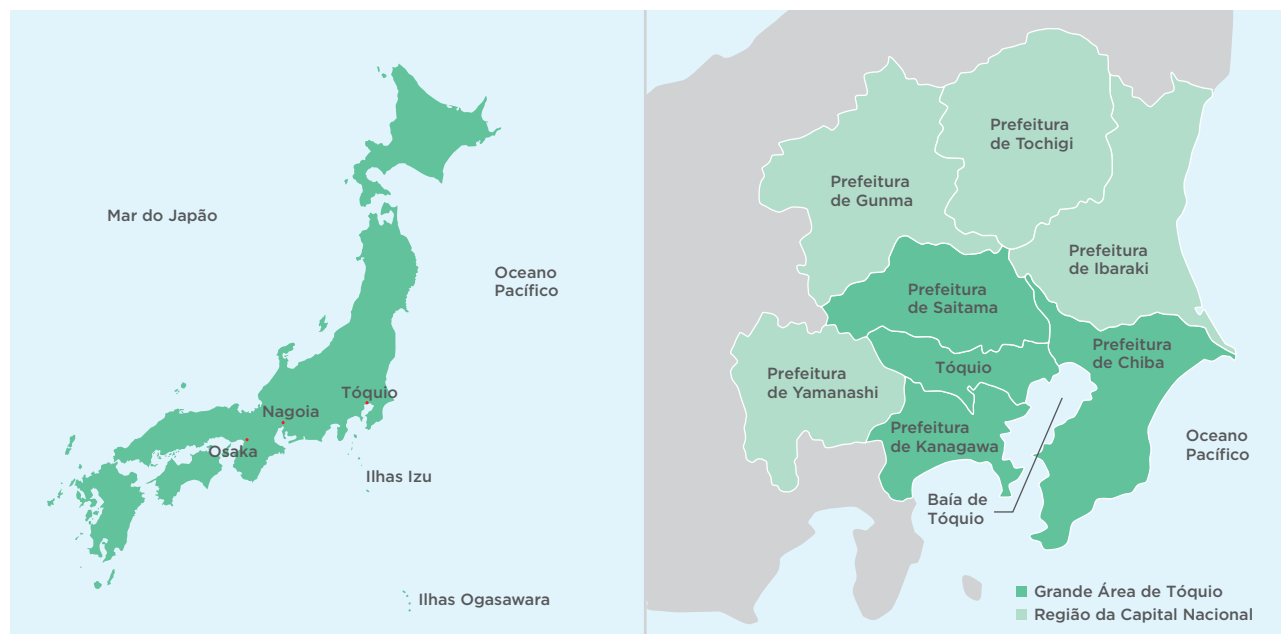
According to the Statistics Bureau of Japan, there were approximately 37.5 million inhabitants in Tokyo's metropolitan area in 2019, representing approximately 10.1% of Japan's total population and generating 19.3% of the country's GDP (Metropolitan Government, 2010 census). These figures serve as an important frame from which to understand the Japanese government's efforts over the past 70 years to improve the quality of life of the metropolitan region's residents and to reduce its impact on the environment.

Tokyo, according to Okazawa and Murakami (2017), has been "the world's largest mega city for the past sixty years in terms of economic scale

and population agglomeration." It is also important to consider the city's administrative complexity, which includes:

- I. The Tokyo area¹ (Tokyo-to, in Japanese), which has 23 special wards and 26 cities, as well as towns and islands (as classified by the number of inhabitants)². This administrative unit notably includes the central region of Tokyo, which consists of three main special wards: Chiyoda-ku, Minato-ku and Chuoo-Ku.
- II. Seven prefectures (a subset of the 47 territorial jurisdictions into which Japan is divided): Kanagawa, Saitama, Chiba, Gunma, Tochigi, Ibaraki and Yamanashi

↓ **FIGURE - ADMINISTRATIVE OVERVIEW OF THE TOKYO METROPOLITAN AREA**



Source: Metropolitan Government of Tokyo, 2020 <https://www.metro.tokyo.lg.jp/ENGLISH/ABOUT/HISTORY/history02.htm>.

¹ The metropolitan area of Tokyo.

² Tokyo Metropolitan Government, "Municipalities within Tokyo." Available at: <https://www.metro.tokyo.lg.jp/english/about/links/municipalities.html>. Accessed on 10/13/2020.

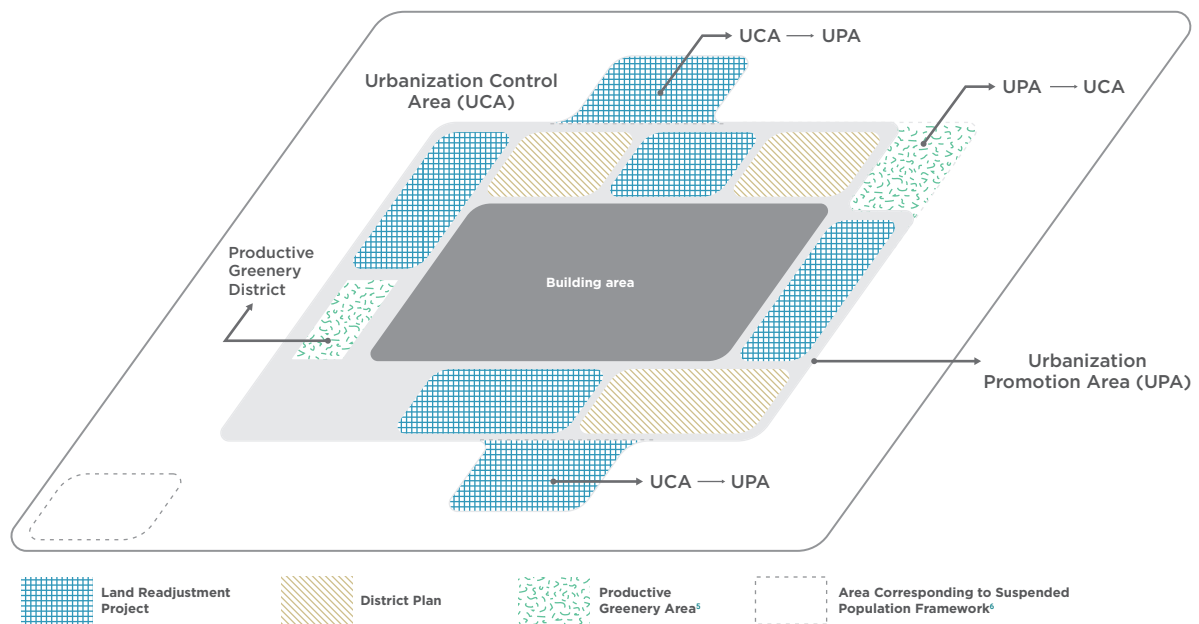
The administrative context of the Tokyo metropolitan area

Japan has long concerned itself with urban issues, as a country with ancient traditions and geographical limitations. There are thus long-established laws that govern the country's territorial planning framework, including: (i) the Arable Land Readjustment Act of 1899; (ii) the Land Readjustment (LR) Law³ of 1954; and (iii) the City Planning Law of 1968. These laws and regulations have played a key role in helping to structure Japan's urban development and

growth around the integration of urban planning and transportation.

Land uses are regulated according to an area division system. At the macro level, there are four categories (Akashi 2007): (1) **Urbanization Promotion Areas (UPA)** and **Urbanization Control Areas (UCA)**⁴; (2) **Land Use Zones**, with 12 different categories of land use; (3) **Special Districts**, such as Fire Protection Districts, Arts Districts, Technology Districts, or Historic Townscape Preservation Districts, among others; and (4) **District Plans**, which allow for specific rules within certain polygons.

↓ FIGURE - LAND USE AND PLANNING SCHEMA.



Source: Akashi, 2007

3 As defined by the Global Observatory on Local Finance, "land readjustment refers to the intervention of public authorities to remodel an urban perimeter composed of mainly privately-owned land in order to build public infrastructures and facilities without having to acquire the lands." UCLG Committee on Local Finance and Development (sf).

4 The division into Urbanization Promotion Areas and the Urbanization Control Areas aims to prevent sprawl and to ensure the efficiency of public investment by managing the pressure to expand already urbanized areas.

5 In 1992, the Japanese government enacted the Law on Productive Green Areas, which designated specific urban land parcels as "productive green areas." Homeowners enjoyed a substantial reduction in property taxes if they chose to use land exclusively for agricultural purposes in those areas. Available at: <https://resources.realestate.co.jp/news/expiration-of-productive-green-areas-tax-break-in-japan-in-2022-impact-on-land-prices/>. Accessed on October 30th, 2020.

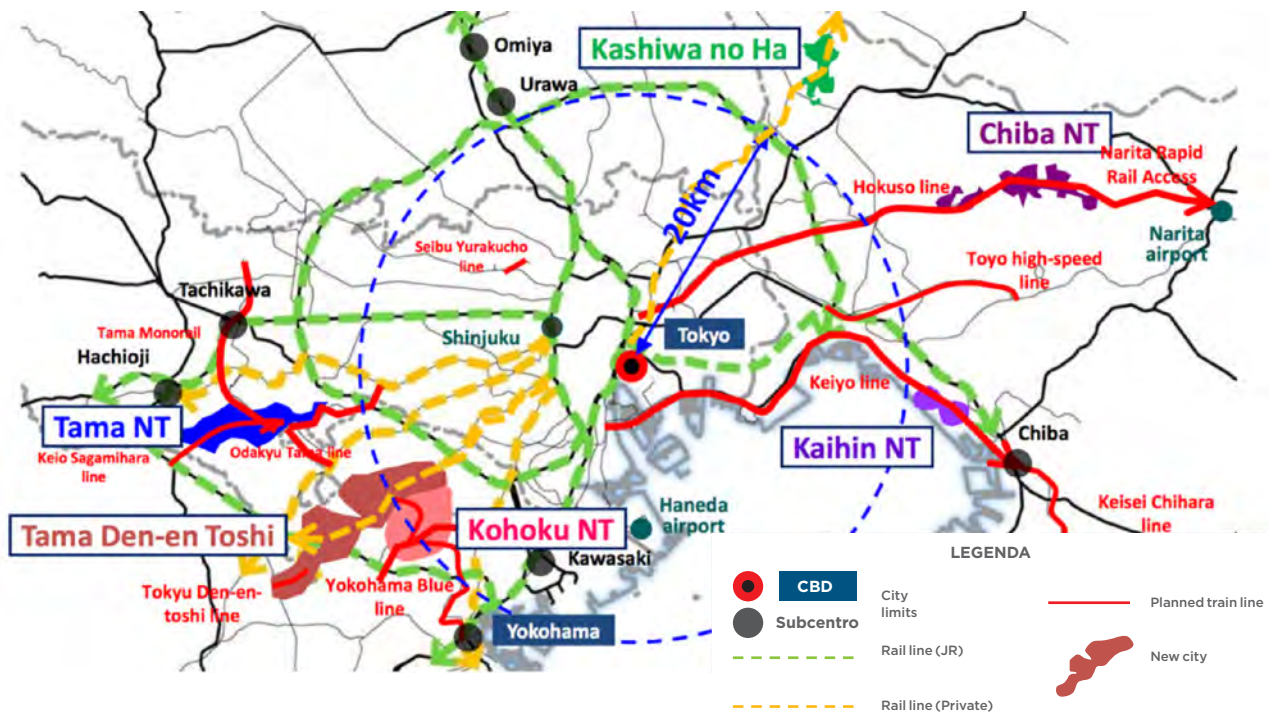
6 Areas that have been targeted to accommodate population increases through expansions of Urbanization Promotion Zones (UPA), but have not yet been defined as such. The need for expanding UPAs as a result of population growth has been acknowledged in agreements across different governmental entities (Akashi 2007, 20).

The National Capital Region’s Master Plan (NCRMP) guides the metropolitan region’s urban growth. Tokyo has been recognized as the nation’s capital since 1956—a designation that has been accompanied by a greater level of support from the country’s central government for its planning and redevelopment (Minoru 2017). The master plan’s objective was to transform Tokyo into a polycentric city; to expand the city’s development into its peripheral regions. The strategy was to form new sub-centers, to redistribute population densities across those centers, and to integrate them

with each other, while conserving green space (Jain and Okazawa 2017).

To realize the plan’s objectives, strategic planning was needed to expand the region’s transportation system. The new urban centers were determined based on large-capacity public transit centers, as outlined in the region’s Rail Network Expansion plan. Building on these efforts, the Urban Renaissance Special Measure Law was instituted in 2002 (and modified on April 16, 2004). The law provides a framework for prioritizing development in areas that can stimulate the economy and generate hubs for urban development (Akashi 2007).

↓ FIGURE - LARGE-SCALE URBAN AND RAILWAY PLANS FOR THE TOKYO METROPOLITAN REGION



Source: Shimizu 2016

Building on this and supported by a system of limited public intervention in the real estate market and a free-hold land tenure system, the Japanese capital experienced rapid growth. The necessary transportation infrastructure was financed with

the support of a close relationship between the public sector (which owned large areas intended for railways, railyards and other uses) and the private sector (which mobilized capital for a mixture of uses such as offices, housing, etc.) (Okazawa and Murakami 2017).

Transit Oriented Development

A diverse array of large railway companies emerged as a result of this model, including some public companies, such as Tokyo Metro Co. Ltd. (an association between the Tokyo Metropolitan Government and the central government's Ministry of Economy); some public-private companies, such as the Japan Railways Group (JR); and other fully private companies. According to data from Okazawa and Murakami (2017), there are currently around 48 railway companies operating high-speed train services (known in Japan as "bullet trains"), trams, metros, and urban and suburban trains. These companies are currently leading, together with public urban planning institutions, the implementation and execution of TOD projects in Tokyo.

The Japanese model for TOD project development generally takes the following form. (1) Land that already has public services is acquired (whether in urban or suburban areas) through agreements between railway companies and pub-

lic sector actors—usually regional and/or municipal governments grant the land to be developed as a concession or loan. (2) The railway company builds alliances with private developers to spur development (commercial, office, residential, public facilities etc.). (3) The increase in population density not only stimulates the demand for services, but also allows railway companies to finance infrastructure construction, which is, in turn, compounded thereafter with the collection of user fees (Suzuki, et al. 2015).

This case study will notably explore Japan's land readjustment tool—one of the main urban planning instruments that allowed for the development of large-scale TOD-related projects in the country, analyzed in this case in the context of the Akihabara station. It will also explore the main mechanisms for financing and land value capture for TOD-related projects as in the case of the Shinagawa Station (the Yamanote line)—the result of a successful alliance between national and local governments.

Source: FOTOGRIIN. The train goes through the center of the Japanese capital. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com





Source: Blanscape. Shinkansen or JR Bullet train running pass through Mt. Fuji and Shibazakura at spring. Maio, 2015. Shutterstock, consultado em 2020. www.shutterstock.com

OVERVIEW OF TOD IMPLEMENTATION IN THE TOKYO METROPOLITAN AREA



MOBILITY

13 metro lines and 282 stations⁷ + Shinkansen bullet trains (high-speed trains connecting Tokyo with other major cities) + an urban and suburban train network: JR and JR Yamanote lines operated by Japan Railways (JR)



SUSTAINABILITY

Japanese cities seek to enact and enforce public policies in a manner that reduces CO² emissions and increases recycling. The Low Carbon Emissions Development Guide (UN-Habitat 2015) was issued in 2010 to guide these efforts.

⁷ A map of Tokyo's metro lines can be found at: https://www.tokyometro.jp/station/pdf/202006/202006_number_es.pdf



LEGAL

The National Development Plan provides the national land use and planning framework. Local planning, meanwhile, determines the construction rates and density levels based on land use. Zoning decisions made as part of the planning process determine land use, development and building construction regulations, as opposed to the legal designation approach taken in most European countries (Akashi 2007).

Instruments analyzed (Akashi 2007)

- National land use laws⁸:
 - Comprehensive National Development Law⁹ (1950; last updated in 2005)
 - National Land Use Planning Law¹⁰ (1974; last updated in 2015)
 - City Planning Law (1968; last updated in 2008)
 - » **Land Readjustment Law**¹¹ (1954; last updated in 2005)
 - » **Urban Redevelopment Law** (1969; latest update 2019)
 - » **Law on Special Measures concerning Comprehensive Advancement of Housing Development and Railway Construction in Metropolitan Areas** (1989)
 - **Urban Renaissance Special Measure Law**¹² (2002; modified in 2004)
- Prefecture¹³ instruments
 - Division between Urbanization Promotion Areas (UPA) and Urbanization Control Areas (UCA).
- Local or municipal instruments:
 - City Master Plans: zoning, special districts, etc.

⁸ Source: (Jain e Okazawa 2017) – https://www.toshiseibi.metro.tokyo.lg.jp/eng/pdf/index_03-3.pdf?2009

⁹ This law aims to promote the use, improvement, and preservation of national territory through a comprehensive look at economic, planning, cultural policies, and more. It takes into account the natural conditions of the land and formulates national planning strategies (Ministry of Land, Infrastructure, Transport, and Tourism 2015).

¹⁰ The legal framework for planning in Japan requires that land use plans be developed at three levels of government: national, prefecture, and municipal.

¹¹ The Land Readjustment Law is a procedural law that stipulates the rights and obligations of the implementers of the land readjustment instrument and as well as stakeholders in the approval and implementation of land readjustment projects.

¹² The national-level Urban Renaissance Special Measure Law (last modified on April 16, 2004) prioritizes action in areas that can stimulate the economy, with a particular emphasis on the potential to generate hubs for urban development (Akashi 2007).

¹³ The 47 territorial jurisdictions into which Japan is divided are known as prefectures. Tokyo-to, corresponding to the metropolitan area of Tokyo, is one of them.



INSTITUTIONAL

Japan has three levels of government: national, prefecture, and municipal. The central (national) government formulates general guidelines and, depending on their abilities, prefectures and municipalities administer and execute project plans.

Planning institutions

- National Government: Ministry of Land, Infrastructure, Transport, and Tourism (MLITT).
- Tokyo Metropolitan Government: Bureau of Urban Development.
- Urban Planning Advisory Committee¹⁴ (local level).
- Urban Renaissance Agency¹⁵.



FINANCIAL

The construction of new railway infrastructure requires sizeable capital investment. Although costs should in theory be recovered primarily through fare revenue, it is often difficult to do so in practice. As described by the World Bank (2017), the metropolitan area of Tokyo overcame this obstacle with the help of six land value capture (LVC) mechanisms, the application of which depends on the location and stakeholders themselves (public, public-private, or private).

Tools analyzed

- Six land value capture mechanisms used primarily to finance rail transportation infrastructure projects in Japan: internalization, requirement, integration, petition, agreement, and auction; the latter being employed as part of the Shinagawa Station project, as will be explored at length below (World Bank 2017).
- System of incentives: The Efficient Land Utilization policy, for example

¹⁴ Together with public meetings, this Committee is responsible for validating and authorizing land readjustment processes and projects. (Minoru 2017, 7)

¹⁵ The Urban Renaissance Agency (URA) is a national public agency initially founded as the Japanese Housing Agency to respond to the growing demand for housing by middle-income workers. The URA leads land readjustment projects using a variety of financing sources, such as through offering public or private loans or through issuing bonds.



Source: Blue Planet Studio. Torre de Tóquio, Japão - torre de comunicação e observação. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

Tokyo's Planning Strategy

Japan's central government coordinates the country's development and land management by developing urban planning laws and financing mechanisms in fulfillment of the vision outlined in the Comprehensive National Development Law. The 1999 National Capital Region Master Plan (NCRMP) was developed under this purview (Akashi 2007) and thus includes plans for land classification, land use, and infrastructure development as well as for mechanisms and incentive systems for engaging with the private sector. The NCRMP serves as a big umbrella, encompassing public sector actors at different levels of government (vertical integration) and across different prefectures and municipal governments (horizontal integration) (División de Planeación Urbana 2003).

The City Planning Law of 1968, meanwhile—a revision of the original one passed in 1919 (Minoru 2017)—promotes urban order and development within the realm of urban planning, including through (Akashi 2007):

- District Plans: the guiding framework for land use and public infrastructure
- Policies for urban improvements, development, and conservation efforts.
- The promotion and control of urbanization, through the division of land into two zones:
 - Urbanization Promotion Areas - UPA: real estate development is taxed; land assembly and land readjustment as well as large-scale development are permitted.
 - Urbanization Control Areas - UCA: real estate development is not taxed; large-scale urban projects and land readjustment are not permitted.

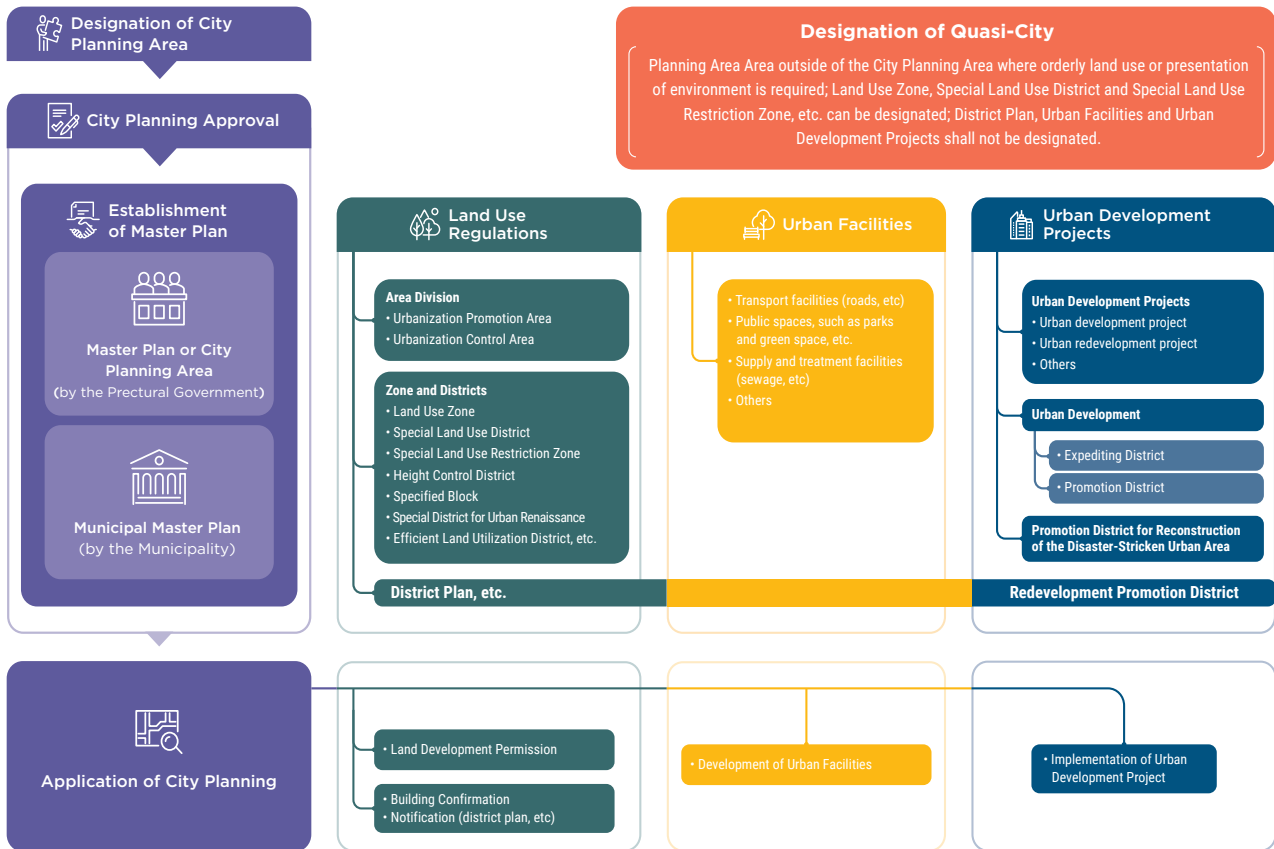
- Land use in zones and districts: control is exercised over construction and land use. A regulatory base is provided for construction and demolition activities in the form of indices that take into account existing locations of educational institutions, health care, and markets, among others, and their interactions.
- Development permission system: used to promote urbanization based on a series of local requirements. Although UCAs regulate building permissions for lots, this law facilitates coordination with public utilities and services and determines compensation, mandates, and other processes required by the central government.
- Planning for public facilities and services: intended to facilitate the future development of public facilities and to enforce restrictions stipulated by the MLIT with regards to roads, parks, sanitation, health, and educational facilities, among others.
- Urban planning projects: provides a guide for supporting the common good as opposed to the will of the individual owner as specifically qualified for¹⁶:
 - Land readjustment projects
 - Urban redevelopment projects
 - Special districts¹⁷
- Definition of planning bodies and processes: provides the framework for public hearings, planning councils, and coordination with ministries, among others.

Regulatory instruments are specified for each of the efforts outlined within the framework of the 1968 City Planning Law, including the Land Readjustment Law, the Urban Redevelopment Law, and the Environmental Impact Assessment Law, among others (Minoru 2017). The following images offer an overview of Japan's planning system and its land use framework.

¹⁶ Minoru Matsui, World Bank Group, and Tokyo Development Learning Center, "CASE STUDY LAND READJUSTMENT IN JAPAN."

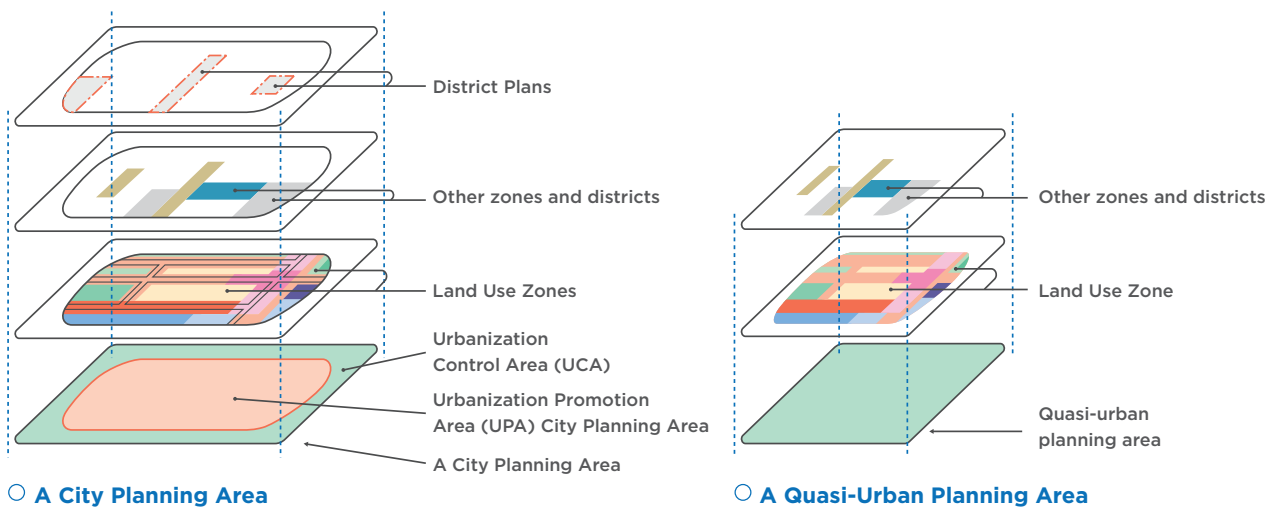
¹⁷ Priority areas for urban development as defined above the municipal level.

↓ FIGURE - STRUCTURE OF THE CITY PLANNING SYSTEM



Source: Ministry of Land, Infrastructure, Transport, and Tourism 2015

↓ FIGURE - LAND USE REGULATION STRUCTURE



Source: Ministry of Land, Infrastructure, Transport, and Tourism 2015

In order to understand the complexity of the Japanese planning system as it applies to TOD projects, it is important to highlight several key laws at the national level. The first is the Law on Special Measures concerning Comprehensive Advancement of Housing Development and Railway Construction in Metropolitan Areas (1989), which is connected with the Planning Law. In 2002, meanwhile, the need to prioritize certain areas for urban development arose in order to make the country's economy more competitive. The resultant effort to streamline processes for new developments and urban regeneration¹⁸ in strategic centers led to the Urban Renaissance Special Measure Law (2004) (Akashi 2007). This law applied to District Plans (as defined within Japan's planning framework), but its nationwide nature allowed for the introduction of more individualized and flexible interventions.

The country's national-level spatial planning system—unlike other countries for which planning occurs at the municipal or state levels—results in flexibility for Special Districts due to their high-level nature before they are passed along for implementation at the prefecture and municipal levels. Urban regeneration and rehabilitation projects are then approved by consultation with the public and by the Urban Planning Advisory Committee. Nonetheless, local governments, housing development agencies, urbanization agencies, private developers, land owners, and entrepreneurs (especially railway companies) can all draw on key land development instruments in order to apply land value capture strategies to TOD investments (Suzuki 2015).

The subsequent analysis thus presents the two most frequently-used tools for implementing TOD projects in Tokyo. It is important to understand that their use is catalyzed by Special District Plans and the associated legal framework¹⁹, which allow for greater flexibility within the urban parameters, based on land use designation.

The case of Akihabara Station

The development of Akihabara Station (1997-2015), located just 2 km north of Tokyo Station, offers a recent case of the transformation of a railway station and its railyards into an important intermodal hub, with the convergence of three train lines (Yamanote line, Keihin Tohoku line and Sobu line), a metro line (Hibiya line), and the Tsukuba Express (Hoshino n.a.²⁰). Its transformation is also notably associated with the Electronic District—one of the largest commercial areas in the world. As described by Minoru (2017) for the World Bank, Akihabara serves as one of the most recent examples of applying the National Land Readjustment Law for locally-approved land readjustment projects, including for both the acquisition and the readjustment of land.

It is important to note that the TOD efforts surrounding the Akihabara intermodal station are also associated with a national strategy to convert the area into a science and technology district, as emphasized by the Tsukuba Science City designation made in 1963 (Hoshino n.a.). By the first decade of the 21st century, the area already boasted more than 45 research and edu-

¹⁸ The urban regeneration process is usually the result of changes to a city's growth patterns and needs; the result is an exploration of the potential of underutilized land to meet the needs generated by economic and population growth (Amirtahmasebi, Orloff and Wahba 2016).

¹⁹ Law on Special Measures concerning Comprehensive Advancement of Housing Development and Railway Construction in Metropolitan Areas (1989); Urban Renaissance Special Measure Law (2004).

²⁰ Hoshino, Kaneo. *Combined railway and urban development toward the 21st century*. n.a. http://www.jsce.or.jp/kokusai/civil_engineering/2000/combined.pdf (Accessed on October 12, 2020).

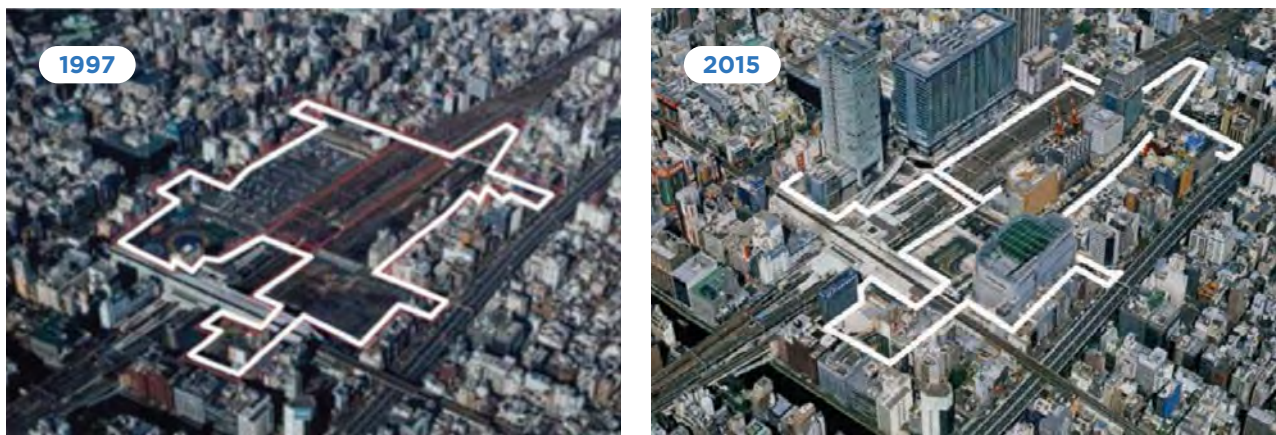
cation institutions (public and private). Before its re-development, the target area consisted of the Akihabara station and extensive vacant lots along the railway line, mostly used for cargo warehouses and railyards and owned by the JNR Settlement Corporation—a total of 3.2 hectares. There was also a public market for agricultural products (2.7 ha), which was owned by the Tokyo Metropolitan Government.

The land readjustment mechanism was applied to the area surrounding the station in combination with the construction of a new railway line and the new Akihabara intermodal station. This approach notably drew on the aforementioned Law on Special Measures concerning Comprehensive Advancement of Housing Development and Railway Construction in Metropolitan Areas

(Hoshino n.a.). The new District would include the development of new homes, cultural facilities, the new station, and a mixture of uses (including commercial and office space).

The land readjustment project was carried out in 1998, but was completed only in 2011—ie the registration procedures for the new lots resulting from the renovations. The project was completed in 2015. The land readjustment instrument supported the development of four main roads, two squares around the station, several public spaces, and local streets. Project costs totaled 34.6 billion yen (US \$346 million), as covered by a national government subsidy and land reserve sales (US \$23 million). The average land contribution rate was 35%, used mainly for public facilities and services (Minoru 2017).

↓ **FIGURE** - BEFORE AND AFTER LAND READJUSTMENT IN AKIHABARA



Source: Minoru 2017

OVERVIEW OF THE AKIHABARA STATION TOD PROJECT



Source: Ron Ellis. Sunset at Akihabara Station in Tokyo. Dezembro, 2019. Shutterstock, consultado em 2020. www.shutterstock.com

- **Project area:** 8.76 hectares
- **Project implementor:** Tokyo Metropolitan Government
- **Number of landowners:** 35 (within the perimeter of the District Plan)
- **Project execution period:** 19 years (1997 to 2015) + 3 years of planning
- **Total development cost:** 34.6 billion yen (US \$346 million)
- **Average contribution of land to the public land bank:** 35.10% (34.22% for public land and 0.88% for the land reserve)
- **Daily station passenger count (2019):** 124,428

The case of Shinagawa Station

Shinagawa Station is one of the most important stations in the city of Tokyo and its metropolitan region. It serves as an intermodal hub for the bullet train (Shinkansen), bus system, shared bicycles, and more. It is a case study that exemplifies the role of the private sector in urban and

infrastructure development—presenting a case where private companies were allowed to design, manage, and operate TOD. The process involved a wide variety of stakeholders from landowners to property developers to different public institutions. It is considered a true international success story for its role in helping the city to overcome its 1991 housing crisis.



Source: East Japan Railway Company 2015

↓ **FIGURE – SHINAGAWA STATION FOLLOWING URBAN RENOVATION EFFORTS**



Fontes:
 (esq) GagliardiPhotography. Shinagawa station and skyline, Tokyo. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com
 (dir) Jose Luis Stephens. Shinagawa central Train Station with buildings of Shinagawa Intercity in Takanawa Avenue. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

Although land readjustment offers an important solution to urban expansion challenges, it presents difficulties for managing areas that are already built-up, as a result of the invariably higher number of landowners participating in redevelopment and readjustment processes. The National Urban Redevelopment Law thus reaffirms the government’s participation; it is required to pay one third of the basic expenses, including site studies, lot alignment, and open spaces, as well as half of the public infrastructure costs using special highway funds (Suzuki, et al. 2015).

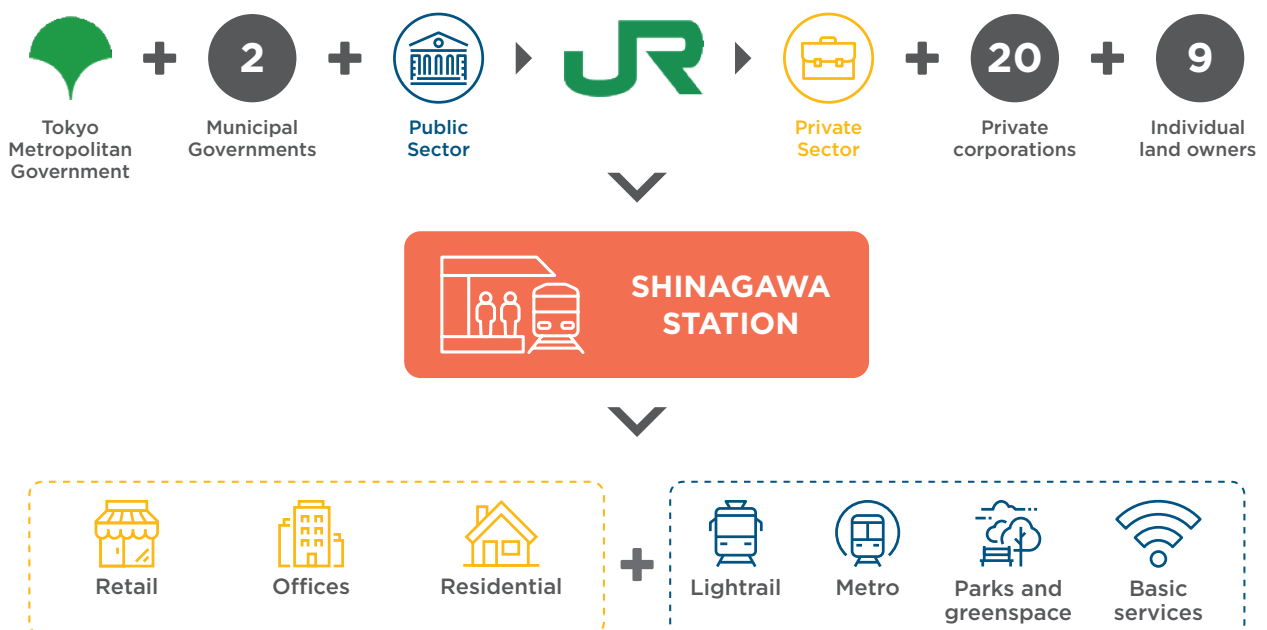
Using the tool, the planning department reviews the proposed plan for redevelopment and modifies zoning codes to support redevelopment by allowing for an increase in building heights (up to three times greater than that of a development that is not transit-oriented). This, in turn, makes projects financially viable by allowing landowners to retain their land rights (Suzuki, et al. 2015).

The Shinagawa Station case is a good example of the effective implementation of the Urban Redevel-

opment Law together with the land readjustment mechanism and the use of public auction as a financing mechanism for the construction of the railway infrastructure and for land value capture (LVC).

As part of the 1987 privatization process, the JNR Settlement Corporation took over a large portion of the JNR (formerly Japanese National Railways) properties in order to reduce the debt accumulated throughout the mid-1980s. A public auction was held to sell the large vacant railyards in central Tokyo, which, despite their high degree of complexity in terms of number of participating actors, nonetheless had the potential for high returns based on their central location. The JNR Settlement Corporation was thus able to market and develop around 10 hectares of the area dedicated to the Shinagawa railway and, in doing so, managed not only to pay off the large debt, but also to increase the value of assets themselves (Suzuki, et al 2015).

↓ **FIGURE - OVERVIEW OF THE ACTORS INVOLVED IN THE SHINAGAWA STATION RENOVATION PROJECT**



Source: Developed by IDOM based on information from Suzuki et al (2015) and World Bank (2017)

Shinagawa Station Project Stakeholders

Railyard functions were gradually relocated to other areas in Tokyo at a cost of 42 million yen (US \$382 million) over the course of 18 years; the development, meanwhile, took 14 years, with interventions focused around commercial and residential uses along six large blocks for a total area of 16.2 hectares.

Its strategic location—close to an economic center identified as part of the National Spatial Strategy—helped to spur the real estate market, and supply was absorbed naturally by demand. An estimated 300,000 passengers pass through this station on a daily basis, generating around 40,000 new jobs (Suzuki, et al. 2015).

OVERVIEW OF THE SHINAGAWA STATION TOD PROJECT









Source: Ron Ellis. The Granary Square is a new regeneration development with a dazzling ensemble of painted geometric shapes coordinating the scattered buildings. Agosto, 2013. Shutterstock, consultado em 2020. www.shutterstock.com

- **Project area:** 16.2 hectares (10ha of train maneuvering yards)
- **Project implementor:** Tokyo Metropolitan Government and JNR Settlement Corporation. Key stakeholders: JR East and JR Central, municipal governments, 20 private developers, and nine landowners.
- **Revaluation of the land:** \$ 17,000/m² (1996) - \$ 30,000/m² (2007)
- **Project execution period:** 14 years (1992 to 2006)
- **Total development cost:** 125 billion yen for land readjustment, infrastructure, and reallocation of existing uses (US \$ 1.137 billion) and 360 billion yen for building construction (US \$ 3.3 billion)
- **Average contribution of land to the public land bank:** 40.78% (38.5% for public spaces and the road system)
- **Daily station passenger count (2019):** 383,442

Regardless of the ultimate mixture of uses, all urban regeneration or TOD projects share the challenge of high construction costs—projects are only financially viable if land is sold at market value once a development is complete. A drop in land

prices is not sustainable in such a scenario, making the number of residential units a crucial point for development (Suzuki, et al. 2015). In the Tokyo metropolitan area, there are six types of mechanisms for land value capture, as presented below:

↓ **TABLE – SUMMARY OF THE SIX PRINCIPAL LAND VALUE CAPTURE MECHANISMS USED IN THE TOKYO METROPOLITAN REGION**

LAND VALUE CAPTURE MECHANISMS	DESCRIPTION	KEY ACTORS	LAND TYPE	EXAMPLE
Internalization	Carrying out land readjustment projects along rail lines, receiving the land reserved for property development, and allocating the capital gains from real estate to railways internally (“internalizing” external businesses in private railway companies)	Private railway companies	Urban & Suburban	Tokyo Corporation Denentoshi Line 
Requirement	Paying half of the construction costs of new town lines and providing the rights of way at a base price	Private railway corporations	Suburban	Hokuso Line 
Integration	Reserving the rights of way for new rail lines and increasing developable parcels for housing sales jointly through land readjustment projects	Local government and private developers	Suburban	Tsukuba Line 
Petition	Paying the construction costs of new station facilities, providing the rights of way for free, and creating station plazas and access roads through land readjustment projects	Local communities and private developers	Suburban & Rural	Linhas JR 
Agreement	Sharing the construction costs or development benefits of new rail projects (and pedestrian access pathways)	Developers and land/building owners	Urban & Suburban	Yokohama Line 
Auction	Selling former rail yard sites for private redevelopment around JR’s terminal stations to reduce the former JNR’s debt	JNR Settlement Corporation and private developers	Urban	Shinagawa 

Contributions of the Case

This case study features two main TOD-related strategies. On the one hand, it highlights the land readjustment tool, particularly as applied to non-central or low-complexity development areas with fewer land owners, such as in the case of the Akihabara Station. On the other hand, it shows how the urban redevelopment instrument allows, together with the land readjustment tool, for the renovation of more central areas with greater complexity and land fragmentation, as in the case of the Shinagawa Station.

The Tokyo metropolitan area has adapted traditional land value capture instruments for use in a number of TOD projects near metro and train stations. These adaptations have varied depending on the actors involved, the location, the period of implementation, and the scale of the project. Tokyo's experience can notably serve as a guide for regional capitals or large cities in developing countries whose legislation allows for the introduction of similar tools.

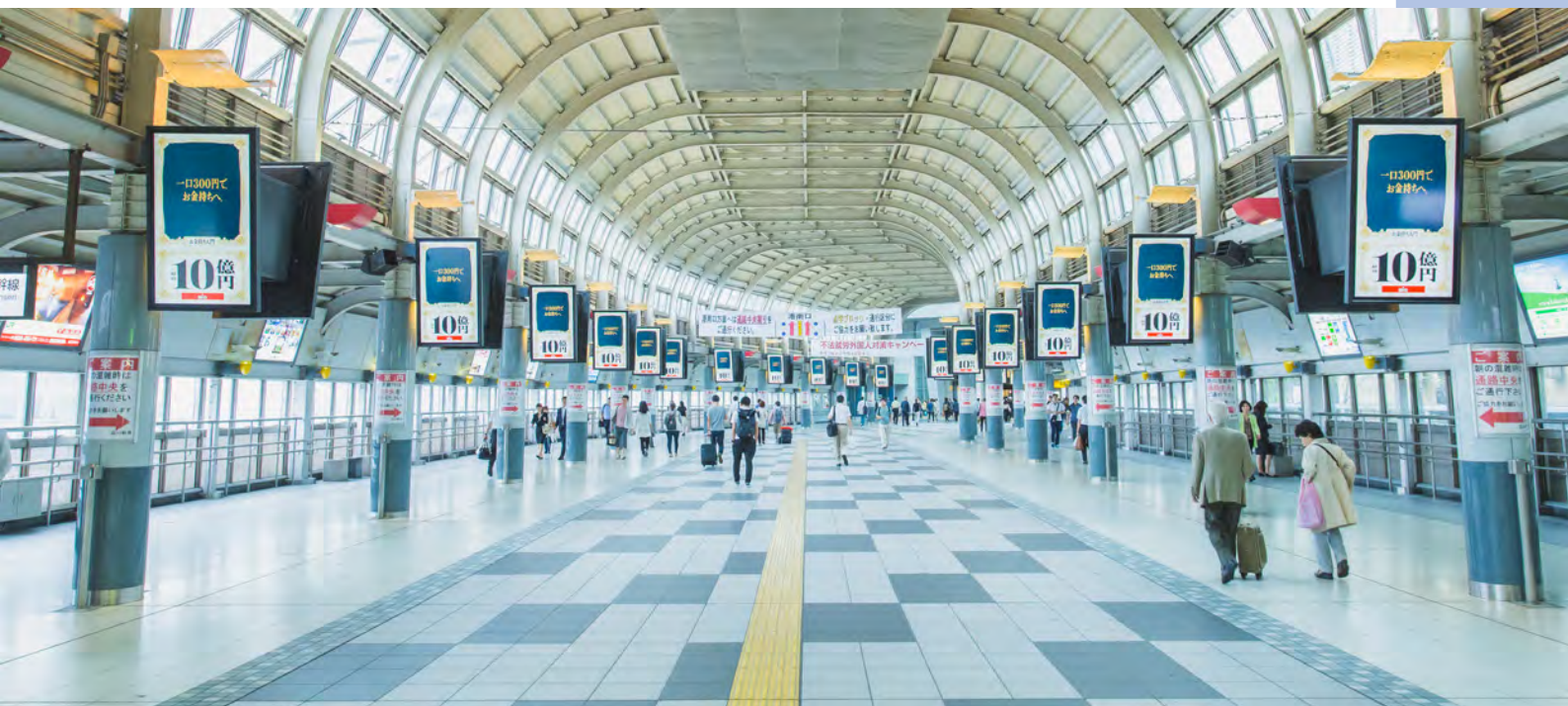
As explained by Minoru (2017), Tokyo's success can be largely attributed to the public sector's credibility in developing large urban projects, as

well as to the legal security offered to land owners and the strong private property rights on which the Japanese system is based. In addition to the subsidies and tax incentives offered by the national government, municipal governments and prefectures also have the economic means—as a result of their financial and legal autonomy—to promote land readjustment, helping to facilitate the economic viability of the projects.

The high technical capacity of the private sector and of municipal and prefecture governments in this case, meanwhile, allowed for the more efficient development of instruments. And the public commitment to the project with the recognition of the tool as a mechanism for improving the quality of life of Tokyo's inhabitants served to undergird its success a well.

In considering the potential application of land readjustment instruments in support of large-scale urban projects for public transit, it is important to note that the instruments, in this case, were based on national laws. In addition to their recognition within a multi-scale planning framework, they were complemented by the creation of Special Districts, which, as explained above, are defined above the municipal level.

Source: Panuwat Yutkitsataphon. Shinagawa station As one of the largest train station in Tokyo. Junho, 2015. Shutterstock, consultado em 2020. www.shutterstock.com



Source: QinJin. Empty street with urban landscape in Chongqing, China.
Date unknown. Shutterstock, consulted in 2020. www.shutterstock.com



Strategic lines to implement TOD in Brazil





Source: Joyfull. Cityscape with railway and high office buildings in Kuala Lumpur, Malaysia. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

Drawing on the main findings and themes collected from national and international TOD-related literature and case studies, we conducted a diagnosis of the current Brazilian reality at the different levels of government: national, state (with an eye towards the metropolitan), and municipal. We took into account the five key axes of analysis identified in previous chapters—**Institutional**, **Legal**, **Land Use**, **Financial**, and **Mobility**—as well as the cross-cutting axis of **Sustainability**, which influences the other five.¹ For each axis, we identified the pertinent instruments, institutions, regulations, organizational charts, plans, and pro-

grams with the potential to influence transit-oriented development in Brazil, either as an obstacle or as an incentive.

The resultant findings helped to define the form and framework of our recommended guidelines to support TOD-related efforts in the short, medium, and long terms. This work was organized along **five strategic lines** – to be presented in this chapter—with the objective of encouraging the development of a basic action plan to overcome the pertinent institutional, legal, and financial obstacles to the adoption of TOD systems in Brazil.

¹ For details on each axis of analysis, see page 62.

MEET THE FIVE STRATEGIC LINES

**GOVERNANCE AND INCLUSION**

1 This strategic line explores different forms of effective governance (both within Brazil and internationally) at differing scales of TOD-related efforts: national, state, metropolitan, municipal, and urban projects themselves. This includes tools for ensuring inclusion and mechanisms for evaluating and monitoring TOD policies and projects to ensure their effectiveness over the long term.

**TRANSFORMATIVE LAWS AND POLICIES**

2 This cross-cutting strategic line serves to support the other four lines, offering solutions and improvements to the current legal system at all levels of governance: from federal to metropolitan and local to intra-urban. It is essential for the realization of TOD projects, generating safeguards and ensuring legal stability.

**PLANNING AND MANAGEMENT INSTRUMENTS**

3 This strategic line explores the key instruments for TOD project planning and management, whether at the municipal and metropolitan levels or in project plans themselves. To this end, it seeks to highlight innovative urban solutions and instruments that can facilitate the implementation of TOD in Brazil, as well as existing instruments that can be improved and adapted to support TOD and 3C cities.

**FINANCING AND LAND VALUE CAPTURE**

4 This fourth strategic line can be found in all TOD-related literature. In the Brazilian context where there is a great lack of public resources to make urban projects feasible, innovative and effective financing tools are essential for TOD implementation.

**SUSTAINABLE MOBILITY AND PUBLIC TRANSPORTATION**

5 This last strategic line seeks to promote sustainable mobility and public transit-concepts that are essential for a 3C city. It offers a series of actions, innovations, and recommendations drawing from successful international case studies that can be replicated and applied in the Brazilian context.

GOVERNANCE AND INCLUSION

As outlined in the TOD Implementation Resources & Tools Guide², one of the main obstacles cities in developing countries face when implementing TOD projects is the lack of an institution capable of working at various levels of government and across sectors, including urban planning and development, mobility and transportation, and management and financing.

It is thus essential that public entities at the national level endorse a TOD strategy and establish a clear agenda that assigns responsibility for its implementation, so that the pertinent actors involved have institutional support and security in their implementation efforts (GPSC and WB, 2018). Along the same lines, Suzuki, Cervero and Luchi (2013) point out that the main factors for the successful implementation of TOD projects within the framework of institutional governance include:

- **strengthening institutional structures;**
- **implementing public policies that support TOD strategies;**
- **coordinating across the different sectors and jurisdictions involved.**

The ensuing analysis offers a series of actions that can be taken within the strategic line of Governance and Inclusion based both on the form of intervention and on the characteristics of the project's locale. Actions target federal and state entities who are primarily responsible for the public policies and governance structures that guide TOD strategic planning. Yet several proposed actions

focused around institutional tools for effective on-the-ground TOD implementation also target municipal and metropolitan actors, as they have the closest relationship with the territory itself and the citizens who will be impacted, making them the natural leaders of any TOD-related strategy.

It is important to emphasize that urban projects aimed at improving living conditions can completely fail if participatory processes are not properly managed. The complexity of TOD projects often implies both major urban transformations and changes in taxes and fees—making it essential to involve all key stakeholders in the discussions and decision-making. Similarly, establishing mechanisms for evaluating and monitoring TOD policies and projects is essential to ensure transparency and efficiency in the use of tools and to improve the planning for future TOD projects.

Finally, all of the above would prove immensely difficult without effective training for the technicians and managers of the institutions responsible for implementing TOD projects. To make TOD projects viable, such training should cover standards, new urban planning instruments, and use of financing mechanisms.

Building on these premises, this strategic line offers four guiding principles, each accompanied by proposed actions and recommendations with regards to institutional frameworks and the participation of key stakeholders in the TOD process:

² TOD Implementation Resources & Tools: Supported by Global Platform for Sustainable Cities (GPSC). Banco Mundial, 2018.



STRATEGIC LINE 1: GOVERNANCE AND INCLUSION

1st Guideline:

Coordination and cooperation in the design of TOD-related public policies



Actions

Create an institutional framework at the national level to promote TOD policies and projects

Coordinate TOD policy design and implementation across State-level institutions

2nd Guideline:

Metropolitan and municipal leadership for TOD project implementation



Actions

Develop mechanisms for coordination: metropolitan entities or implementing institutions

Establish institutional frameworks based on a project's scale and the municipality's management capacity in order to ensure active public sector participation in TOD project implementation

3rd Guideline:

Public participation in TOD project planning processes



Actions

Improve the identification and management of key stakeholders in the TOD participatory process

Create or maintain a Municipal or Metropolitan Council to monitor the implementation of TOD projects

4th Guideline:

Improve data collection and monitoring procedures and evaluation of results of TOD projects



Actions

Establish integrated databases for TOD project implementation

Establish a national TOD monitoring and evaluation system

Train technicians and municipal managers in TOD project implementation

A Coordination and cooperation in the design of TOD-related public policies

It is important to develop public policies that can assist in shaping both the design and implementation of TOD strategies. Public policies also serve to define common objectives and to develop a strategic vision for TOD at the national level, ensuring institutional alignment across different levels of government with regards to regional implementation.

The 2015 Estatuto da Metrópole³ (Metropolitan Statute) and other State-level mandates to promote metropolitan and regional mass transit infrastructure ensure that States also play a strategic role in the implementation of TOD projects within their territories.

A.1 Create an institutional framework at the national level to promote TOD policies and projects

From an institutional perspective, a successfully implemented TOD project relies on a governing model in which there is a clearly-defined leading institution equipped with tools and public policies that support TOD principles, operating in tandem with different sectors, entities, and pertinent jurisdictions.⁴

The national government, as endowed with the power to define public policies, is naturally equipped for the leading role of guiding the TOD implementation processes and in assisting municipal and metropolitan governments in their TOD projects.

MAIN RECOMMENDATIONS

• National institutional coordination

At the national scale, the institutions designated to support TOD efforts should be those with expertise in the areas of urbanism, mobility and transportation, and financing.

• Framework for national TOD leadership

Efforts can be divided along two timelines

Short-term: establish the Ministério de Desenvolvimento Regional⁵ (Ministry of Regional Development—MDR) as the institution to lead the development of TOD-related public policies and strategic coordination across different levels of governance. This Ministry has the power to develop urban infrastructure policy and to promote regional and economic development.⁶ It serves as one of the main interlocutors between municipalities and the Federal Government.

Long-term: develop and strengthen an institutional framework for the design and implementation of TOD policies. This includes formulating and managing cross-sectoral policies. Drawing on case study findings, a national TOD institution is an effective way to manage the complexity inherent in cross-sectoral collaboration; it can manage both relations across institutions at the national level as well as collaboration with multilateral development financing agents. It could also provide technical and financial support

³ The "Metropolitan Statute" was instituted by Federal Law n° 13.089/2015.

⁴ Suzuki, Cervero and Iuchi (2013)

⁵ "Ministry of Regional Development"

⁶ (October 2019). Available at: <https://www.mdr.gov.br/institucional>. [Accessed: 10/02/2020].

for municipal institutions or public sector companies responsible for executing or monitoring TOD projects. Such an institution can help guide complementary efforts and promote local projects through contribution programs⁷ for urban improvement, readjustment or redistribution, for example, in partnership with States, regional planning agencies, and municipalities.

- **Adopt sustainable policies and procedures for joining multilateral funds and cooperation**

In order to receive technical support or financing from development banks, it is necessary to have institutional alignment across national-level priorities and strategies and those of the multilateral banks and development agencies (Makino, 2015). In Brazil, most multilateral banks and development agencies with financing programs prioritize Mitigation and Adaptation to Climate Change and Sustainable Development as key areas of action.

One way to approach expanding TOD-related efforts could be to make such projects relevant to multilateral institutions as other countries have done through the Nationally Appropriate Mitigation Actions (NAMAs) program.

Through the program, countries can obtain resources from the Green Climate Fund (GCF) to implement strategic projects. Approaching TOD as a strategy to reduce GHG emissions for future development under the NAMA umbrella is a unique opportunity for Brazil to

achieve its TOD agenda through global partnerships and acclaim.

MAIN OPPORTUNITIES

The Ministry of Infrastructure’s “Trens Regionais de Passageiros”⁸ Program boasts great potential to help catalyze, coordinate and implement TOD projects. The program’s objective is to propose actions to increase passenger rail transport in Brazil using the existing rail network and future concessions emerging from the new network under construction. Technical, economic, social, environmental, and legal feasibility studies for routine deployment of passenger trains would be essential to identify potential TOD-related projects. There should already be cooperation between the Ministry of Infrastructure (the program leader), SNTT, ANTT, and Departamento de Mobilidade (Department of Mobility—MDR) to coordinate joint actions and strategies.

It is also important to emphasize the importance of financing and technical support from Caixa Econômica Federal (Brazil’s Federal Savings Bank) and BNDES (the Brazilian Development Bank). These federal institutions have the tools to support the implementation of TOD projects at both the local and regional levels. Both organizations function as a link between ministry programs and the management of funds. BNDES can obtain equity interest as part of PPPs or urban projects led by public companies. Caixa, meanwhile, can help manage the funds for projects of public interest (such as affordable housing).

⁷ Contribution programs offer a platform through which the population benefiting from a public project can participate in helping to cover the expenses that the project entails, sharing the financial burden with the public sector. <https://jus.com.br/artigos/66845/aspectos-legais-da-contribuicao-de-melhoria>.

⁸ Regional Passenger Trains

A.2 Coordinate TOD policy design and implementation across State-level institutions

A fragmentation and lack of cross-institutional coordination across State actors in charge of finance, planning, public works, and infrastructure reduce the effectiveness of regional policies and investments in cross-municipal transport infrastructure. In order for regional and metropolitan TOD projects to be successful, it is essential that there be State TOD guidelines in the form of regional urban norms and strategic plans to support coordination for cross-municipal TOD projects.

MAIN RECOMMENDATIONS

Considering States' limited jurisdiction over land use and planning—a power given instead to municipalities (art. 30, VIII of the Federal Constitution)—the recommendations for States are as follows:

- **Promote the coordination of urban development with mobility planning in cross-municipal projects.** Such strategic projects have a large-scale, regional impact. States should institute general urban standards, in accordance with national guidelines as well as outline cross-municipal TOD-related opportunities and programs based on the transportation infrastructure. As a result of the high costs invariably associated with implementing transportation infrastructure,

State participation is essential both for financial support and to generate greater security for private investors in the initial stages of TOD projects.

- **Create cross-sectoral working groups for the coordination of pertinent State-level institutions.** This includes at minimum the presence of the secretariats in the following areas: Management, Planning and Regional Development; Mobility; Housing; and Infrastructure Financing. Such a working group would establish and promote State and Metropolitan TOD-related programs within a federally-determined framework, thus serving as the link between national policy and local action.

MAIN OPPORTUNITIES

The Metropolitan Statute and the mandate to produce Planos de Desenvolvimento Urbano Integrados⁹ (Integrated Urban Development Plans—PDUIs) may allow States to play a greater role in regional planning. The PDUI, coupled with regional mobility policies—which often depend on state entities—offers a framework from which to promote, in an integrated manner, regional metropolitan and mobility planning according to TOD principles.

This opportunity is also related to the first recommended action associated with the next guideline: develop mechanisms for coordination in the form of metropolitan entities or implementing institutions.

9 "Integrated Urban Development Plans"

B Metropolitan and municipal leadership for TOD project implementation

Creating an institutional framework for TOD project implementation at the local or metropolitan level is essential to ensure a project's success and longevity. Each entity involved in the project will have different functions, but it is important that their role and responsibilities are clearly defined throughout the TOD project's various stages.

Thus, institutions responsible for TOD projects should meet the following three criteria:

- **Institutional capacity:** the entities involved in the TOD project must have the capacity and capabilities to support and advance the TOD's objectives and vision. The institutional framework should thus outline the form of participation and necessary contributions of each entity to the overall TOD strategy.
- **Levels of involvement:** entities can and should have different levels of engagement and involvement with the TOD project in question, according to their role and capacity to support and engage.
- **Institutional framework:** once the entities pertinent to the TOD strategy have been identified, their attributes and capabilities should be analyzed and developed into a coordinated framework of engagement, including potential legal support, key functions and activities, forms of participation (either the institution itself or with external actors), team members, etc

As TOD projects have a direct impact on the built environment, it is important that public institutions endorse TOD-related efforts and establish a clear framework for a project's execution, so that the various actors involved have institutional security of implementation. As a result of the nature of TOD, government leadership is generally necessary—more specifically, local government leadership at the municipal or metropolitan level in most cases. It is thus important that TOD principles and strategies be incorporated into urban/metropolitan policy, prioritizing public interests over private ones.

This particular guideline thus presents two clear recommendations: to establish metropolitan areas as the agents responsible for the implementation of regional TOD; as the leading institutions for projects at the intermediate scale (between states and municipalities); and to propose various institutional frameworks at the municipal and cross-municipal scales for TOD projects led by local entities.

B.1 Develop mechanisms for coordination: metropolitan entities or implementing institutions

The Metropolitan Statute established general guidelines for the planning, management, and execution of Funções Públicas de Interesse Comum (Public Functions of Common Interest—FPICs)¹⁰ in Brazilian metropolitan regions and urban agglomerations. Existing proposals boast strong synergy with the institutional needs and requirements of TOD projects at the metropolitan and regional scales.

¹⁰ FPICs are public policies or related actions that individual municipalities are unable to enact or that would affect neighboring municipalities (Law No. 13.089/2015, art. 2, inc. II).

- The creation of independent metropolitan planning and management entities with a long-term vision and their own legal powers is essential for implementing a regional strategy that coordinates urban planning and mobility efforts. In addition to ensuring the effective functioning of Regiões Metropolitanas¹¹ (Metropolitan Regions—RM) and Aglomerados Urbanos¹² (Urban Agglomerations—AU), once established, these entities would have the capacity to manage TOD project implementation.
- TOD projects at the metropolitan scale require greater institutional capacity than developments at the local scale, as they will affect more than one municipality, each with different dynamics, institutions, and governance conditions. Local public actors rarely have the capacity to coordinate across different sectors such as planning, mobility, and housing. (Giroux, 2017).
- In addition to coordinating across sectors, metropolitan entities could develop and manage a common project schedule, helping to coordinate and bring together the activities of different actors and institutions. Such a strategy would help to counter tendencies to compartmentalize activities—a key barrier to the coordination and execution of complex projects.

MAIN RECOMMENDATIONS

For TOD leadership at the metropolitan scale, we recommend an independent institution in the form of a metropolitan actor or entity, such as a public foundation or a public company.

In working across governmental authorities at the metropolitan scale, it is important to ensure that political-ideological positions not be superimposed on the public interest in the name of cross-municipal governance aimed at the common good. Metropolitan entities can play an important role in arbitrating conflicts of interest between two or more municipalities, and should act as mediators and, if applicable, impartial decision-makers in accordance with the common interests of the region.

It is noteworthy that of the 75 RMs and 9 AUs and Regiões Integradas de Desenvolvimento¹³ (Integrated Development Regions—RIDEs), only 7 RMs and 2 AUs are managed by metropolitan entities (indirect public administration), excluding the RMs and AUs of the State of São Paulo, which are managed by a public company (Emplasa¹⁴) currently undergoing liquidation. Its functions are currently being transferred to State institutions.

¹¹ As defined in the Metropolitan Statute, the Metropolitan Region is a regional unit consisting of a group of neighboring Municipalities as determined by State law to integrate the organization, planning, and execution of public functions of common interest.

¹² As defined in the Metropolitan Statute, Urban Agglomeration is a territorial unit that consists of the grouping of two or more bordering municipalities, characterized by functional complementarity and the integration of geographic, environmental, political, and socioeconomic dynamics.

¹³ Integrated Development Regions are metropolitan areas that encompass municipalities across different States with the objective of promoting projects for economic growth and development. Brazil has three RIDEs: the Federal District and the Surrounding Region, which encompasses 33 municipalities in the States of Goiás and Minas Gerais located close to Brasília; the RIDE Polo Grande Teresina (PI), comprising 15 municipalities in the states of Piauí and Maranhão located in the Teresina area; and RIDE Polo Petrolina (PE) and Juazeiro (BA), which includes 7 municipalities in the border region between Pernambuco and Bahia - <https://www.mdr.gov.br/saneamento/planos-de-saneamento-basico-das-ride-integrated-development-regions#:~:text=Thus%2C%20institu%C3%ADdas%20por%20Law%20Complementar,econ%C3%B4mica%20de%20territ%C3%B3rios%20em%20development.>

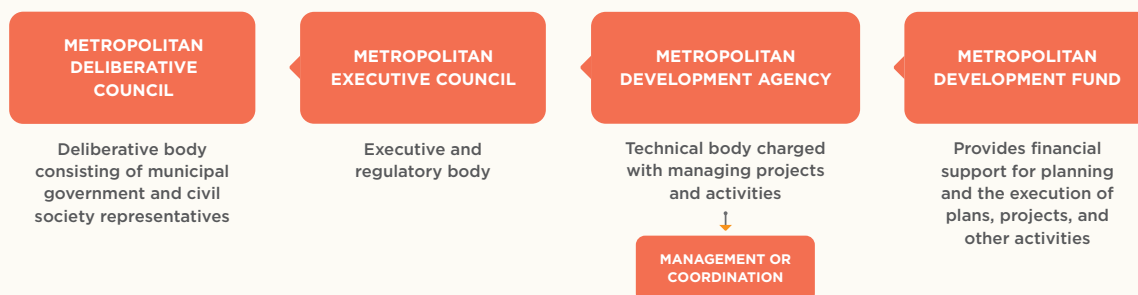
¹⁴ Empresa Paulista de Planejamento Metropolitano S.A. - Law 17.056/2019 and the General Shareholders' Meeting held on 8/21/2019 authorized the liquidation of Emplasa. <https://emplasa.sp.gov.br/>

BRAZILIAN CASE 2: RM DEVELOPMENT AGENCY OF THE CUIABA VALLEY—AGEM/VRC

AGEM/VRC was created as an autonomous entity—an indirect public administration body—with administrative and financial autonomy and an indefinite term. Its PDUI – dubbed the Integrated Development Master Plan for the Metropolitan Region of the Vale do Rio Cuiabá (PDDI/VRC¹⁵)—was approved in December 2018, with the main mission of integrating, planning, and executing public functions of interest for the integrated development of the Cuiaba Valley Metropolitan Region. These include land use planning, accessibility and mobility at the regional level.

It is important to note that the development of the PDDI/VRC was overseen by CODEM, the Cuiaba Valley Conselho Deliberativo Metropolitano (Metropolitan Council), composed of representatives of the region’s governments and civil society members. It received technical assistance from the Instituto Brasileiro de Administração Municipal¹⁶ (Brazilian Institute for Municipal Administration—IBAM).

↓ **FIGURE – METROPOLITAN GOVERNMENT BODIES OF THE VALE DO RIO BUIABA METROPOLITAN REGION**



Source: Developed by the authors with information from Complementary Law n 499 of July 22, 2013--D.O. 22.07.13. Accessed: 3/20/2020

Several of the plan’s strategies stand out:

- Its approach to defining the metropolitan areas of interest, including: (I) establishing a “priority” area for densification and diversified uses, as defined by the area of influence of the axes along which the light rail is planned in Cuiabá and Várzea Grande; and (II) the railway’s area of influence, upon its completion.
- The urban studies and projects planned may (...) include recommendations for the use of land value capture instruments to help recover public investments and/or changes to land use regulations¹⁷.

¹⁵ PDDI/VRC comprises the municipalities of Acorizal, Chapada dos Guimarães, Cuiabá, Nossa Senhora do Livramento, Santo Antônio de Leverger and Várzea Grande (source: Complementary Law No. 609, of December 27, 2018).

¹⁶ “Brazilian Institute for Municipal Administration”

¹⁷ Art. 64, §4°, of Complementary Law no 609/2018.

B.2 Establish institutional frameworks based on a project's scale and the municipality's management capacity in order to ensure active public sector participation in TOD project implementation

Institutional frameworks “are of great importance for the formulation, in an agile manner, of sustainable development policies, especially for policies that demand great cooperation from private actors” (Fiani, 2013). Along the same lines, it should be noted that institutional frameworks should be led or coordinated by public actors, ensuring active government participation, whether in the form of guiding strategies for the project's implementation or financial support to ensure a project's viability.

A project's institutional framework, on the other hand, cannot be standardized, as it is directly related to the institutional, political, and financial needs of the moment, as well as a number of additional moving forces, such as a city's current real estate dynamics or the public's expectations. It is possible, however, to draw on case studies to establish an overview of the most common frameworks for TOD systems, and to determine their pertinence for possible scenarios in Brazil based on the technical and management capabilities necessary to accelerate TOD implementation.

MAIN RECOMMENDATIONS

I. Either fully- or quasi-public companies can be effective institutions in managing and ensuring the viability of large-scale projects in RMs, AUs and municipalities with the necessary technical and financial capacities.

It is necessary to evaluate the best option based on the merits of each case. When the land is mostly public, for example, we recommend the options with greater public participation (public companies, consortia or quasi-public companies). When the land involved is mostly private, however, we recommend PPPs.

Fully public companies can serve as effective managers for TOD projects, overseeing both infrastructure planning and urban planning in the pertinent areas of influence. There are several case studies that demonstrate the feasibility of this type of institutional framework, including Bilbao Ría 2000, Panamá Metro Company, and the Bogotá Metro Company.

Quasi-public companies can also serve as effective institutions as a result of their greater capacities and operational flexibility as compared to fully public companies. Under this framework, the public sector's role can take on three forms:

- As the project leader: the public sector provides the financing, makes key decisions and assumes the main risks
- As a participant: the public sector plays a limited role, providing subsidies or support (in the case of PPPs) to allow private partners to obtain the necessary advantages that make the project/business attractive to the market
- An intermediate position: the public sector contributes jointly or more equally alongside the project's private partners in the financing of the project, and serves to help manage and coordinate efforts with other public entities.

QUASI-PUBLIC COMPANY: THE PORTO REGION'S URBAN DEVELOPMENT COMPANY (CDURP-RJ)

CDURP, established by Complementary Law No. 102/2009, manages the Operação Urbana Consorciada (Urban Project Consortium) for Porto Maravilha¹⁸. It is a mixed-capital company—incorporated as a corporation—with its own assets and legal standing. The municipality of Rio de Janeiro exercises control over the Company and is required to maintain a minimum of 51% of the shares. **It is authorized by law to take the form of a publicly-held company, with shares traded on the stock exchange or in secondary over-the-counter markets.**

CDURP has three main functions, in coordination with other municipal actors:

- The structuring, monitoring, and contracting of the Porto Maravilha PPP, and the establishment of the Concessionária Porto Novo (Porto Novo Concessionaire) which executes projects on the 500 hectares of the Área de Especial Interesse Urbanístico¹⁹ (Special Area of Urban Interest—AEIU) of the Porto Region of Rio de Janeiro alongside other public actors. It is worth mentioning that this relevant TOD since it involves regeneration of the port area, with improvements to public space, public services, and mixed-use developments as coordinated with the new light rail system.
- Project management, including the power to issue Cepacs²⁰, as accountable to the Comissão de Valores Mobiliários²¹ (Securities and Exchange Commission—CVM) and to the Secretaria Municipal de Urbanismo²² (Municipal Urban Planning Department) for joint project approval.
- Promotion of economic and social growth in the region, so that the company functions in many ways as a development agency, providing land for the market, for social services (affordable housing) and cultural projects (Porto Cultura Project and historical heritage restoration) (Da Gama and Werneck, 2017).

PROCEED ►

¹⁸ Urban Operations Consortiums are specific interventions carried out as coordinated across different sectors, including the public and private sectors, companies providing public services, residents, and other local stakeholders in pursuit of infrastructure, social, and environmental improvements (Source: São Paulo City Hall).

¹⁹ Special Areas of Urban Interest are areas that need to be better integrated into the urban fabric in order to take advantage of improvements already implemented or to reduce the precariousness of existing infrastructure. (Porto Alegre City Hall, 1999) - Available at: http://lproweb.procempa.com.br/pmpa/prefpoa/spm/usu_doc/guia_pddua.pdf

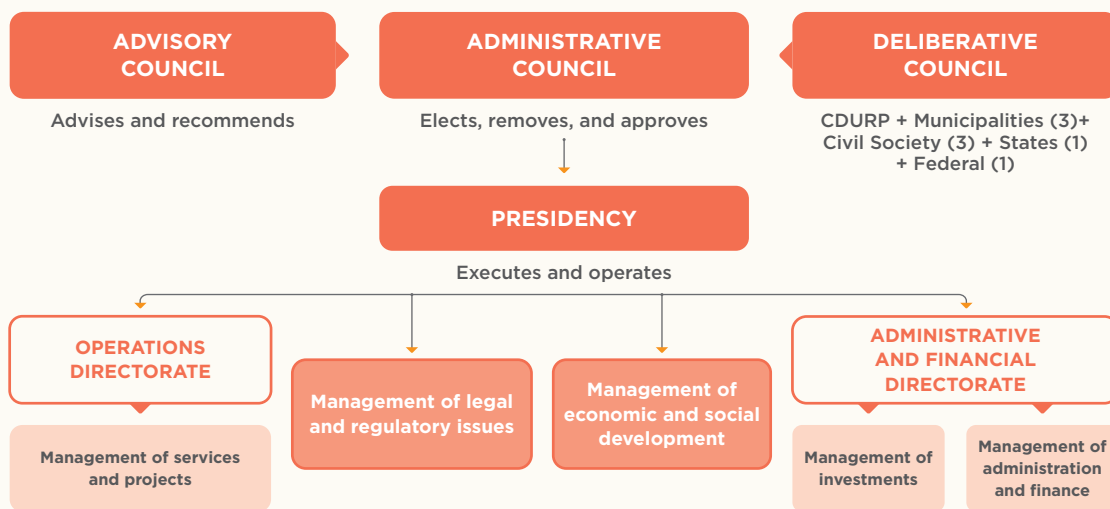
²⁰ Issued by the government, the Additional Construction Potential Certificate (Cepac) is used to finance Consortium Urban Operations - <https://www.aecweb.com.br/revista/materias/entenda-os-cepacs-e-as-operacoes-urban-consortium/16229>

²¹ "Securities and Exchange Commission"

²² "Municipal Department of Urbanism"

As an entity, it has administrative and financial autonomy, but is connected to the Secretaria Extraordinária de Desenvolvimento do Município²³ (Department of Extraordinary Municipal Development). It is governed by a Board of Directors, as assisted by an Advisory Board and a Fiscal Council, which elects, removes, and approves the actions and operations of the entity’s president and governing bodies, according to the figure below:

ORGANIZATIONAL STRUCTURE OF THE CDURP



The creation of CDURP and the Fundos de Investimento Imobiliários²⁴ (Real Estate Investment Trusts—FII) provided an autonomy that helped to shield the Porto Maravilha Urban Project Consortium’s planning efforts from political interference and management changes. Further, the Complementary Law that created the CDURP allows the body to participate in other urban projects in the city, meaning that the Porto Maravilha experience can be replicated for other municipal TOD systems. In order to be applied to projects outside of city limits, however, the law would need to be revised.

²³ “Secretariat of Extraordinary Municipal Development”

²⁴ Real Estate Investment Trusts were created by Law 8,668/93 and are regulated by CVM n472/08. A trust’s operation and public provision of shares depend on prior registration with the Securities and Exchange Commission. These are investment funds intended for investment in real estate projects, which include, in addition to the acquisition of real estate rights, investment in securities related to the real estate market, such as real estate bills of exchange (LCI), mortgage bills (LH), certificates of additional construction allowances, certificates of real estate receivables (CRI), and others are provided for as part of the regulations - https://www.investidor.gov.br/menu/Menu_Investidor/valores_mobiliarios/fundos_imobiliarios.html

II. The use of PPPs as an institutional framework for project execution and as a mechanism for the revitalization or re-urbanization of old industrial or derelict areas.²⁵ PPPs

serve as a method of cooperation between the public and private sectors, with the purpose of exploring or executing a specific project. PPPs are created through administrative concessions and operate under the assumption that the private partner will be more effective and more efficient in the provision and management of public works and services than the public sector.

In addition, PPPs offer a way to engage the private sector and to share gains catalyzed by the changes, without the need to necessarily contribute resources. PPPs will be explored at greater depth as part of the strategic line on financing; but it is important to note that they should be used as a mechanism for real estate development around transportation infrastructure, as opposed to for the financing of infrastructure itself.

III. The use of Public Consortia as an institutional framework for small municipalities with limited revenue. Law 11,107, of April 6, 2005 – Lei dos Consórcios Públicos²⁶ (Law of Public Consortia)—created a new potential framework for metropolitan and cross-institutional coordination. This new type of consortium allows not only for horizontal, but also for vertical integration across different public entities (Schvarsberg and Lopes, 2011).

For the fulfillment of its objectives, the public consortium may: enter agreements & contracts, as well as receive social or economic aid or contributions and subsidies from other

government entities and bodies; promote expropriations and institute easements under the terms of a declaration of public utility or need, or pre-determined social interest as carried out by the public actor; and be contracted through the direct or indirect administration by the consortium's entities, waiving bidding processes²⁷.

According to the Confederação Nacional de Municípios (2018), the Union does not participate as an associated entity in any consortium (in urban development and planning), emphasizing that this type of association is predominantly for small municipalities. Consortia serve as an alternative for these cities, as a relatively simple institutional model for the implementation of infrastructure-related public policies and for the development of small TOD projects associated with basic transportation-related infrastructure such as: (i) central bus stations where several lines compete; (ii) main road axes with or without an exclusive lane for an intercity bus network; or even (iii) BRT corridors in medium-sized cities with established transportation networks.

- Public Consortia are autonomous legal entities that integrate the indirect administration of public sector entities at different levels of government to ensure coordination across key public actors (National, State, Federal District and Municipalities).
- It is important to note that even if there are no successful cases in Brazil of creating Public Consortia for large-scale urban projects, the use of such an institutional framework that integrates the different levels of government can help to catalyze TOD projects that are economically and institutionally sustainable.

²⁵ Legal Encyclopedia of PUCSP: Urban concession by Alexandre Levin. (2017). Consulted at: <https://enciclopediajuridica.pucsp.br/verbete/111/edicao-1/concessao-urbanistica->

²⁶ "Public Consortium Law"

²⁷ Law no 11.107/2005, art. 2º; §1º; incisos I, II e III.

MAIN OPPORTUNITIES

The approach taken by the São Paulo PD (2014) to involve private companies in the city's revitalization and re-urbanization efforts serves as a good example of effective use of PPPs to help implement TOD projects. This strategy could be used more broadly for TOD projects in other regions in order to bring more stakeholders into the fold.

Although there are no cases of using Public Consortia for large-scale urban projects to date, the institutional framework was notably considered among the options for the Porto Maravilha Urban Project Consortium (Rio de Janeiro) as investigated by the inter-ministerial working group led by the Ministério das Cidades and supported by the Casa Civil and the Secretaria de Patrimônio da União (SPU) between 2004 and 2009. Nonetheless, the decision was ultimately reached to adopt the CDURP's current form as a quasi-public company.

Source: Metamorworks. Partnership of business concept. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



C Public participation in the TOD project planning processes

This third guideline pertains to both the planning and the implementation of TOD-related projects, with an emphasis on public participation in decision-making processes.

Stakeholder mapping is fundamental to the success of participatory processes. Once a TOD's area of influence and its impacts have been identified, there should be a survey of the local public and private sector actors as well as the public itself (which can be represented by a civic organization). Participation can be manifested in several different ways:

- Public workshops throughout the TOD process, including planning, analysis, and proposals.
- Public hearings for the general community as well as specific sectors.
- A website with interactive tools for communication that are routinely updated, including a presentation of the results, project monitoring, and other pertinent information.
- Tools for responding to project applicants.
- Training courses for interested parties on relevant topics (which can be carried out in person or online).
- Publicity campaigns for the participatory process and/or advertising campaigns about the project and results.

Private sector participation can also be expanded in addition to the aforementioned strategies. Such opportunities include:

- **Expressions of Interest:** this is an alternative approach for the public sector in which private sector companies develop analyses and proposals for projects within the TOD's area of influence with the intention of entering into PPPs and/or concession contracts.
- **Expressions of Private Interest:** under this approach, private entities can take the voluntary initiative to propose studies, projects, and solutions. In the case of TOD, this could include developing transit infrastructure or commercial areas within TOD areas of influence.

The public sector's project costs are reduced in both cases, as is the need to develop projects internally. The approaches also serve to incorporate more entities and potential solutions into TOD efforts, as well as the benefit of adding private vision to the project. It is important to note that the public sector would still lead and structure TOD-related efforts in the city. There are thus two primary overarching tasks: "Improve the identification and inclusion of key stakeholders in the TOD participatory process" and "Create or maintain a Municipal or Metropolitan Council to monitor the implementation of TOD projects".

C.1 Improve the identification and inclusion of key stakeholders in the TOD participatory process

The City Statute (2001) incorporates public participation in urban planning decisions into the country’s legal framework. It is thus legally mandated that civil society be included both in initial discussions as well as in a project’s implementation and monitoring processes through workshops, public hearings, debates, council meetings, and working groups. An analysis of existing case studies would indicate, however, that participatory processes in urban projects in Brazil have been heretofore poorly implemented. Municipal laws, for example, offer only limited opportunities for public participation, often limited to public hearings.

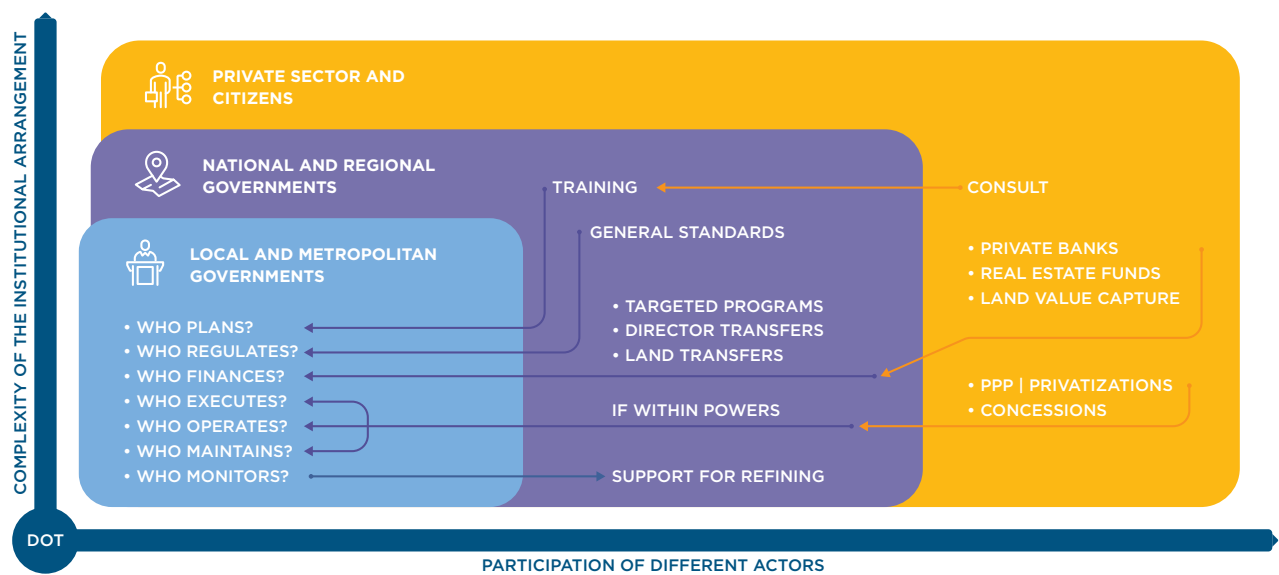
It is thus necessary to reverse this approach; to place a greater emphasis on participatory processes in an effort to develop 3C cities.

MAIN RECOMMENDATIONS

The implementation of TOD projects should:

- Adopt clear mechanisms for public participation: this is a challenge that cuts across all aspects of designing TOD-related policies and implementing TOD-related projects. It is essential to strengthen national, state, and municipal guidelines so as to ensure effective public participation in decision-making regarding TOD policies and projects. It is also important for participants to feel that their demands have been met and that they have control over the project outcomes as measured by indicators and goals.
- Conduct stakeholder mapping for TOD-related projects, a process that depends on: (i) the scale at which the discussion is taking place (national/central; state/regional; metropolitan, municipal or local/zonal); or (ii) the step in the TOD process—whether in the planning or execution stages.

↓ **FIGURE - PARTICIPATION OF VARIOUS ACTORS IN DIFFERENT PHASES OF TOD PROJECTS**



Source: Developed by the authors

Next, we explore the process of identifying key stakeholders at different phases of TOD-related projects:

- I. **TOD project planning:** this phase involves planning and organizing the project's interventions through analyses and proposals (defining the mode and technologies to be implemented as well as necessary investments, forms and sources of financing, and the project's governance structure). The execution of this phase is primarily the responsibility of the coordinating body (local government). Yet important contributions can be made from other entities:
 - *Central and Regional Governments* can assist in training managers in related topics and in exploring public instruments and policies that can either assist or disrupt the process as a whole.
 - *Private Sector and the Public* need to be participants in discussions and strategic planning, so as to be a part of the whole process and to take ownership of the proposals to be carried out. The private sector can participate in several areas: project execution, direct financing, transit system operation, real estate sector analysis, etc. The public participation process, in turn, needs to be carried out across several different sectors of society. Discussions need to consider or involve individuals who will be affected by associated interventions (expropriations, resettlements, etc.).
- II. **TOD implementation:** the phase in which the entire legal structure and legal framework are prepared for the project's execution, with a defined governance framework and clear budgetary planning and financial models. At this phase, the coordinating body is in charge of the project's implementation, including pertinent investments and financing, but they can count on collaboration from a number of other actors:
 - *Central and Regional Governments* can promote financial transfer programs (direct and indirect) for the project's execution, in addition to providing public lands in their jurisdictions. The national government can also connect the project with multilateral entities that can finance all or part of the operations.
 - *Private Sector:* depending on the arrangements and demands, the private sector can participate in several ways, including the project's execution through PPPs, direct financing through private banks (indebtedness), and indirect financing through land value capture, among others.
- III. **TOD Operation and Maintenance:** once the project is completed, transportation system operations and urban renewal/transformation efforts begin. The coordinating body or local government are once again responsible for the execution and management of this phase, which aims to ensure the functioning of the transportation system and the project, as well as its maintenance, over time.
 - *Private Sector:* can participate in the transit system's operation, as well as in the urban renewal process itself.
- IV. **Refinement:** this final phase involves assessing and monitoring the established goals and the intervention as a whole, taking into account its economic, financial, urban, social, and environmental sustainability. Necessary changes and improvements need to be orchestrated and managed by the coordinating body or local government, but they should also meet the demands and desires that may arise from public participation and monitoring²⁸.

A LACK OF PUBLIC PARTICIPATION IN THE NOVA LUZ SPECIAL URBAN PROJECT (SP)

The Nova Luz Projeto Urbanístico Específico (Special Urban Project) aimed to renovate and revitalize an area of 30 hectares in downtown São Paulo. The area contained historically valuable buildings, including the famed Estação da Luz. Begun in 2005, the project was suspended by the courts in 2011 and 2012 and finally shelved by the mayor in 2013. It was immensely controversial as a result of the instrument applied—Land Concession—as the land involved was mostly privately owned. Today, it serves as a clear example of the failure of a TOD-related project in Brazil, due to a poorly managed participatory process.

Main barriers

- The political decision to use Land Concession as part of the Nova Luz project received no public input; there was no public hearing. (Court of Justice of SP)
- The project required immense public investment (R\$600 million + tax incentives), despite the intent of the Lei da Concessão Urbanística²⁹ (Urban Concession Law), which anticipates private sector financing. A PPP is recommended as the best instrument for such an undertaking.
- The private sector was disinterested in funding the project, as it was not convinced that the land would appreciate and the area be transformed.

↓ FIGURE – PERIMETER OF THE NOVA LUZ PROJECT.



Source: SP-Urbanismo (2011). Nova Luz--Consolidated Urban Project. Municipal government of Sao Paulo--Urban Development

This case exemplifies the situation of several urban projects and their participatory processes in Brazil. Despite legislation mandating public participation, project decisions are actually approached in an authoritarian manner without stakeholder input—particularly without the voices of more vulnerable stakeholders with limited financial means.

²⁹ "Urban Concession Law"

C.2 Create or maintain a Municipal or Metropolitan Council to monitor the implementation of TOD projects

Councils, also called public policy councils, are among the key platforms to allow for citizens to actively participate in the process of creating public policy in Brazil. However, there are currently efforts across the country to dismantle these bodies, reducing opportunities to give voice to and serve different sectors of society in the development of urban projects.

Municipal and metropolitan councils should be tasked with monitoring and executing TOD strategies for cities or regions, as well as projects themselves; this includes reviewing and preparing pertinent policies and regulations and developing guidelines for TOD interventions in the public realm.

MAIN RECOMMENDATIONS

As the best platform to bring together civil society and local public sector actors, councils should be

responsible for monitoring a TOD project's public participation from planning to execution. A city's Municipal or Metropolitan Council is tasked with integrating urban development policies across different sectors, most notably urban planning, housing, sanitation, and urban mobility.

- In practice, councils boast a wide array of nomenclatures: Conselho das Cidades (Concidade), Conselho Municipal de Desenvolvimento Urbano or Conselho Municipal de Desenvolvimento e Urbanização (CMDU). Nonetheless, regardless of name, it is important that both civil society and public actors are well-represented on the council tasked with monitoring and evaluating the TOD project implementation.
- It is necessary to involve local communities (neighborhood associations or residents) from the areas affected by TOD—individuals living in the project's areas of influence. This should take the form of a working group that can collaborate with the Municipal Council or the Metropolitan Council as necessary, depending on the project's potential impacts on the wellbeing and the identity of the communities in question.

Source: Chinnapong. Microphone voice speaker in town hall meeting. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



D Improve data collection and monitoring procedures and evaluation of results of TOD projects

A lack of geographic data is one of the major barriers to TOD implementation in Brazil. Municipalities, States and the national government itself do not have updated and interconnected geographic and cadastral databases, which, in turn, hinders the planning and execution of urban projects. Improving data collection and systematization is an initial and fundamental step towards enabling the adoption of TOD systems.

As for TOD monitoring, the use of indicators - including sustainability-related ones - is the best approach for analyzing the strategies adopted, establishing goals, and evaluating the results achieved. This includes technical criteria that can be measured, and, significantly, be easily understood by different actors, including the TOD leadership structure.

Established goals based on indicators should have a temporal dimension, as expected outcomes can occur in the short, medium or long terms. Municipalities and metropolitan regions also need trained professionals who can effectively collect and monitor the pertinent data.

This guideline thus has three recommended actions: (i) "Establish integrated databases for TOD project implementation"; (ii) "Establish a national system for monitoring and evaluating TOD projects"; and (iii) "Training of technicians and municipal managers in the implementation of TOD projects"

D.1 Establish integrated databases for TOD project implementation

There is only limited data on both public and private land ownership across several national-level

entities in Brazil, including data on land tenure, property limits, cadastral information, land value, and titles, among others.

This, in turn, impairs the implementation of projects, resulting in cost increases from such things as terms of expropriation. The lack of information also hinders the voluntary participation of property owners, and undermines project management and the use of TOD-related instruments as outlined in the City Statute. The fact that municipalities are unaware of their land and borders further prevents the collection of property taxes and the effective implementation of land value capture strategies.

MAIN RECOMMENDATIONS

- Create a geo-referenced database to share information across the different institutions that are responsible for managing public lands at the national and state levels. A database that defines the scope of TOD projects and could serve this purpose is being created as part of the Política Nacional de Desenvolvimento Urbano (National Urban Development Policy—PNDU).
- It is important to establish clear communication and project-specific roles for different government entities and their properties (as analyzed on a case-by-case basis). Alongside this, it is important to improve project management, institutional structures, and operational efforts, which are often not adequate to serve the needs of urban projects or are not possible at smaller scales or for projects conducted by small municipalities.
- Create a multisectoral database, where municipal and metropolitan managers and technicians can find information directly related to urban planning. This includes, for example, property value³⁰ and cadastral maps, from

³⁰ A property value map is a mechanism used in the real estate market to subdivide urbanized areas into value zones, in order to determine the value of the square meter of construction - <https://www.agenteimovel.com.br/noticias/pgv-plant-generica-of-values/>

which it is possible to calculate and update property tax values and property transfer tax values in municipalities where such data is out of date, or to find information on tax debt, current property conditions (if current regulations are being complied with) or owner data.

regions should feed information into the national system, which can serve as a transparent database for all government entities..

MAIN RECOMMENDATIONS

D.2 Establish a national TOD monitoring and evaluation system

Monitoring urban policies and projects—especially TOD-related projects—ensures greater transparency and public participation, by tracking improvements and verifying that pre-determined objectives were fulfilled. An evaluation methodology should be agile, recurring, and technically and economically feasible. It should also be based on indicators so as to go beyond a TOD project's leadership, and instead enable evaluation by other sectors (other public entities, the private sector, and civil society in general) in addition to the leading public institutions.

A national system that makes it possible to monitor all TOD projects at the national scale can help:

- Create, improve and adjust public policies/national TOD financing mechanisms that are passed on to municipalities/metropolitan regions;
- Monitor the effectiveness of TOD projects. To this end, municipalities and metropolitan

Establish a single national system and platform open to the general public in which cities/metropolitan regions enter their data, the completion of which could perhaps result in federal transfers. This tool should be made available even in advance of the implementation of the first TOD projects.

Initial diagnostics for TOD projects should serve as inputs to establish a series of parameters and TOD indicators. TOD projects, once implemented, should then undergo periodic analysis and review. The information collected will serve to assess the socioeconomic and environmental benefits, in addition to serving as a basis for future sustainable urban development strategies in Brazilian cities.

It is important to emphasize that two scales of evaluation should be included as part of this process: (i) policy objectives or TOD strategies; and (ii) indicators regarding the benefits of TOD projects. To evaluate TOD policies, it is necessary to have data at the municipal or metropolitan scale. To evaluate the projects themselves, however, data from TOD areas of influence is necessary.

↓ **FIGURE** – PROPOSAL FOR POTENTIAL TOPICS AND SUBTOPICS FOR A NATIONAL SYSTEM OF TOD INDICATORS

POTENTIAL TOPICS AND SUBTOPICS FOR MONITORING TOD PROJECTS



Source: Developed by the authors (2020); ITDP Brazil (2017); IDOM Colombia (2018); EMBARQ Mexico (2013)

MAIN OPPORTUNITIES

There are two national initiatives that could be initially relied upon to help assess TOD project implementation:

- **Programa Cidades Sustentáveis³¹ (Sustainable Cities Program—PCS):** with support from the Global Environment Facility (GEF) and the UN, the PCS offers support for municipalities for the implementation and fulfillment of Sustainable Development Goals (SDGs). It also has socioeconomic and development indicators, in addition to a series of guidelines for integrated sustainable urban planning.
- **Observatório de Inovação para Cidades Sustentáveis (Sustainable City Innovation Observatory—OICS):** works to disseminate innovative urban solutions in sustainability, in addition to collecting information from the PCS through integrated planning efforts within the fields of transportation, energy, climate change, and public participation.

In addition, MDR is already working towards developing a unified platform for data and mobility

indicators (SIMU³²), which has great synergy with TOD efforts and could be adapted to receive municipal and metropolitan information from TOD projects.

D.3 TOD project implementation training for technicians and municipal managers

Many institutions at varying levels of government do not have the economic and physical resources to carry out either data collection and systematization or indicator monitoring and standardization. A lack of homogenization in monitoring and evaluation methodologies means monitoring systems are of little use for planning processes or for developing reliable assessments; evaluations are in many ways being carried out more effectively by non-profit organizations and civil society groups.

One of MDR's main functions is precisely to support municipal and social agent training efforts in the areas of planning, urban services, and land management (MDR, 2019). This, in turn, improves the performance of the institutions in charge of developing municipal and metropolitan TOD projects. Building knowledge and capacity around urban planning instruments, financing mechanisms, and land value capture is essential for the economic, technical, and social viability of TOD projects.

³¹ The Sustainable Cities Program is an urban sustainability program that works to incorporate social, environmental, economic, political, and cultural dimensions into municipal planning. Since 2012, the program has been working to raise awareness and mobilize local governments to implement public policies that contribute to tackling social inequality and building fairer and more sustainable cities. Structured into 12 thematic axes as aligned with the United Nations' Sustainable Development Goals (SDGs), the program offers tools and strategies to support public management and integrated urban planning, as well as mechanisms for public participation. The program's tools include a set of 260 indicators related to different areas of public administration, a monitoring panel for established goals and software that allows for comparisons across cities. The program also offers an overview of best practices and successful case studies of pertinent public policies in Brazil and across the globe, a training and capacity building program for municipal public managers, and information for the general public. - <https://www.cidadessustentaveis.org.br/institucional/pagina/pcs>

³² Sistema de Informações em Mobilidade Urbana (Urban Mobility Information System)

MAIN RECOMMENDATIONS

Based at the national level, the MDR and the IDB could carry out training courses for municipal and metropolitan managers based on the recommendations outlined in this document. Suggested themes include:

- Concepts and strategies for TOD.
- Methods for implementing TOD projects in different contexts.
- TOD-related data collection and monitoring.
- Implementation strategies for Partial Plans and Land Readjustment (as will be explored at greater length in the strategic line examining planning and management instruments).
- Mechanisms for collecting and increasing municipal taxes to finance TOD projects (as addressed in strategic line 4 on financing)

At the metropolitan and municipal levels, institutions responsible for implementing TOD projects should build multidisciplinary technical teams and employ managers with an integrated view of the pertinent subjects (urban legislation, land use planning, financing mechanisms, land title regularization, and urban mobility and transportation, among others). It is also important to know how to evaluate the applicability of urban planning in-

struments, such as the *Outorga Onerosa do Direito de Construir*³³ (Sale of Building Rights—OODC), Urban Project Consortia or *Contribuição de Melhoria* (Special Assessment Tax); or new instruments, such as Land Readjustment or “TOD urban intervention plans” in considering their possible impacts on TOD strategies.

MAIN OPPORTUNITIES

The Programa Nacional de Capacitação das Cidades³⁴ (National City Capacity Building Program—PNCC) could be a great resource to help create a TOD capacity building program for municipalities, RMs and AUs based on the aforementioned framework. The website www.capacidades.gov.br provides tools to take advantage of pertinent new technologies and related resources (2020). Activities and studies could be carried out for all institutions responsible for planning, implementing, and evaluating TOD policies and projects.

As part of the umbrella of efforts associated with developing the PNDU, meanwhile, the MDR is developing a training strategy—with partnerships and resources—in sustainable urban development, which also pertains to more specific subject areas such as TOD.

³³ The “Onerous Grant of the Right to Build” refers to a government concession permitting the property owner to build above the permitted limit, as a result of financial considerations. The city then charges for the additional use of urban land, reinvesting the additional resources in the city itself, creating a virtuous cycle <https://wribrasil.org.br/pt/blog/2019/08/o-que-e-grant-onerous-of-the-right-to-build>

³⁴ The PNCC is the means by which the MDR promotes, coordinates, and supports programs for institutional development and technical training, to fulfill its requirement to ensure that programs and projects are executed effectively and efficiently.



Source: Blvdone. Blvdone. Crowd of strangers walking on a busy New York street.
Date unknown. Shutterstock, consulted in 2020. www.shutterstock.com.

TRANSFORMING LAWS AND POLICIES FOR TOD

The Brazilian legal planning framework evinces characteristics both supportive of and in hindrance to TOD efforts at the state and municipal levels. While the system itself is by and large favorable to TOD—as could be enhanced through new instruments and institutions—there are nonetheless several pre-existing restrictions that require improvements to current laws and policies. In particular:

- The difficulty in implementing programs and activities provided for in regulatory instruments due to a failure to collect or connect the necessary financial resources.
- Institutional and administrative fragility, mainly at the local level, making it difficult to develop self-enforcing laws, lead complex projects, develop, maintain, and update databases with strategic planning information, implement urban planning instruments, and monitor all of the above.

Taking these restrictions into account, this strategic line proposes actions and recommendations to promote a framework for urban planning policies and regulations that is compatible both with the local reality and the Federal Constitution.

Source: Valery Evlakhov. The concept of law and justice. Date unknown. Shutterstock, consulted in 2020. www.shutterstock.com





STRATEGIC LINE 2: TRANSFORMING LAWS AND POLICIES FOR TOD

1st Guideline:

Legal measures that align with TOD strategies



Actions

Review the national standard that regulates urban policy—the City Statute

Codify the integration of land use and transportation within the National Policy for Urban Mobility

2nd Guideline:

TOD strategies as part of national development and infrastructure policy



Actions

Incorporate TOD concepts into national development plans as a tool to achieve sustainable development

3rd Guideline:

TOD in metropolitan and regional planning and regulatory instruments



Actions

Adopt TOD strategies as part of the Integrated Urban Development Plans (PDUJ) and in other Metropolitan Statute instruments

Develop and codify metropolitan mobility plans based on national mobility policies

Incentivize the development of long-term strategic development plans with participation from both municipal and private sector actors in areas where urban planning policies and actions, transportation infrastructure and urban services collide

4th Guideline:

A planning system and legal framework at the municipal level capable of supporting TOD-related strategies



Actions

Adopt guidelines within municipal master plans that facilitate TOD strategies

Incorporate smaller-scale plans and related instruments into Master Plans

Adopt guidelines in Mobility Plans that reconcile daily trips with land use choices



Source: Rafapress. St. Photo shows the Constitution of the Federative Republic of Brazil. Julho, 2019. Shutterstock, consultado em 2020. www.shutterstock.com

A Legal measures that align with TOD strategies

The main national-level TOD-related measures include: the Federal Constitution (1988), the City Statute (Law nº 10.257/2001), the Política Nacional de Mobilidade Urbana (Urban National Mobility Policy—PNMU; Law No. 12,587/2012) and the Metropolitan Statute (Law No. 13,089/2015).

The **Brazilian Federal Constitution** established a system of urban law composed of constitutional urban planning policy standards, federal urban policy laws, and municipal planning rules (such as the Fundamental Law, Master Plan, and other municipal urban planning legislation). The document also defines the planning powers of different levels of government in Brazil¹: the na-

tional government sets the general rules for urban planning law, the system for urban plans, planning and management instruments, and basic urban standards; States establish metropolitan areas; and Municipalities are responsible for legislation related to planning, land use, and parceling, in addition to preparing a Master Plan and other urban planning documents.

The **City Statute**, established by Federal Law nº 10,257 of 2001, fleshes out the Federal Constitution's chapter on urban policy and introduces urban, property, and tax instruments to be applied mainly by municipalities in order to promote development and land management. The Statute gives municipalities relative autonomy to establish their own urban development strategies and urban planning instruments, as long as the general urban policy guidelines as defined in the Con-

¹ Brazil's federal system is composed of the national government, states, the Distrito Federal, and municipalities. That includes 27 subnational federative units (26 states plus the Distrito Federal) and more than 5000 municipalities. States and municipalities are subordinate to the national government and the Federal Constitution, yet they have a degree of autonomy with respect to management, legislative, and tax collection powers.

stitution and in the City Statute are met, including the social function of property, democratic management, and the right to a sustainable city. Despite the autonomy given to municipalities and the preeminence of the municipal master plans in the Brazilian legal system, the national government still plays a central role in urban planning policy: it establishes general rules and promotes a planning system that is integrated across all levels of government. It can also facilitate the integration of planning policies with those of other urban sectors.

In addition to the City Statute, there are a number of other pertinent laws and policies that have been developed at the federal level. The **National Urban Mobility Policy (PNMU)** is particularly noteworthy among them, as it is inherently related to TOD efforts. Established by Federal Law No. 12,587 of 2012, the PNMU serves as a complement to the City Statute and obligates municipalities with more than 20,000 inhabitants to develop an Urban Mobility Plan. The Plan should be integrated and compatible with a city's Master Plan and, when applicable, with its Integrated Urban Development Plan (PDU)². The coordination between those two documents—the Master Plan and the Mobility Plan—represents a significant step forward in facilitating TOD within the existing regulatory framework.

Finally, the **Metropolitan Statute** is a third federal law with direct implications for TOD, as approved by Federal Law n° 13,089 of 2015. When discussing metropolitan areas in Brazil, it is essential

to remember that the autonomy granted to municipalities in the Federal Constitution came at the detriment to regional interests and metropolitan areas. Although it established the structure, land management, and resource collection and distribution frameworks at the municipal level, it made it much more difficult to develop agreements regarding shared management across municipalities within metropolitan regions. “Most of the municipalities that are required to develop Master Plans can be found in metropolitan regions, urban agglomerations, or are medium-sized cities part of a larger regional dynamic. When choosing to draw boundaries at the municipal level, one loses the context of a municipality's impacts beyond its borders, treating large-scale issues instead in a one-off manner as opposed to a system-based one.”^{3,4} The Metropolitan Statute is the main regulatory effort aimed at reducing the challenges of Brazilian metropolitan management, with a particular focus on addressing the urban infrastructure deficit.

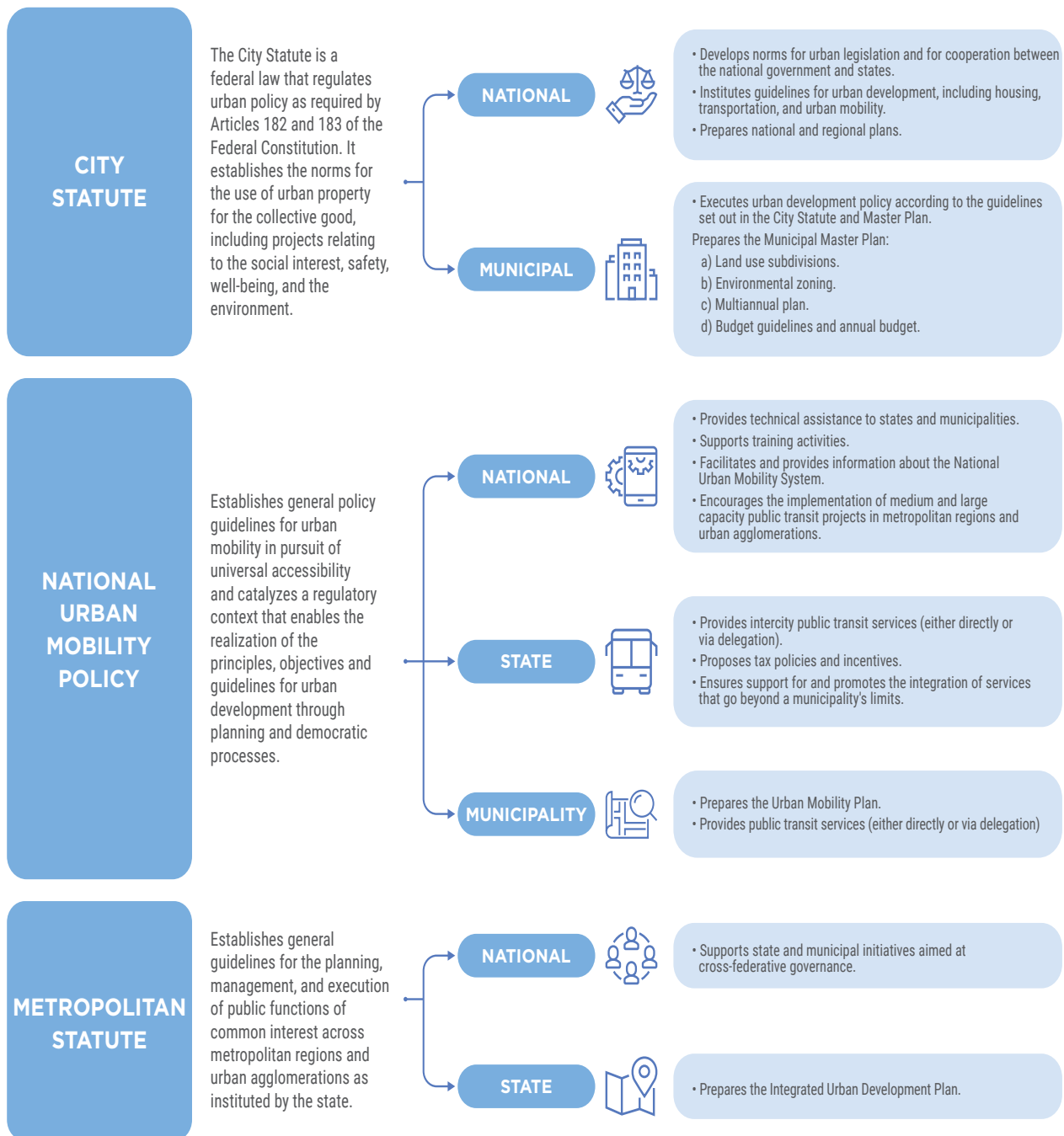
The Constitution and Metropolitan Statute propose a form of metropolitan management organized around *Funções Públicas de Interesse Comum (Public Functions of Common Interest –FPIC)*⁵. Mobility and transportation are among the FPICs provided for within the Metropolitan Statute; related guidelines thus apply to all municipalities part of a given metropolitan region. Like the PNMU, the Metropolitan Statute gives metropolitan regions the power to establish the rules FPIC management, as well as related financing and land use regulations.

² Integrated urban development plans are established by the Metropolitan Statute.

³ Grande parte dos municípios que têm como obrigatória a elaboração do Plano Diretor está inserida em regiões metropolitanas, em aglomerações urbanas ou são cidades médias inseridas em lógicas regionais dinâmicas. Ao encerrar as diretrizes nas fronteiras municipais, perde-se a contextualização de toda influência sofrida e exercida pelos municípios do entorno, tratando as grandes questões de maneira pontual e não sistêmica.”

⁴ Marguti, Costa, Galindo, O Estatuto da Cidade e a Habitat III: um balanço de quinze anos da política urbana no Brasil e a nova agenda urbana, IPEA, 2016.

⁵ A Public Function of Common Interest refers to a public policy or related action that cannot be realized by an individual municipality, or the result of which is accompanied by impacts on neighboring municipalities. (Lei n° 13.089/2015, art. 2°, inc. II).



A.1 Review the national standard that regulates urban policy—the City Statute

The federal regulatory framework could be revised to more directly absorb TOD strategies within the City Statute.

MAIN RECOMMENDATIONS

- Adopt guidelines requiring municipalities to coordinate land use and mobility planning efforts as part of national urban policy.
- Homogenize the nomenclature that regulates land use. There is no standard within Brazil

that establishes generic land use classes, as can be found in Spanish law, for example. Clearer regulations of that kind can help to make land use designations compatible within metropolitan regions, ensuring that all municipalities within a metropolitan area have a common basis.

- Adopt a hierarchical system for plans. Incorporate additional plans at differing scales as necessary to regulate land use beyond the Master Plan, ranging from the macro scale (metropolitan planning) to the micro scale (neighborhood level).

DEVELOPING A PLAN HIERARCHY—BENEFITS FOR TOD

Standardizing instruments

Municipalities adopt different names for plans that have the same function. Standardization can support the development of national government financing policies for metropolitan regions and can allow for instruments identified within the PDUI to be used for more than one municipality.

Homogenization and nomenclatures

Typological classification can assist in achieving TOD-related objectives, including ensuring a more coherent and consistent adoption of the concept within municipal plans by easing the development of homogenous indicators and evaluation criteria as well as the identification of best practices and replicable solutions for different cases.

Implementation protocol

Classification allows for a more formal and coherent scheme to be developed—one that does not conflict with other instruments or regulations. It facilitates the creation of a TOD implementation protocol that includes an established legal framework, transparency, equal rights, and other key urban development principles that should be respected as outlined in the Constitution and the City Statute.

Coherence across plans

A hierarchical system allows for the inclusion of TOD strategies at scales ranging from planning to urban design. It also supports the adoption of guidelines, within the scope of the aforementioned plans, that help to coordinate efforts across transportation and urban development.

Establish a unified floor area ratio (FAR)⁶. This can help guide population and activity densities for TOD and can offer a platform from which to calculate value increases generated by transportation infrastructure development or improvement. It can also ease the use of the instruments provided for in the City Statute.

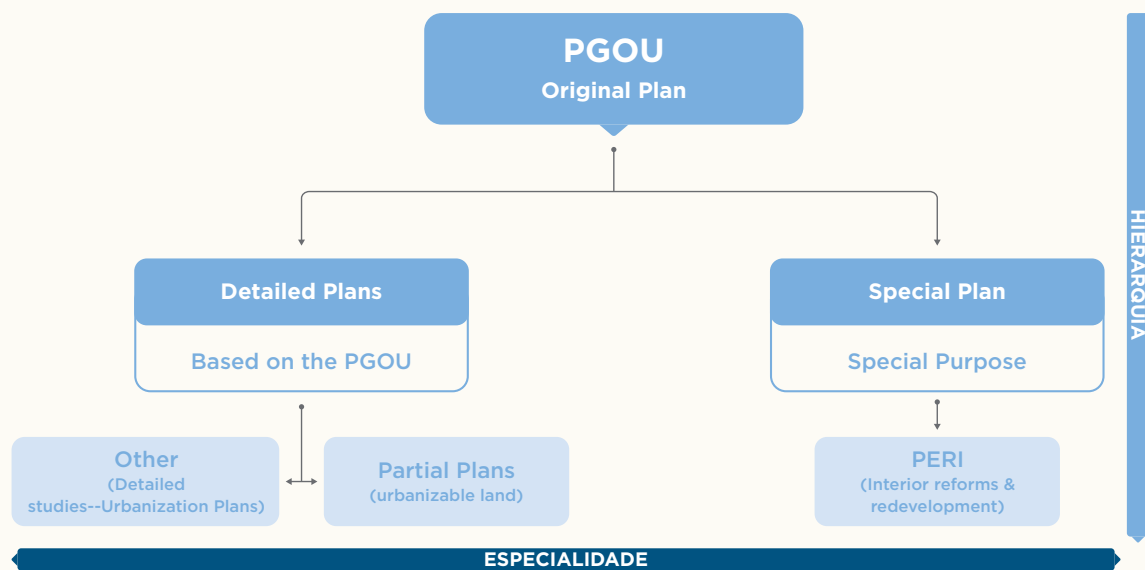
Studies have demonstrated, however, that Brazilian municipalities are unfamiliar with the purpose of FAR limits. FAR is often either absent from municipal legislation or incorporated in a manner differing from its intended objectives.

⁶ FAR regulations are limits on construction. Master plans can establish areas in which the right to build can be exercised above this limit through the sale of building rights, up to a maximum limit as defined in the Master Plan. With an FAR equal to one (1), the property's owner can build an area equivalent to the land area without additional cost.

A HIERARCHICAL SYSTEM FOR URBAN PLANS—THE SPANISH MODEL FOR STANDARDS

In Spanish law, urban plans are divided into hierarchically-arranged classes: General Urban Planning Plans (PGOU), Detailed Plans, as derived from the PGOU, and Special Plans. The associated principles include:

- **Hierarchy:** requirements in lower-level plans cannot contradict those in higher-level plans.
- **Competence or specialty:** if a higher-level plan establishes a land classification outside of its competence (eg the power was assigned to a Detailed Plan), the lower-level plan preempts the higher-level plan.



General Urban Planning Plan (PGOU): Applies throughout the municipality. The PGOU labels the land (urban, urbanizable and non-urbanizable), classifies it (land use), and draws up the general structure of the territory; it also outlines the schema for Detailed Plans, determines environmental protection measures, and establishes land reserves for public endowments and facilities.

Each land type is treated differently:

PROCEED ►

- Urban land: fully planned, taking into account all possible projects or activities for planning and development efforts.
- Urbanizable land: treated in a basic manner (with a fixed average/type of use for different sectors); it requires a Detailed Plan—the Partial Plan.
- Non-urbanizable land: protective measures are taken for land conservation, improvement, and protection.

Partial Plan (PP): Partial plans address the development of urbanizable land as classified in the PGOU. They are considered executive plans because they codify planning activities, providing spatial planning for the area in question. It provides the full framework necessary for the land to become urbanized and part of the larger urban network.

Special Interior Reform Plan (PERI): A plan used to guide efforts for an array of urban projects, including reducing traffic congestion, developing public services and facilities, expanding sanitation, addressing circulation or aesthetic challenges, introducing environmental measures, and other related projects.

SÃO PAULO'S MASTER PLAN—ADVANCES IN TOD STRATEGIES

São Paulo's Strategic Master Plan (PDE/SP, Law nº 16.050/2014) distinguishes itself in its integration of urban development with transportation. The plan outlines Eixos de Estruturação da Transformação Urbana (strategic axes of urban transformation) focused around 'areas of influence' in proximity to train and subway stations and adjacent to bus lanes. The maximum allowed FAR along the axes is 4 as compared to a fixed FAR of 1 in the remainder of the city. By increasing FAR along transportation corridors, the PDE/SP seeks to optimize land use in proximity to public transit infrastructure in order to attract a greater number of companies, and, along with them, a higher population density.

The city's expected benefits include increased demand for public transit and a reduction in single-occupancy vehicle use, helping to alleviate environmental pollution.

In addition to an increased FAR, the PDE/SP also defines other parameters and mechanisms to catalyze an urban design capable of promoting sustainable urban mobility, including:

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- A maximum share of land per unit⁷;
- public space⁸;
- active facades⁹;
- mixed use;
- sidewalk widening;
- restrictions on vacant lots;
- parking maximums

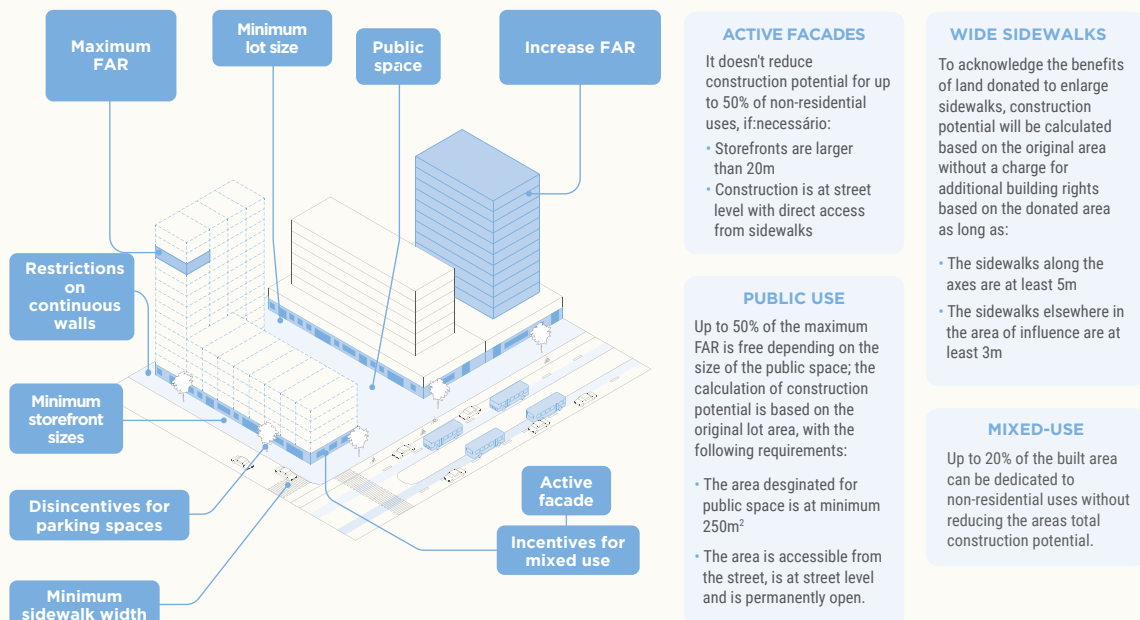
São Paulo's Lei do Parcelamento, Uso e Ocupação do Solo (Land Readjustment, Use, and Occupation Law— Law No. 16,402/2016) codifies the PDE/SP's proposed guidelines and details complementary regulations for land use and readjustment.

Five years after the PDE/SP's approval, the City of São Paulo launched an evaluation of the results. According to the report, the real estate market successfully responded to the development incentives put in place along the axes for urban transformation. More than 250 enterprises were licensed in the area between 2014 and 2018, along with significant growth in residential units. As compared to 10,754 units built between 2004 and 2008, 19,386 units were completed between 2014 and 2018 - an increase of 81%. Notably, 59% of those units were built without parking.

↓ FIGURE – AXES FOR URBAN TRANSFORMATION -- SAO PAULO

AXES FOR URBAN TRANSFORMATION TO IMPROVE URBAN QUALITY

The following parameters and incentives were established to ensure any transformations would improve urban quality



Source: Illustrated Sao Paulo Master Plan, pg 68. Available at: <https://gestaourbana.prefeitura.sp.gov.br/> [Acesso: 03/04/2020]

- 7 Share of land, in this case, corresponds with the number of housing units based in a unit of land area. Housing density is defined as the relationship between the number of housing units and the total area of the land - <https://gestaourbana.prefeitura.sp.gov.br/novopde->
- 8 As defined by public use of an area located on the ground floor that cannot be closed with buildings, installations, or equipment - <https://gestaourbana.prefeitura.sp.gov.br/novo-pde-fruicao-publica/>
- 9 Non-residential facades should be located along public sidewalks with open access for the population and with openings onto the street - <https://gestaourbana.prefeitura.sp.gov.br/novo-pde-fachada-ativa/>

A.2 Codify the integration of land use and transportation within the National Policy for Urban Mobility

MAIN RECOMMENDATIONS

- TOD should be codified within the Brazilian legal system in a manner replicable in municipal mobility plans, PDUIs, and master plans.
- The PNMU should indicate that Mobility Plans should address land use planning within its guidelines, encouraging the integration of urban mobility and land use planning efforts.
- There should be a requirement to develop Metropolitan Mobility Plans. These would, in turn, enable the integration of mobility guidelines at the metropolitan scale, in addition to helping to coordinate investments and improving transportation management. Metropolitan areas have great potential to catalyze TOD, but they are as-of-yet without the instruments to support the necessary integration. The few metropolitan area transportation plans that exist focus exclusively on public transit, without addressing other pertinent modes or PNMU objectives.

Source: Alf Ribeiro. Nove de Julho Avenue and entrance to Daher Cutiat Tunnel at night in downtown São Paulo, Brazil. Julho, 2013. Shutterstock, consultado em 2020. www.shutterstock.com



URBAN MOBILITY PLAN—RIO DE JANEIRO

According to PNMU art.24, the National Urban Mobility Policy should be implemented via Urban Mobility Plans, which should incorporate the principles, objectives, and guidelines of the Law, as well as:

- I. Public transit services;
- II. Road circulation;
- III. Urban mobility infrastructure, including bicycle lanes and tracks;
- IV. Accessibility for people with disabilities and restricted mobility;
- V. The integration of public transit with private and non-motorized modes;
- VI. The operation and management of freight transportation on roads;
- VII. Travel networks;
- VIII. Public and private parking areas, free or paid;
- IX. The identification of restricted areas and access rules for controlled circulation areas;
- X. Financial mechanisms and instruments to support public transit and urban mobility infrastructure
- XI. The review and evaluation of the Urban Mobility Plan within ten years as well as periodic updates.

There is thus no clear relationship between land use and the minimum content required for an Urban Mobility Plan, which, as we saw earlier, is fundamental for the integration of urban and mobility planning.

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Source: Leonid Andronov. Modern city tram at Parada dos Museus Stop in central Rio de Janeiro. Janeiro, 2020. Shutterstock, consultado em 2020. www.shutterstock.com

Nonetheless, many municipal mobility plans offer guidelines for how they align with the Master Plan based on the understanding that the two cannot be treated as separate in order to achieve a sustainable mobility system. Rio de Janeiro's Sustainable Urban Mobility Plan (PMUS, 2015)¹⁰ offers an good example. It includes:

- **Urban parameters:** correcting for urban sprawl by offering construction opportunities and the legal framework to support built environment densification across the city.
- **Urban redevelopment plans for areas close to public transit:** incorporating all access points to the transportation network into planning and design efforts in order to both increase accessibility and increase use of municipal investments in mobility.
- **Urban redevelopment:** identifying opportunities for mobility system interventions to support the land use guidelines laid out in the city's Master Plan and Urban Redevelopment Plans (PEUs); identifying the land use policies that are counter to PMUS objectives; and developing a new hierarchy of roads based on new urban centers¹¹ as defined by the Lei de Uso e Ocupação do Solo (Law of Land Use and Occupation—LUOS) (Complementary Bill 33/2013).
- **Transportation corridors:** exploring potential areas for TOD intervention and implementation, including the mapping of areas with expanded accessibility due to transit system expansion.

¹⁰ Rio Decree no 45781/2019 - Art. 7 The Sustainable Urban Mobility Plan guidelines include:

- I - Integration with urban development policies and pertinent housing, sanitation, planning and land use management policies;
- II - Prioritization of active modes of travel over motorized ones and public transit over individual motorized transportation;
- III - Integration of urban transportation modes and services;
- IV - Mitigation of the environmental, social, and economic costs of displacement for people and goods;
- V - Encouragement of scientific-technological development and the use of renewable energy and less polluting technologies;
- VI - Prioritization of public transit projects that catalyze development and are integrated within the urban context;
- VII - Guarantee of economic sustainability for public passenger transit networks to ensure that universal access is preserved and low fares maintained.

¹¹ PLC 33/2013 (LUOS - Rio de Janeiro) - Art. 56 Urban centrality is understood as the quality of a space where activities converge and urban development emerges and which exerts an attraction on other parts of the city to differing degrees and along differing hierarchies, in relation to:

- I - The concentration and diversity of uses and economic activities;
- II - The availability of transportation and accessibility;
- III - The provision of infrastructure;
- IV - Job concentration and availability;
- V - Housing supply, including affordable housing;
- VI - Its contribution to the city's economy.

B TOD strategies as part of national development and infrastructure policy

The integration of urban mobility policies and spatial planning efforts serves as the underlying principle for TOD. In practice, this means managing the impacts of urban projects on investments in both planning and transportation at the municipal, cross-municipal, or regional levels. It is thus necessary to put management structures in place that are capable of centralizing data and information and developing policies for specific sectors, as well as planning and intervening. To this end, TOD should be incorporated into local planning policies and national transportation and mobility infrastructure programs alike.

B.1 Incorporate TOD concepts into national development plans as a tool to achieve sustainable development

National development plans are long-term strategies for the nation's development, based on research studies and analyses conducted by the national administration in coordination with ministries from different sectors as well as civil society. They are intended to guide public policies and national investments; the incorporation of TOD within its scope would thus make it possible to plan for TOD-related urban projects at the national level as well as for their impacts on regional plans. Following are some recommendations for how TOD could be included at the national level in Brazil.

MAIN RECOMMENDATIONS

- Include guidelines that can support TOD strategies within national development planning instruments as reflected in regional sector-specific plans and in the Plano Plurianual (Pluriannual Plan—PPA). Strategic plans are designed to convey the strategic direction for federal public policies, as consolidated in the PPA, which determines the areas of priority for national government investment. Highlighting TOD as part of that is a way to address the subject in both programmatic and financial form to support infrastructure expansion and urban and regional development.
- Incorporate specific TOD guidelines into the Política Nacional de Desenvolvimento Regional (National Regional Development Policy—PNDR) and the National Urban Development Policy (PNDU) building on the general guidelines already present in both. More directly, the PNDR provides for the activities related to urban infrastructure development and access to essential public services, thus addressing the fundamental aspects of TOD and facilitating its adoption in practice. The PNDU is “a policy based on the vision of sustainable urban development, which actively incorporates the socio-cultural, economic-financial and urban-environmental, sustainability-related dimensions”¹²—a vision fully aligned with TOD implementation.

C TOD in metropolitan and regional planning and regulatory instruments

Brazil's Metropolitan Regions (RMs) date back to the 1970s. Since that time, RMs have faced the challenge of a lack of efficient and effective metropolitan tools for cross-municipal management on issues such as housing, mobility, and the environment.

Municipalities were strengthened in the Federal Constitution (CF/88) of 1988, which in many ways stemmed the movement in support of planning managed at the regional level. One critique of CF/88 is its poor definition of Metropolitan Regions, requiring state governments to institute RMs via Lei Complementar (Complementary Law). Each RM, as a result, has very different rules and arrangements as determined by Brazil's individual states.

The Metropolitan Statute notably filled some gaps in urban planning and development standards for metropolitan areas and urban agglomerations by establishing rules for their planning, management, cross-municipal governance, and the implementation of Public Functions of Common Interest (FPICs). The Metropolitan Statute also introduced Integrated Urban Development Plans (PDUJ), which are tasked with establishing guidelines for intersectoral public policy efforts and for activities in the shared public interest, including strategic projects and priority areas for investments. The instrument helps to support TOD in this manner, as it is able to connect land use guidelines with those of mobility. Nonetheless, the PNMU does not require a Mobility Plan at the metropolitan scale. The resultant vacuum means that each RM has handled the issue in a

different manner. Some developed transportation plans focused around cross-city commuting, without taking sustainable mobility needs into account.

With a view towards the incorporation of TOD strategies at the metropolitan scale, this guideline thus aims to offer some actions and recommendations that could be adopted within public policies.

C.1 Adopt TOD strategies as part of the Integrated Urban Development Plans (PDUJ) and in other Metropolitan Statute instruments

As discussed above, the Metropolitan Statute, by filling a gap in metropolitan planning-related federal regulations, established some instruments that should be adopted by Metropolitan Regions. They include PDUJs, cross-municipal sector-specific plans, public funds, cross-municipal project consortia, public consortia, cooperation agreements, management contracts, and public-private and cross-municipal partnerships.

MAIN RECOMMENDATIONS

Metropolitan mobility, as an area of shared interest, should be included within the scope of PDUJ guidelines and should be reflected in metropolitan zoning as required by law. Some recommendations for achieving the integration of those two fundamental TOD elements are as follows:

- I. Incorporate TOD for RMs into PDUJ's scope, providing for TOD-related projects and plans. This includes:
 - o Fostering urban redevelopment primarily through the densification of areas of influ-

- ence along transportation corridors and near terminal stations.
 - Coordinating across sector-specific municipal plans, including both land use mobility.
 - Creating a fund to promote integrated projects as interwoven with TOD strategies.
 - Avoiding contradictory, interfering, or overlapping projects with regards to transportation infrastructure, land use, and facilities.
- II. Create cross-municipal instruments to support TOD strategies at the metropolitan scale. Identify cross-municipal projects that fall within PDUI's scope that could serve as opportunities for TOD.

RIO DE JANEIRO'S INTEGRATED STRATEGIC URBAN DEVELOPMENT PLAN

The Strategic Urban Development Plan for Rio de Janeiro's Metropolitan Region (PDUI/RMJ) was tasked with developing scenarios, strategies, and instruments to guide the RM's development. The plan, a PDUI, was developed in response to the requirements set out in the Metropolitan Statute. Yet it goes beyond traditional PDUIs in its proposed strategic plan. The process was begun in 2015 and completed in 2018, with the approval of Metropolitan Law 184/2018, providing for the RM's composition, organization, and management, defining its public functions and services of common interest, and establishing the Agência Executiva da Região Metropolitana do Rio de Janeiro (Executive Agency for the Metropolitan Region of Rio de Janeiro).

Analysis conducted as part of the plan found low urban densities along the Region's old railway lines, and further explored whether there was a demand for investment to expand the mode's capacity. As a result, the PDUI created 'Trilhos e Trilhas' with the objective of guiding the area's development along the railway axes in Metropolitan Region's North and West Zones, which includes suburban trains, subway lines (further along), and road axes.

"The PDUI foresees the application of the TOD methodology [in this case] as a planning strategy that links the value and use of the land with public transit development and improvement, promoting density in areas near high- or medium-capacity transit corridors and stations in order to increase the population's access to employment opportunities, services, and public facilities."^{13,14}

To fulfill this guideline, a number of actions were proposed, including infrastructure investment, rezoning and mobility development in the targeted urban centers, and a mapping of areas where such efforts could be applied.

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13 O PDUI prevê que deverá ser aplicada a metodologia de DOT, Desenvolvimento Urbano Orientado ao Transporte, considerando a estratégia de planejamento que relaciona a valorização e o uso do solo com a implantação ou melhorias do transporte coletivo, promovendo densidades adequadas nas áreas lindeiras dos eixos ou estações de transporte modais de alta ou média capacidade a fim de ampliar o acesso da população a oportunidades de emprego e renda, serviços e equipamentos públicos.

14 Strategic Urban Development Plan for Rio de Janeiro's Metropolitan Region (revised version), pg. 91.

The densification along axes and the network of urban centers connected by the axes are part of the macro-zoning of the RMRJ. Although the PDUI does not have regulatory power, it is nonetheless possible to assess the impact of these guidelines on projects within the metropolitan region. The municipality of Queimados, for example, is preparing a project to restructure the areas around the Queimados Station on the Japeri Branch of Rio de Janeiro’s metropolitan rail system based on TOD concepts.

As outlined in the city’s new Master Plan, the project proposes limits to real estate expansion in Queimados in areas far from the center and without infrastructure. The objective is to increase interest in investment in the area surrounding the station. The project thus seeks to increase housing and commercial density, which, in turn, is expected to “increase the collection of the IPTU property tax and the ITBI property transfer tax with an increase in both the number of square meters built and the real estate values themselves, as well as an expansion of the number of existing properties in the area, not forgetting the expected increase in service tax (ISS) collection, resulting from a growth in the area’s centrality and an increase in the region’s services.”^{15,16} It is estimated that 25% of the IPTU and ITBI will come from the TOD area.

↓ **FIGURE - PDUI RMRJ. RESIDENTIAL AND URBAN AXES OF DENSIFICATION**



Source: Consórcio Quanta - Lerner

15 “Ampliar a arrecadação do Imposto sobre a Propriedade Predial e Territorial Urbana (IPTU) e do Imposto de Transmissão de Bens Imóveis (ITBI), pelo aumento do número de metros quadrados, pela valorização imobiliária e pela ampliação do número de imóveis existentes na área, não esquecendo o aumento esperado da arrecadação do Imposto Sobre Serviço (ISS), pela ampliação da centralidade da área DOT e pelo incremento de serviços existentes na região.”

16 Preliminary feasibility study: Urban Redevelopment Project Surrounding the Queimados Ramal Japeri Station of the Metropolitan Railway System of Rio de Janeiro. Source: Consórcio Conectar.

RECIFE-OLINDA CROSS-MUNICIPAL PROJECT

The Recife-Olinda Urban Project was an attempt at a Cross-Municipal Project Consortium in a shared area in the center of Recife's Metropolitan Region. The aim of the project was to propose interventions and instruments to promote urban development at a metropolitan scale in pursuit of urban and environmental rehabilitation. This would be done through improvements to infrastructure, mobility, transportation, services, public space, and the landscape itself. The challenge was to overcome a fragmented vision as divided by interests of differing political parties within the same territory.

A cooperation agreement was reached in 2005 between the federal, state, and municipal actors in both Recife and Olinda to support the project's development and implementation. This was done in pioneering fashion, not only between different government entities, but also between different sectors, such as urban development, tourism, culture, and economic development, among others. A political council served as the managing nucleus composed of thematic assemblies, including one dedicated exclusively to the Recife-Olinda project.

Within this institutional framework, an urban project was proposed for an area of 470 hectares (359 in Recife and 111 in Olinda), whose guidelines and implementation strategy were to be jointly defined by the federal government, the State of Pernambuco, and the municipalities of Recife and Olinda. There was also participation from the Portuguese public company Parque Expo and the Organização Social Núcleo de Gestão do Porto Digital consultancy.

There was consensus that a public consortium would be the best entity for implementing the project, with participation from Recife and Olinda, the state of Pernambuco, and the national government. A direct bid for a company to launch the Fundo de Direitos Imobiliários (Real Estate Fund) was suggested in order to capture private resources for the project.

The guidelines for the shared management of the project had to incorporate:

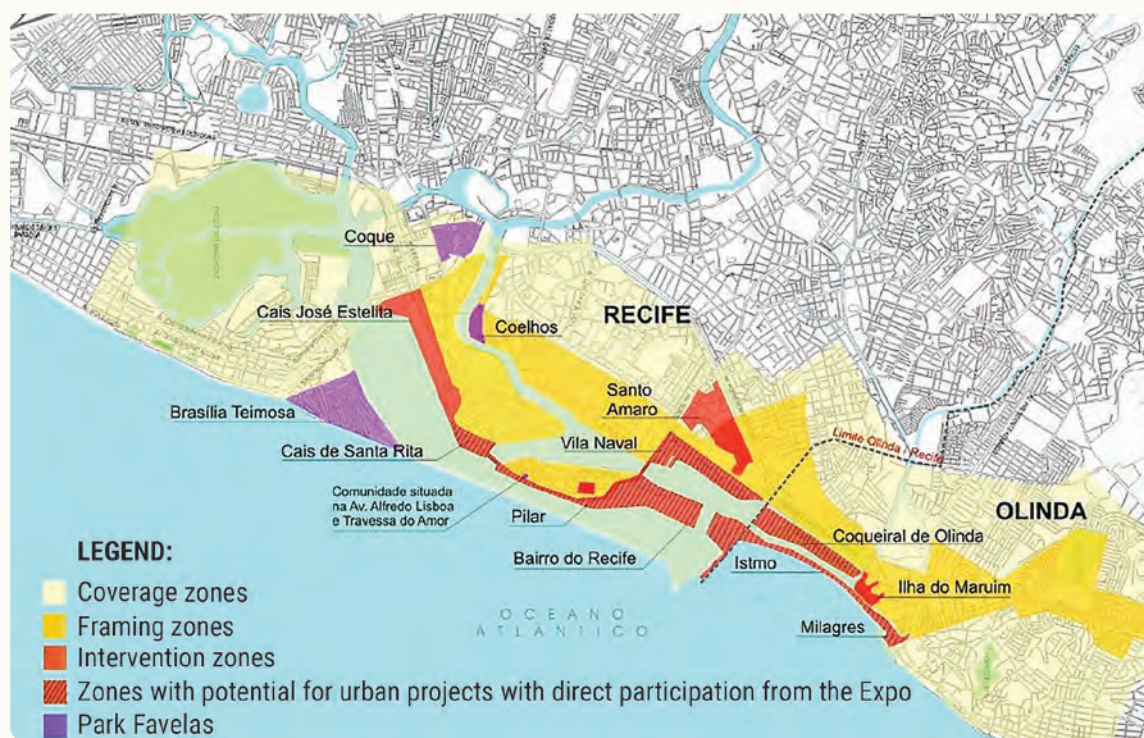
- I. Cross-municipal implementation managers
- II. The aspects of the project to be carried out;
- III. Self-financing for the project;
- IV. The contribution of public resources, including goods and rights;
- V. An environment that could receive and attract private resources;
- VI. Simplified standards and fast-tracked licensing standards;
- VII. The execution of urban projects;
- VIII. The possibility of real estate transactions;
- IX. Legal certainty regarding tenure or property rights for third party contracting partners.

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“The law that ratifies the statement of intent, giving the consortium legal standing should, as a special rule, enable the consortium to acquire or manage the real estate contained within the perimeter of the urban project, or, if applicable, be contracted by the federal government to carry out the necessary divestitures.”^{17,18}

The approval process proved to be one of the project’s greatest challenges; the City Statute required approval from each individual municipality, since the Metropolitan Statute, and the cross-municipal project consortium instrument that it introduced, did not yet exist. The project was ultimately not implemented as a result of management changes that created difficulties in the consortium’s creation and in the provision of the necessary land to make the operation feasible.

↓ **FIGURE - BOUNDARIES OF THE RECIFE-OLINDA CROSS-MUNICIPAL PROJECT**



Source: Ministry of Cities, Government of Pernambuco, Municipality of Recife, Municipality of Olinda, Porto Digital, Parque Expo

17 “A lei que ratificar o protocolo de intenções, imputando a personalidade jurídica de direito público ao consórcio, deverá, como norma especial, outorgar delegação ao consórcio para adquirir ou administrar os bens imóveis contidos no perímetro da operação urbana, ou ainda, se for o caso, ser contratado pela União para realizar as alienações necessárias.”

18 Urban, Economic, and Legal Consultancy for the Recife-Olinda Project. Ministério das Cidades, 2007, pg. 50. Available at: https://www.mdr.gov.br/images/stories/ArquivosSNPU/Biblioteca/ReabilitacaoAreasUrbanas/Recife_Consultoria_Urbanistica.pdf

C.2 Develop and codify metropolitan mobility plans based on national mobility policies

Today, the mobility models adopted by Brazilian Metropolitan Regions are rarely interconnected with environmental, social, or economic planning. Ground transportation is the main emitter of greenhouse gases, and circulation difficulties for individual and collective transportation alike result in access challenges, which, in turn, affect employment opportunities. Metropolitan Regions also have to deal with a scarcity of public resources, limiting potential investments in new mobility infrastructure.

Revisions to metropolitan mobility models should emphasize the development of an efficient public transit system, limit use of individual motorized modes, and promote active travel. They should support efforts to consolidate a multimodal and integrated transportation network that is of good quality, safe, and accessible in both cost and infrastructure, as well as environmentally responsible. These features are notably aligned with the UN Sustainable Development Goals (SDGs), including Health and Well-being (3rd SDG), Industry, Innovation and Infrastructure (9th SDG); and Sustainable Cities and Communities (11th SDG).

In addition to the challenge of supplying quality opportunities for displacement, new metropolitan mobility models also have the obstacle of managing and financing public transit networks. Transit agencies today are often faced with a gradual loss of passengers, which reduces fare collection and results, in turn, in regular fare increases.

MAIN RECOMMENDATIONS

- **Implement a Metropolitan Mobility Plan.** This recommendation should be included in Brazil's regulatory framework as an obligation for all Metropolitan Regions. "If there were to exist, in the federal regulatory framework, an incentive to integrate the transportation system, as motivated by overlapping activities across municipal areas, an incentive to develop a joint and integrated urban mobility plan would naturally follow"¹⁹ (Lima Neto and Orrico Filho, 2014). As already mentioned, most plans at the metropolitan scale are restricted to public transit and fail to incorporate other PNMU principles. Metropolitan area mobility plans could enable better coordination of investments in public transit, as well as in other modes, in turn enhancing the effectiveness of the public transit network.

MAIN OPPORTUNITIES

The current concession plan for the urban train lines owned by the Companhia Brasileira de Trens Urbanos (Brazilian Company of Urban Trains—CBTU) and the Empresa de Trens Urbanos de Porto Alegre S.A (Porto Alegre Urban Train Company—Trensurb) provides for instruments and regulations that enable the use of TOD strategies. In fact, BNDES commissioned a study to prepare for the concession of passenger rail in Brazil: the Estudo da Outorga de Concessão dos Serviços Públicos de Transporte Ferroviário de Passageiros²⁰ (Study of Public Passenger Rail Transport Concession). The ultimate goal is the auction and privatization of rail transport services currently managed by CBTU and Trensurb, including in Belo Horizonte, Recife, Maceió, João Pessoa, Natal, and Porto Alegre.

¹⁹ "Se existe, no normative federal, o incentivo à integração da operação do sistema de transporte, motivado pela sobreposição de atividades nos territórios municipais, caberia também o incentivo ao planejamento conjunto e integrado da mobilidade urbana."

²⁰ Notice (N° 02/2020) for the process of contracting services for the Estudo da Outorga de Concessão dos Serviços Públicos de Transporte Ferroviário de Passageiros.

The study includes regulatory parameters for the concession (item 3.3.2 of the public notice), in order to help RMs develop plans for urban mobility. RMs are required to develop a proposal, for example, of preliminary scenarios for the system's expansion, as well as suggestions for

urban interventions and revisions to land use law to help densify the areas surrounding the concession based on the pre-existing conditions of each metropolitan area. If enacted, this model for concession could be an opportunity to implement TOD strategies.

THE METROPOLITAN TRANSPORTATION PLAN FOR GRAND PARIS

The main motivation behind the Grand Paris project is to correct the great territorial inequalities of the Parisian metropolitan area and re-establish the city as a main international center. The project was launched in 2008 and is anticipated to create between 100,000 to 500,000 jobs in the region over the next 20 years. It is also expected to increase the GDP of the Parisian metropolitan region by between 650 million euros and 1.1 billion euros by 2030.

The project's three main challenges include the modernization and expansion of the transportation network, the construction of new housing, and the development of new economic activity. The new metro network – the Grand Paris Express – will integrate the region's main centers of business (airports, financial centers, research and university hubs) and metropolitan areas that are difficult to access. It also seeks to reduce travel time in the region and improve overall access to employment, education, culture, and leisure.

To do so, the project plans for the construction of four new metro lines at a length of 200km with 68 stations. The expectation is that 95% of the metropolitan population will live less than 2km away from a train or subway station. There will also be other development projects alongside the Grand Paris Express, including the creation of new economic and university centers, as integrated with the newly planned stations.

The Société du Grand Paris (SGP), created to oversee the metro's expansion, is responsible, together with the municipalities, for selecting real estate projects near the stations to be carried out by private developers.

SGP is a state-owned public industrial and commercial establishment. It is a legally-established, collective entity, with the objective of managing public service activities of an industrial and commercial nature. Public entities are notably linked either to the state or a local authority.

Law 597/2010²¹, which regulates the Grand Paris project, called for the preparation of a master transportation network plan after consultation with local authorities and cross-municipal cooperation entities—if their competencies touch on matters of urbanism or development—including the Association of Mayors of the Île-de-France Region, the Joint Paris-Metropolis Association, the Transport Association d'Île-de-France and the Atelier International du Grand Paris.

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²¹ A pertinent example is the Strategic Plan for the Revitalization of the Bilbao Metropolitan Area (Spain), the Bilbao-Metropoli 30, as addressed in Chapter 2. The plan combined urban and metropolitan planning with large-scale urban projects.

According to the same law, the SGP can acquire, if necessary, by expropriation or preemption²², assets of any kind, real estate or land, as necessary for the development and operation of the public transportation network infrastructure. It can also develop or construct. For projects in municipalities that have signed a Territorial Development Contract (CDT), the SGP can only carry out such activities as provided for in the contract. If a municipality is not a signatory to a CDT, the SGP can only intervene within a radius of up to 600m from the stations.

CDTs are contractual documents prepared jointly by local authorities, the Regional Department, the Interdepartmental Office of Public Works, and Development of Île-de-France, representing the state. The objective is to promote economic development and organize urban development around the Grand Paris Express network. CDTs thus contribute to a metropolitan-level vision for strategic areas such as transportation and mobility, sustainable development, energy transition, urban planning, housing, business, culture, and leisure.

The CDT approach has enabled local authorities and partners to devise development strategies that are sustainable, flexible, and adapted to specific territories. It is notably an instrument that could be adopted at the metropolitan level to help develop mobility infrastructure.



Source: Bambax. A train leaves a platform in the Paris metro. January, 2014. Shutterstock, consultado em 2020. www.shutterstock.com

²² In Brazil, the right of preemption is provided for in articles 25 and 27 of the City Statute. It is a legal "instrument of urban policy which gives the municipality preference for the purchase of urban property, respecting its value in the real estate market, before the property of interest is sold to private individuals." <https://mundogeo.com/2000/01/01/cartografia-cadastral-urbana-e-o-direito-de-preempcao/>

The right of preemption in Brazil is similar to the rules that have been used in other parts of the world, such as by the City of Paris to acquire real estate, for example (David, 2015).



Source: Miks Mihails Ignats. Aerial view over the city. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

C.3 Incentivize the creation of long-term strategic development plans with participation from municipal and private actors in areas where urban planning policies and actions, transportation infrastructure and urban services collide

RMs should identify instruments to support cooperation between the public and private sectors. Strategic development plans can serve as tools to help assemble key public and private actors and to build consensus on strategic urban development projects in order to support TOD.

MAIN RECOMMENDATIONS

- Develop *Projetos Estratégicos Metropolitanos*²³ (Strategic Metropolitan Projects) which integrate

urban planning policies with urban transportation infrastructure and public services. Such projects should prioritize territorial integration (based on analysis and collective reflection identifying the area's problems and potential); strengthen public participation; and define models for the future of planning and mobility. The difference between a Strategic Metropolitan Project and a PDU is that the first presupposes more active participation from private actors. It is a societal project, completed in partnership with public authorities, to help foster territorial development. It is also important to note that it is not a management plan, since it is intended to be implemented by the pertinent local administrations over time.

²³ A pertinent example is the Strategic Plan for the Revitalization of the Bilbao Metropolitan Area (Spain), the Bilbao-Metropoli 30, as addressed in Chapter 2. The plan combined urban and metropolitan planning with large-scale urban projects.

D A planning system and legal framework at the municipal level capable of supporting TOD-related strategies

Municipal Master Plans are often insufficient or inaccurate in their efforts to define urban concepts or parameters, to localize the instruments in space, and to determine deadlines for the implementation and operationalization of the administrative procedures necessary for the execution of TOD projects. One can even observe incongruities between instruments, institutions and procedures provided for in the Master Plan and other municipal planning laws. Land use laws, meanwhile, are based on an “internal lot” logic, and often fail to provide enough support for TOD projects and strategies, which require larger-scale, integrated urban and mobility planning.

If these limitations were not enough, cities also face challenges in combining the different instruments provided for in the City Statute to produce the targeted results. The main challenge is coordination across the various laws that regulate urban projects, infrastructure improvements, and urban transformations. Municipalities often select tax, economic, or urban planning instruments without consideration for the TOD objectives outlined for urban projects.

In light of these challenges, this guideline proposes actions to help align urban and mobility planning with TOD strategies and to identify instruments that are complementary to the Master Plan and that can correct inconsistencies across different urban regulations.

D.1 Adopt guidelines within municipal Master Plans to facilitate the use of TOD strategies

The Master Plan is the main development instrument and should support coordination between urban land use regulations and sector-specific policies aimed at urban issues, including municipal mobility policy. In defining a series of minimum content requirements for Master Plans and pertinent urban, judicial, and tax instruments that need to be codified, the City Statute outlines two main functions with which each Master Plan is required to comply (Evers, et al. 2018): a strategic function and a regulatory function.

MAIN RECOMMENDATIONS

- Incorporate TOD strategies into strategic functions:
 - Indicate strategic areas with existing urban infrastructure within zoning plans for population and activity densification.
 - Build population density scenarios and determine the need to increase or decrease the urban perimeter based on projections. This helps to avoid urban and infrastructure sprawl.
 - Demarcate transportation corridors and the areas surrounding stations as areas for TOD.
 - Coordinate the land use guidelines with those determined in the Mobility Plan.
 - Adopt the guidelines established at the PDUI scale – including anticipated cross-municipal projects – within the scope of the municipal Master Plan.

- Incorporate standards that can encourage and enable the use of TOD strategies within the Master Plan's regulatory scope:
 - Employ the instruments for mandatory parceling, building and use (PEUC) and progressive IPTU²⁴ to combat urban voids in densified areas.
 - Establish transportation axes or corridors for medium- and high-capacity public transit, as well as infrastructure for different modes of transportation in pursuit of universal access.
 - Adopt maximum lot and block sizes to facilitate active transportation.
 - Define a single, basic FAR (equal to 1) for the entire urban perimeter (except in areas of restricted use (where FAR can be less than 1). Provide for the sale of building rights (OODC) and a charge for land use changes (OOAU), identifying strategic uses for the resultant resources, as established by the City Statute.
 - Increase the real estate market intensity and the mixture of uses in regions and areas already equipped with infrastructure by setting higher FARs and, eventually, offering social or urban incentives or exemptions in exchange for construction rights.
 - Allow for the Special Assessment Tax to be implemented to help recover real estate value increases resulting from TOD-related projects.
 - Allow for use of the Urban Project Consortia in areas with the potential for higher urban and real estate intensities.

D.2 Incorporate smaller-scale plans and instruments that are compatible with master plan goals into the planning system

The Master Plan is not sufficient to develop urban projects. Cities are being built, in many cases, without the municipality's involvement, whose performance ends up being restricted to establishing standards and correcting problems arising from fragmented urban development.

TOD-related urban projects need to occur at two scales as linked to a city's development. The first scale is that of urban planning more generally, which consists of land use guidelines and regulations that are capable of encouraging and enabling TOD strategies. The second scale is the urban design itself, including road layouts, open space, and the shape of private space. The latter requires a specific urban plan (complementary to the Master Plan) which is responsible for the TOD-related aspects.

It is thus recommended to incorporate urban plans within federal legislation in order to establish a national system for spatial planning as can be seen in Portugal's Lei de Bases Gerais da Política Pública de Solos, de Ordenamento do Território e de Urbanismo (Law on Spatial Planning and Urban Policy), to help guide Brazilian municipalities in drawing up their respective local plans.

²⁴ The PEUC and IPTU are instruments provided for in art. 182 of the Federal Constitution and are regulated by the City Statute. The PEUC imposes the obligation that a property be parceled, built, or used. If this obligation is not met, the property is subject to a progressive IPTU tax, which increases over time, doubling every year for five years, up to a maximum of 15% - Available at: <https://www.caubr.gov.br/wp-content/uploads/2017/10/CAPACIDADES2.pdf>

OPPORTUNITY

There is a legislative proposal in progress that seeks to incorporate four types of plans into the City Statute: the PDUJ, the Master Plan, the Urban Plan, and the Detailed Plan. Bill No. 5680/2019 proposes to amend Law No.10,257 of July 10, 2001 (City Statute), Law No.13,465, of July 11, 2017 (on urban and rural land regularization), and Decree-Law No. 3,365 of June 21, 1941 (which provides for expropriations for public use) to require urban plans.

The bill's rationalization is as follows: "The institutionalization of urban planning in both the Constitution and ordinary legislation is 'incomplete,' since Master Plans are excessively generic, meaning that land use is effectively being carried

out by means of sparse, non-transparent, and technically poorly-developed laws."²⁵

The requirement could thus help to correct distortions by linking public and private interventions with the pre-established content of each plan as provided for in federal regulations. Such standardization could offer greater legal certainty for the population and for businesses, since all urban projects and regulations would be planned with the proper technical preparation and public participation.

MAIN RECOMMENDATIONS

- Develop "Intermediate Urban Plans" and "Partial (or Detailed) Plans"²⁶ at the municipal level to serve as planning tools to link the Master Plan's guidelines with the urban project scale.

MUNICIPAL SYSTEM FOR URBAN AND TERRITORIAL PLANNING

Municipal Master Plan

Municipal: Municipal

Scope: Municipal development strategy. The municipal planning model outlines municipal zoning requirements.

Urbanization Plan

Scale: Urban area within the municipality

Scope: Based on the Master Plan, the Urbanization Plan determines land subdivisions, urban boundaries, and the locations for infrastructure and collective facilities.

Partial Plans

Scale: Pre-determined boundary

Scope: Based on the Master Plan and the Urbanization Plan, the Partial Plan details interventions for a specific region. It sets rules for infrastructure deployment, public space design and FAR and other building regulations. It is important to require land value capture at the scale of the Partial Plan.

²⁵ "The justification points to the institutionalization of urbanism promoted by the Constitution and ordinary legislation as 'incomplete', since the Master Plan would have acquired an excessively generic character, while the effective management of land use is carried out through sparse, insufficiently transparent and technically ill-founded."

²⁶ As detailed in Guideline 1, Strategic Planning and Management Instruments

D.3 Adopt guidelines in Mobility Plans that reconcile daily trips with land use choices

Reducing sprawl and fostering a compact city are means to achieve a mobility that is more sustainable and socially inclusive, while offering greater access to employment. From the point of view of trips, that means reducing distances traveled. The existing city must be intensified through increased population density, pathways must be oriented around pedestrians, and urban functions should be better integrated with the public transit network.

MAIN RECOMMENDATIONS

Below are recommendations that can be adopted within the scope of Mobility Plans to help promote TOD strategies:

- Define medium-capacity transportation axes and capitalize on their potential for ordering and transforming urban territory, through population and built environment densification and the reclassification of urban space.
- Propose the integration of transportation modes at medium- and high-capacity transit stations. Due to the high concentration of people at stations, it is necessary to ensure good connections across modes (subway, bicycle, pedestrian, bus, taxi, and individual vehicle). The goal is to reduce travel time—an essential factor for mode choice—and to increase demand for and the reach of public transit.
- Limit the circulation of vehicles in city centers to reduce individual vehicle use.
- Incorporate TOD strategies into Mobility Plans. It is important to foresee the use of TOD strategies in infrastructure construction and expansion when drawing up plans. The plan should include the identified opportunity, a proposal, and the goal for implementation.

Source: View Apart. Ruas lotadas de Nova York durante a hora do rush. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



PLANNING AND MANAGEMENT INSTRUMENTS

TOD implementation relies on planning and management tools and instruments that support urban project development; more directly, it requires mechanisms that can strategically support urban regeneration efforts and mobility improvements, while simultaneously regulating and encouraging a variety of stakeholders to engage in areas where the market is attractive.

The adoption of these mechanisms often faces obstacles, however: many urban instruments that already exist under the City Statute are still rarely used by municipalities—especially medium and small cities—with direct implications for urban strategies and TOD project implementation. Only a limited number of public entities

engage in project development and implementation; and few instruments are used beyond expropriation, which requires time and is accompanied by costs often above the capacities of many municipalities.

In order to support both on-going urban planning efforts and TOD projects, the purpose of this chapter is to offer guidelines and actions for incorporating planning and management instruments into the existing Brazilian legal system and to provide recommendations for incorporating urban planning instruments that are already provided for in the City Statute (Law No. 10,257/01). The proposed actions are divided into two main guidelines, as shown below:



STRATEGIC LINE 3: PLANNING AND MANAGEMENT INSTRUMENTS

1st Guideline:

Use of new instruments for TOD project implementation and operation in cities and metropolitan regions



Actions

Implement a system of targeted urban plans as defined under Municipal Master Plans—Partial Plans

Introduce an instrument for the physical and legal reorganization of land: land readjustment

2nd Guideline:

Effective use of mechanisms and instruments



Actions

Explore current opportunities for expropriation

Implement instruments for guiding urban development in TOD areas

Use properties owned by different public entities in TOD areas

A Use of new instruments for TOD project implementation and operation in cities and metropolitan regions

This first guideline seeks to explore two planning and management instruments that are widely used in other countries in the world, including Latin America, and are strongly connected with the implementation of TOD projects: (i) the Partial Plan – a specific urban plan, known as the “Plano de Pormenor” in Portuguese legislation - and (ii) land readjustment.

Two actions are thus proposed under this guideline:

A.1 Implement a system of targeted urban plans as defined under Municipal Master Plans—Partial Plans

The Partial Plan is an urban planning instrument used in several international legal systems. As described in Colombia’s National

Territorial Development Law (Law 388/1997), article 19, Partial Plans are an instrument to complement and implement land use plans for pre-determined urban areas and for areas of urban expansion, as well as for Urban Action Units¹, Macroprojects², and other special urban operations. National Decree 2,181 from 2006 supplements the above definition: “The Partial Plan determines the use and intensity of private space, assigns development obligations, and outlines the provision of infrastructure, space, and public services to allow for the execution of projects included in its planning scope.”³

Partial Plans help to begin the urbanization⁴ process in areas of urban sprawl, for example, and to provide the associated infrastructure. They can also be used in urban areas seeking to change their current condition. They have a clear relationship with TOD project implementation, providing the vision for how to define and modify TOD target areas within cities.

While the Municipal Master Plan defines the overarching TOD strategy, Partial Plans could develop and define areas of influence for stations, facilitating TOD implementation through:

1 Urban Action Units (UAU) are defined under Colombian law as one or more plots that are categorically demarcated within the municipal land use plan.

2 Large-scale urban interventions

3 Free translation

4 Urban areas are legally classified as:

- Urban land
- Urban sprawl
- Urbanizable land.
- Urban land of special interest.

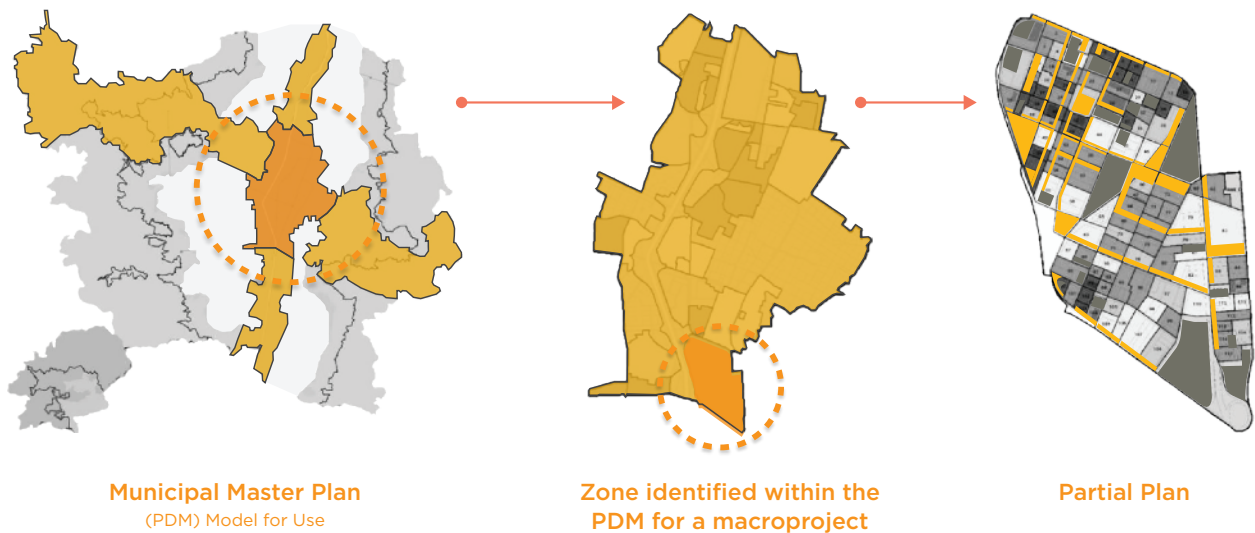
“Urban land (...) is the area where there exist, continuously, dwellings, circulation routes between residential units, services, political-administrative functions, green belts or agricultural production essential to meet the food needs of the population living in that urban area (...). Urban sprawl is an undefined area around the city, outside the urban limits provided for in municipal legislation, where growth continues through the aggregation of new urban components (...). Urbanizable land is a stretch of urban land in which the public sector, based on existing conditions, prevents occupation before needed corrections make it feasible for housing (...). Urban land of special interest includes areas identified as strategic, military, or protected, among others, and its use is therefore restricted or prohibited through legal instruments” (MP-GO). More can be found at: http://www.mpggo.mp.br/portalweb/hp/9/docs/doutrinaparc_27.pdf

- Planning across urban planning scales, including at local or neighborhood scales.
- Developing a land bank by pooling⁵ land to finance the proposed urban project, with participation from local landowners in addition to developers or external investors.
- Determining the percentages or target areas to avoid speculation and gentrification, including mandating affordable housing provision.

According to Montandon (2009, p.104), the Partial Plan is also a management tool, as it involves owners, investors, and the public sector in a process of 'compulsory negotiation', through its

emphasis on equity in the definition of charges (obligations) and benefits (incentives) to owners (...). Partial Plans thus help to break the logic of planning lot by lot, linking activities into a larger territorial strategy—one that is synergistic with TOD. Further, these Plans can be proposed and led by either the public or private sectors, meaning both can use the instrument for urban projects. In Japan, for example, Partial Plans proposed by the private sector take three forms: individual, cooperative-led, and company-led. Proposals, projects, and management, however, will always require public participation and prior public sector approval (MINORU MATSUI, 2017).

↓ **FIGURE – GRAPHICAL SCHEMA SHOWING THE DIFFERENT LEVELS OF URBAN PLANS.**

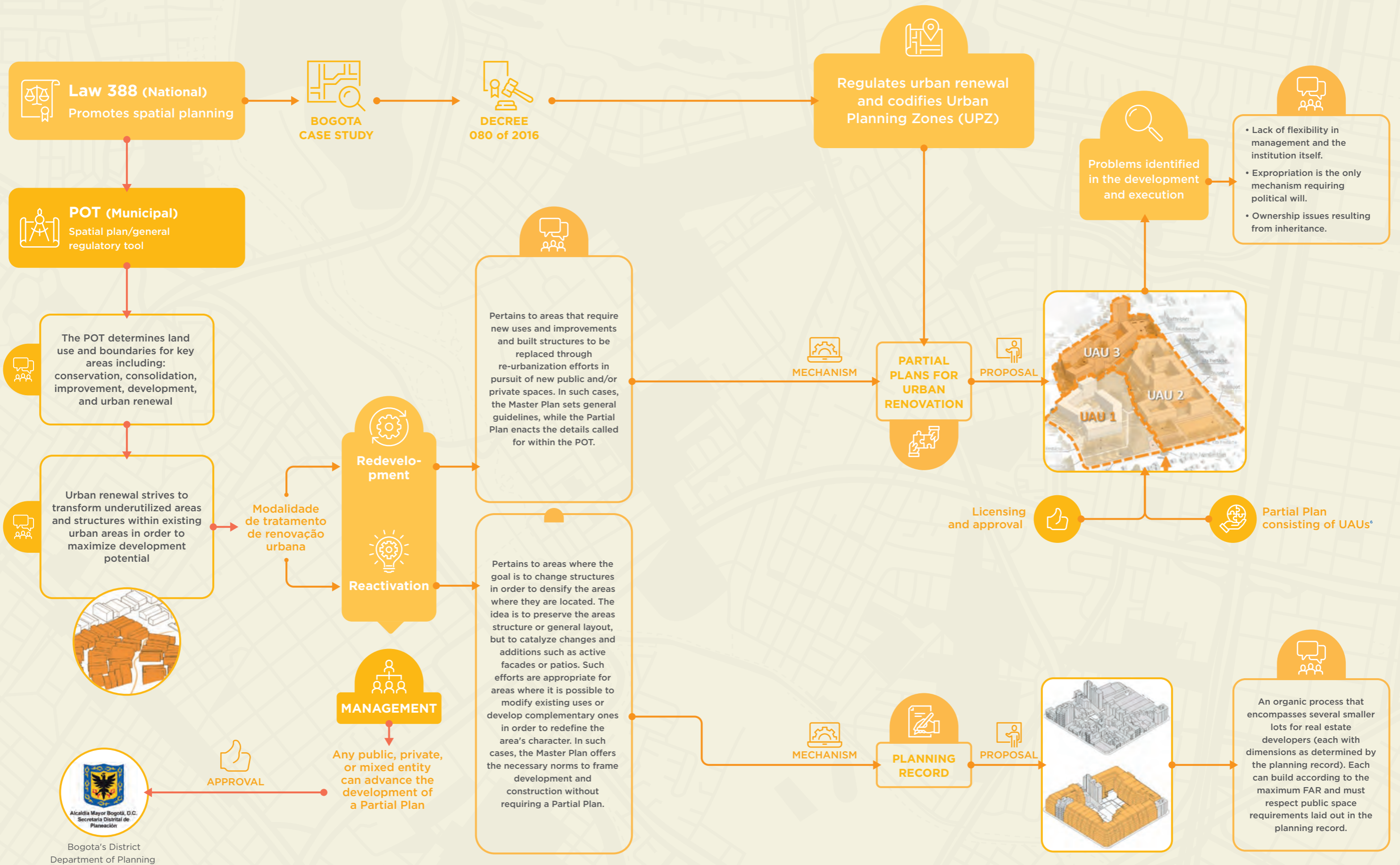


Source: Government of Medellín -- Publicaciones de los Macroproyectos, 2016 [Acceso: 4/12/2020]

⁵ Land Pooling or Land Readjustment: addressed at length later in the book, this involves urban land development through the acquisition of fragmented lots belonging to different owners, the subsequent consolidation of the various lots in one area and then subdivision in an orderly and planned way, followed by infrastructure development and redistribution of the lots with new services back to the original owners. Available at: <https://www.adb.org/sites/default/files/publication/626076/sawp-072-land-pooling-nepal.pdf>



THE COLOMBIA EXPERIENCE WITH PARTIAL PLANS



The implementation of a similar instrument in Brazil appears to already be underway in some municipalities, including the Projeto de Intervenção Urbana (Urban Intervention Project—PIU)⁷ under consideration by the São Paulo PDM as well as the Urban Project

Consortia⁸ included in the City Statute. Nonetheless, neither of these two Brazilian instruments fully mimics the characteristics of the Partial Plan, largely because there is no management of the negotiation process between the owners involved.

↓ TABLE – COMPARISON OF PIUS OUCS AND PARTIAL PLANS

Source: Developed by the authors

	PIUS (SAO PAULO MUNICIPALITY)	URBAN PROJECT CONSORTIA	PARTIAL PLANS (INTERNATIONAL EXPERIENCE)
SIMILARITIES	Need to anticipate as part of general urban planning efforts		
	A legal-executive character		
	Definition of public and private uses (profitable or not), urban indexes, and general systems and efforts as derived from the Municipal Master Plan		
	Definition of an Urban Project		
	Period of public consultation		
	Use permitted at different territorial scales		
	Need to anticipate phases of implementation		

⁷ An 'Urban Intervention Project' is an instrument that serves as an intermediary between the Master Plan and the project itself. Its function is to develop and systematize urban mechanisms that improve land use and urban infrastructure by increasing demographic and built environment densities, in addition to spurring the creation of new economic activities, including jobs, affordable housing, and public facilities. Available at: <https://leismunicipal.com.br/a/sp/s/sao-paulo/decreto/2018/5806/58066/decreto-n-58066-2018-dispoe-sobre-os-projetos-de-intervencao-urban-predicted-in-1-of-article-2-of-law-n-16211-of-27-de-may-de-2015-as-well-as-about-the-analysis-of-the-processes-of-licensing-which-specifies>

⁸ According to the Caderno de Regulamentação e Implementação de Instrumentos do Estatuto da Cidade (Regulations and Implementation Booklet of City Statute Instruments; BRAZIL, 2017), an Urban Project Consortium (OUC) is an urban planning instrument provided for by the City Statute (Law n° 10.257/01) to support urban project-related partnerships with the private sector: The set of interventions and measures are to be coordinated by the municipal government, with the participation of owners, residents, users, and private investors, in order to achieve physical, social, and environmental improvements (Law n° 10.257/2001, art. 32, § 1). Available at: <http://www.capacidades.gov.br/biblioteca/detalhar/id/355/titulo/operacoes-urbanas-consorciadas-ouc#prettyPhoto>

	PIUS (SAO PAULO MUNICIPALITY)	URBAN PROJECT CONSORTIA	PARTIAL PLANS (INTERNATIONAL EXPERIENCE)
DIFFERENCES	Restricted urban transformation: A network of urban transformation-an area of metropolitan restructuring; a public transit network as defined by strategic axes for urban transformation; an environmental network; a network of local restructuring.	Limited urban transformation: A pre-determined area with specific needs and characteristics as relevant for the intended transformation.	Contingent upon: Land transformation towards urbanization and integration within the urban fabric.
	Applicable in underutilized areas or areas with transformation potential.		Applicable in urbanizable and urban areas.
	The opportunity and means to capture the value derived from densification.		Obligation to capture the surplus value derived from urbanization with compulsory participation
	Financing system: Urban Project Consortia, concessions, sale of building rights, public financing.	Financing system: Cepacs, mechanisms for urban flexibility, public financing, partnership with the private sector, public works.	Finance system: Land readjustment (donation of part or all of the land), public financing, public works
	Project leadership: public or private	Project leadership: public	Project leadership: public or private

Source: Developed by the authors.

MAIN BARRIERS

There are no significant barriers within Master Plans in Brazil to impede the implementation of intermediate plans by municipalities. The absence of clear instruments at the national level(City Statute), however, has resulted in several municipalities creating their own tools with different names and differing efficacies, creating competition with existing instruments.

MAIN RECOMMENDATIONS AND OPPORTUNITIES

As the Partial Plan creates a detailed land use framework to enable the urbanization of its target area, the following actions can help facilitate its implementation within the scope of the Brazilian planning system:

- **Introducing forecasting as part of the Municipal Master Plan:** as in the case of Urban Project Consortia (Law No. 10,257 / 2001, art. 32), the general urban planning guidelines set out in the Master Plan evince areas where intermediate urban plans, such as Partial Plans, could be adopted.
- **Allocating uses and dividing the Partial Plan area into Units of Execution (UEs):** UEs are smaller areas in which interventions can be coordinated as called for as part of the plan, including the equal distribution of the benefits and burdens of urbanization across landowners. (Martin Rebollo, 2009).
- **Incorporating an intermediate planning tool in Municipal Master Plan revisions** to help plan the TOD areas of influence and to encourage the implementation of TOD-related projects.
- **Demarcation of the Units of Execution or performance:** determine which are a priority to be developed first.
- **Preservation of land for allocation** (land to support public, collective, or community uses and services): the plan must comply with the urban requirements laid out by the legislature. Land should thus be preserved for green areas, open space, cultural centers etc.
- **Preservation of land for affordable housing:** Spanish state law requires that a minimum of 30% of housing to be included in developments on rural land that is being urbanized be affordable, and 10% on urbanized land that is undergoing changes.
- **Economic evaluation** of urbanization and the provision of services.
- **Management system foreseen for the project:** (i) Systematic or integrated performance provides for the urbanization of the entire target area (sector, polygon, scope, performance unit or execution unit); or (ii) Unsystematic or isolated action may occur on land classified as urban, in which it is not possible to determine the unit of performance.

INSTRUMENT APPLICATION

Partial Plan best practices, drawing on Spanish and Colombian experiences, include⁹ (as adapted from Montandon, 2009 and regulatory review):

Formulation and Review:

- **Demarcation of the geographical area or territorial scope** of the plan.
- **Land qualification:** the plan must offer a detailed qualification (which is not the same as classification) of the full land area, through detailing uses and, when applicable, the anticipated built volumes (either public or private) on buildable land.

Finally, it is necessary to hold public hearings and obtain the Mayor's approval.

A.2 Introduce an instrument for the physical and legal reorganization of land: land readjustment

Land readjustment has been widely used as part of spatial planning in several countries across the globe, including in Latin America. It has only

⁹ Wolters Kluwer. Legal Guides. Administrative Law: Urbanism, housing and environment. Available at https://guiasjuridicas.wolterskluwer.es/Content/Documento.aspx?params=H4sIAAAAAAEAMtMSBf1jTAAAUjMwMDtbLUouLM_DxblwMDCwNzAwuQQGZapUt-ckhIQEAAASA. Accessed: October 2020.

recently been adopted by several municipalities in Brazil and there are still no specific examples of projects actively applying the instrument. Nonetheless, it has been included as part of the Municipal Master Plans of Belo Horizonte, Curitiba, and São Paulo, albeit without specific legal support and with several adaptations in place to ensure its legal feasibility.

This instrument aims to encourage urban development through a shared execution—where owners (both public and private) contribute their properties to create new and remodeled urban areas.

According to Souza, Ochi and Hosono (2018), land readjustment has the following advantages:

- Correcting errors and imperfections resulting from unmanaged urban growth.
- Responding to the demand for urbanized land with the implementation of new developments or needed infrastructure.
- Allowing for new parcelization with guidelines that are compatible with urban projects or planning strategies.
- Distributing the costs and benefits of urbanization to all owners affected by the instrument.

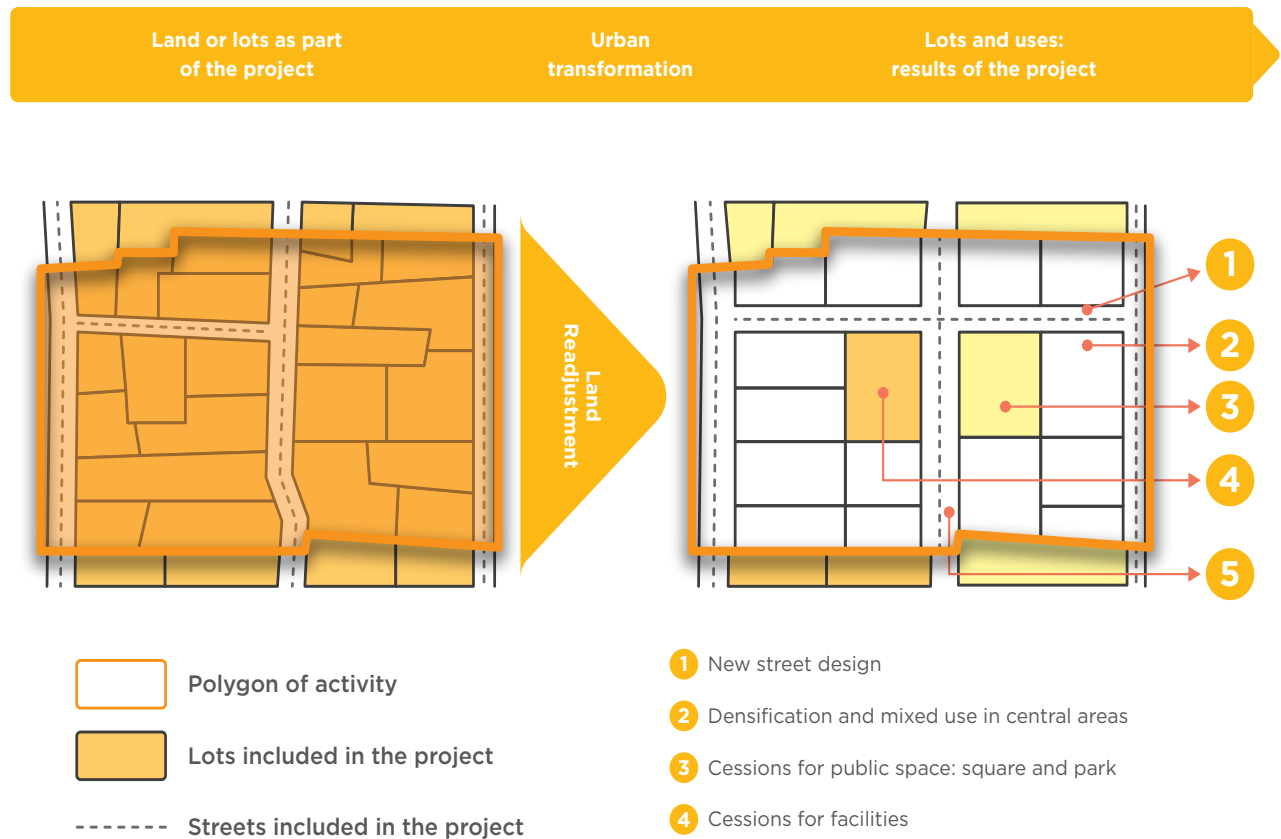
- Reducing and/or avoiding the need to resort to land expropriation.
- Its self-financing nature, as it uses the land's own value for incentivizing implementation.

Its relationship with TOD strategies is thus clear; TOD involves an intervention model for expanding and supporting transportation infrastructure through territorial remodeling (metropolitan or urban) that relies primarily on a land bank.

The main mechanism for executing land readjustment involves changing the design, location, dimensions, and area of several land parcels through a process of transferring property rights from one area to another in pursuit of the intended urban design scenario. In other words, old lots are transformed into new ones, in partially or totally different locations and forms (Souza, Ochi, Hosono, 2018). The “innovation” of this tool is, ultimately, the participation of landowners in the urban project through the equal division of the project's costs and benefits, thus avoiding the need for expropriation and its associated costs and bureaucratic obstacles.



↓ **FIGURE** – GRAPHICAL REPRESENTATION OF LAND READJUSTMENT.



Source: Developed by the authors

Engaging in land readjustment supports TOD efforts in the following ways:

- By enabling coordinated development for an entire area, avoiding expropriation, and adjusting the distribution of burdens and benefits, as well as the location of systems, facilities, and infrastructure, depending on the needs specific to the area.
- By re-examining the existing road network and offering either support for strengthening the existing infrastructure or for better adapting future infrastructure, with a direct impact on the mobility system and public and private transportation management.
- By making it possible for landowners to participate in the project through the exchange of old lots for new lots suitable for planning. This

can reduce public sector costs and deadlines associated with the expropriation process and the principle of fair distribution of benefits from urbanization.

- By introducing a feasible financial approach—capturing land value increases and selling real estate units with appreciated value—for the execution of the project, reducing costs for the public sector, entrepreneurs, and landowners through redistribution.
- By promoting the donation of land for public interventions and carrying out the necessary readjustments, with reduced public sector costs.
- By increasing development and population density through the revision of the land use rules according to the new spatial configuration of the area, allowing for the occupation of underutilized or abandoned lands.

- By enabling the adoption of a mixture of uses and the definition of new urban indices¹⁰, resulting in increased social and economic diversity in the target area.
- By avoiding speculation resulting from a need to integrate specific lands in the project's execution.

↓ **TABLE - COMPARISON OF EXISTING URBAN INSTRUMENTS AND LAND READJUSTMENT**

Source: Developed by the authors, based on Souza 2009, Montandon 2009, Pinto 2013 and from products developed by IDOM

INSTRUMENT	DEFINITION	DIFFERENCES AS COMPARED WITH LAND READJUSTMENT
Differences as compared with land readjustment ¹¹	The law solely defines the concepts of parcelization ¹² and subdivision in the context of urban land parcels.	Among the forms of urban parcelization, subdivision is the only one that produces public spaces under municipal ownership. Parcels can be further subdivided or consolidated, but there is no central body that manages the reconfiguration of parcels, land, or streets. This is exactly the concept behind land readjustment in which public and private investments work together to renew degraded or underutilized areas.
Urban Project Consortia	A set of coordinated municipal measures and interventions in collaboration with land owners, residents, permanent users, and private investors in pursuit of achieving structural urban transformations as well as social and environmental improvements (art. 32 1- City Statute)	The main difference between the two instruments is that while property owners participate either voluntarily or compulsorily in land readjustment projects, they may elect not to participate in Urban Project Consortia projects while still potentially enjoying the value increases stemming from the project.
Real Estate Consortium	A form of realizing urban projects in which land owners transfer their property to the municipal government for the duration of the project and then receive, as payment, urbanized real estate units upon the project's completion (art.46 1 - City Statute).	The City State restricts the use of Real Estate Consortium to properties owned by the state; or properties required to participate in parcelization (art. 46, caput). The latter is a very restricted category, including only properties on which there is no building, ones that are not being used, or whose use is less than the minimum defined use in the Master Plan or its resultant legislation (art. 5, inc. I). This is a very limited group of properties, making it difficult to collect the contiguous set of properties (of which none are either built upon or in full use) required for urban projects.

¹⁰ Urban indices refer to a set of rules that regulate building dimensions in relation to the land where they will be built. They also regulate, through zoning and land use, the uses for which these buildings are intended. Available at: <https://www.studioalfa.arq.br/post/2018/03/13/desmistificar-os-%C3%ADndices-urban%C3%ADsticos#:~:text=Ind%C3%ADces%20urban%20s%C3%A3o%20um%20set,which%20se%20destinate%20these%20builds%C3%A7%C3%B5es>.

MAIN CHALLENGES

- The development of a suitable formula, taking the context of the Brazilian system into account, for valuing the project's initial land parcels, while preserving the principles of transparency and legal security.
- Making the operation attractive for landowners in the project's target areas as well as for potential developers interested in investing in the project's construction (which will result in the necessary future real estate value increases).
- The use of this tool depends on the existence of a system of municipal, general, and detailed urban plans, as previously explained in the Partial Plans section.

MAIN RECOMMENDATIONS

- Engage in land readjustment using the instruments provided for as part of the City Statute. This would assist in: (i) Knowledge development for municipal managers, who would be trained to evaluate the real estate market and in all procedures for using the tool; and (ii) standardization of the concepts, nomenclatures, parameters, and minimum standards associated with the tool to ease its application for different projects and in different Brazilian municipal contexts.
- Explore formulas to assess the property rights of landowners in the process of land readjustment.

INSTRUMENT APPLICATION

Steps for the operationalization and implementation of land readjustment (adapted from Souza, 2009; and from international case studies):

- Identify an urban project and ensure its legal feasibility.

- Project definition:
 - Determine the agency or agencies implementing the project.
 - Consensus building: ensure a qualified majority of owners are willing to voluntarily participate in the project (with clearly defined criteria)
 - Establish the procedures for owners not participating in the project: either use of the expropriation mechanism or sale of properties to the developer (they will not be part of the property valuation process).
 - Conduct an economic and financial viability analysis for the project.
 - Conduct analysis of land tenure and evaluate property records/titles in the project area.
 - Establish a Retribution Rate system: how each owner participating in the project will be rewarded based on the characteristics and previous conditions of their property.
 - Attract public and private financial support.
- Project implementation
 - Temporarily relocate owners
 - Implement the necessary changes, preserving land for: infrastructure development, green space, public facilities, affordable housing, and urbanized areas to sell via the market to recover the investments made.
 - Issue new records and property titles for owners participating in the project

The power to process and shape land readjustment rests with municipal governments and, if applicable, with administrative bodies or entities expressly endowed by law with the competency to do. Other participants in the process include owners of the affected lands, as well as other interested parties and stakeholders who might be affected by the process. The scope of the project extends to all lands that fall within the unit of execution as defined by the plan or a corresponding procedure. It must comply with the agreed-upon rules (requiring a majority of owners) that are laid out as part of the project and must be widely disseminated.

The documents required for land readjustment, drawing on the Spanish experience, include: a justification assertion¹¹, a list of owners and interested parties, a proposal for the amount awarded, an assessment of the rights infringed upon as part of the project's execution, a provisional financial estimate (estimated costs and benefits for the urban project), and the corresponding urban plans/projects.

A land readjustment project thus must at minimum include:

- Land readjustment parcels: the landowners within the readjusted area, the local administration, and, if applicable, landowners outside of the readjusted area are entitled to a land parcel resulting from the readjustment. Each land-

owner is eligible for a land parcel proportional to their original parcel. The criteria for valuation are determined either by State land use law or by unanimous consensus of the affected landowners. Land readjustment does not extinguish owners' land rights; even if not outlined as part of the project, they will be awarded¹² according to the principle of real subrogation.¹³

- Valuation of the resultant parcels: by definition, the valuation of the resultant parcels will be completed according to the criteria agreed upon by all parties, as long as it is not contrary to urban planning law or causes harm to the public interest or that of third parties.
- Restitution and settlement accounts: rights and assets other than the land itself will be valued independently of it, as determined by land use and expropriation laws.

¹¹ A framework and justification for the need for readjustment.

¹² "A person who is awarded, by judicial decree, rights or assets; the one to whom the debtor's property or income is paid in payment of the debt" - in Ciberdúvidas da Língua Portuguesa, <https://ciberduvidas.iscte-iul.pt/consultorio/perguntas/adjudicante-e-adjudicatario/17376> [accessed on 08/31/2020]

¹³ Subrogation occurs when someone's debt is paid by a third party who acquires the credit and satisfies the creditor, but does not cancel the debt or release the debtor, who owes that third party". <http://rafaeldemenezes.adv.br/aula/direito-das-obrigacoes/aula-14/> [accessed on 08/31/2020]

Real subrogation "occurs when one thing is subrogated in another, taking its place and considered to be of same quality as the replaced item". <https://blogmarianagoncalves.jusbrasil.com.br/artigos/550342710/sub-rogacao-de-bens-imoveis-e-divorcio-consideracoes-importantes> [accessed on 08/31/2020]

OPPORTUNITIES FOR LAND READJUSTMENT IN MUNICIPAL MASTER PLANS

Some municipal master plans have already codified land readjustment, but the strategy has yet to be implemented as part of an urban project. It is important to note that methods of voluntary property owner associations that result in distribution as part of an urban project already exist as part of the current legal system, through Special Purpose Companies (SPE¹⁴) and Real Estate Investment Trusts (FII).

CURITIBA'S URBAN REDEVELOPMENT

Chapter VIII, art. 169 in Curitiba's Municipal Master Plan (Law No. 14.771 / 2017) establishes that urban redevelopment is a land management instrument that allows for the implementation of urban projects in the public's interest, through land readjustment, modification, or rights acquisition with the owners' consent, to promote the best use of property, public or private, for the purpose of creating, increasing, or rehabilitating public space or public use. The Curitiba Master Plan designates specific areas where this instrument could be applied in the city.

According to the plan, the urban project can be carried out either by the public sector or through PPPs. It also emphasizes that execution costs are to be shared (depending on the specific municipal legislation for each project). It specifies possible participation in FIIs, administrative contracts, concessions, and PPPs, but leaves it unclear whether the public sector lead can create or delegate an FII institution to enable the project.

LAND READJUSTMENT IN BELO HORIZONTE

Chapter VI of Belo Horizonte's Municipal Master Plan (Law No. 11,181 / 2019) establishes land readjustment as an instrument for redrawing portions of the municipal territory with a view towards urban qualification, carried out based on a unification of real estate records for subsequent parcelization.

The chapter is very brief and not very descriptive. It does not offer specific areas in which to apply the instrument, only stating that it can be used in Urban Project Operation areas. It does designate a management format, as found in the Curitiba and São Paulo Master Plans. It has not yet been applied to any urban projects.

¹⁴ SPE is a type of business created in order to carry out a specific project. Its activity is, in other words, quite restricted, and it may, in some cases, have a pre-designated period of existence. - In Sebrae, <https://www.sebrae.com.br/sites/PortalSebrae/artigos/o-que-sao-sociedades-de-purposito-specifico,79af438af-1c92410VgnVCM100000b272010aRCRD> [accessed on 08/31/2020] According to Victor Carvalho Pinto's definition (2013), an SPE "is a traditional instrument for operationalizing projects, to facilitate their financing by separating generated revenues and assets and making the accounting more transparent for external investors. An SPE can be created by the municipal government, by law, in which case it would be a public company or a mixed-capital company, or by the winner of a public bid for a concession, or by a public-private partnership. In addition to the capital contributed by the controlling company—the municipal government itself—property owners to be paid in installments and investors more generally may also participate in the SPE capital process by issuing new shares."

B Effective use of existing mechanisms and instruments

This second guideline seeks to offer strategies for the use of instruments and mechanisms that already exist in the current legal system and that are already being used for urban planning in several Brazilian cities, yet whose implementation still faces barriers. It is possible to overcome these obstacles with the codification of certain strategies within the Municipal Plan, capable of supporting the adoption of TOD projects.

It will also present strategies for federal government-led urban projects that have TOD-related purposes.

B.1 Explore current expropriation opportunities

As previously noted, urban interventions to support TOD implementation (almost invariably) require the transformation of private properties. The most common form is regulation of real estate activities, which does not, however, guarantee a stock of land for carrying out public transportation-related infrastructure projects, nor does it allow for the transformation of urban areas beyond the limits of the areas immediately surrounding the transport nodes.

According to Brega (2014), it is the public sector's responsibility to promote urban planning and land

use regulation, so the rights and capacities associated with private property are those provided for in the PDM and, as of 2015, also in the PDUIs. Private landowners must meet basic parameters in order to comply with their zoning requirements, such as a property's social value.

Several types of urban projects depend on existing land conditions, such as, for example, the acquisition of contiguous properties originally belonging to different owners. Pinto (2013) argues that there is a market failure in such cases known as the "holdout problem," in which each owner seeks to extract a price higher than that for which he would sell under normal circumstances. The process of urban transformation is thus led or carried out by the private sector, while depending, almost exclusively, on public action. Yet the public sector can notably apply mechanisms and instruments that already exist under Brazilian legislation at different levels of government in such cases.

In the context of TOD projects, urban expropriation¹⁵—which can be applied by different federal entities—can assist in the formation of a land bank to support both the development of transportation infrastructure and the remodeling of private parcels in pursuit of urban improvements or the collection of public resources for the execution of the project. It must be applied, however, in tandem with an urban plan that adequately justifies its implementation (Brega, 2014).

¹⁵ Unlike with standard expropriation practices which affect individual parcels, urban expropriation affects full areas or sectors. In addition to properties needed for public works, it also encompasses, according to the rules laid out as part of the plan, buildings intended for private use. This thus includes properties that will be used for public purposes—the development of a square, for example, or the construction of public facilities—as well as once privately-owned parcels that will be returned in urbanized or re-urbanized form to private ownership after the plan has been completed (Brega, 2014, p. 4).

MAIN BARRIERS

Applying urban expropriation to support urban projects in the Brazilian context presents the following obstacles:

- Many urban infrastructure projects led by different federative entities do not have projects associated with the infrastructure build-out and thus do not consider the possibility of urban expropriation.
- Indemnities must be in cash and of a “fair” value—an abstract concept that is open to interpretation across different judicial experts.
- Indemnities cannot be paid through exchange for another property or its return following Government possession. This does not avoid the “retention problem” and requires the government to have the necessary capital to compensate those owners who do not want to participate in the urban plan.
- It is a time-consuming process, involving many parties, including public authorities and various private owners, and legal procedures, resulting in a timeline that might not correspond with the needs of the urban project.
- There is often a negative perception on the part of expropriated owners, who will not receive their property’s equivalent value. There is thus a sense of loss and, invariably, a number of court cases, which delay or hinder the implementation of the project.
- There is often a lack of planning for the time required for expropriation, resulting in higher government expenses.
- There is often a lack of coordination across federal entities in expropriation projects led either by the State or the federal government.

THE COSTS OF EXPROPRIATION FOR THE SÃO PAULO URBAN PROJECT CONSORTIUM

According to the SPUrbanismo report, “Gestão das Operações Urbanas na Cidade de São Paulo” (Management of Urban Operations in the City of São Paulo—São Paulo, 2016), the urban development plan for the Águas Espraiadas, Centro, Água Branca, and Faria Lima consortia provided for expropriations to meet two objectives: affordable housing and urbanization.

In the latter case, the intent was both to build out public infrastructure (including road improvements, facilities, and public space), but to also engage in land readjustment albeit without a specifically identified location or project.

The São Paulo OUC raised R\$10.067 billion and invested R\$6.496 billion between 1997 and 2016. R\$1.82 billion thereof was allocated to expropriations, equivalent to 28% of the total invested and 18% of the total collected.

Fernando Haddad’s municipal governance team (2013-2016) thus ultimately pointed to expropriation as one of the main obstacles to urban development policy, especially in relation to the time and public funding required for its enactment (Annenberg & De Paula, 2016).

PROJECT ANNOUNCEMENT¹⁶—A COLOMBIAN LAND VALUE CONTROL MECHANISM

Government announcements of plans, programs, or public works themselves lead to increases in property values and, with that, in the amount to be paid in the expropriation process. Pinilla (2014) explains that public authorities in Colombia were at first permissive of efforts to incorporate the foreseen property value increases into the initial property evaluations for expropriated properties, despite their implications for higher public spending.

This permissiveness occurred despite the presence of Law 9 of 1989, which allowed for the discounting of acquisition values for properties based on the increase resulting from the announcement of the proposed project. It was only in Bogotá in 2003 that the mechanism was first implemented for the New Usme Strategic Operation (OUNU) whose objective was to catalyze affordable housing through land use changes in an area targeted for urban expansion in the south of the city.

The goal behind the strategy was to exert strict control over the land values, which involved: i) Public authorities presenting the project's main characteristics as part of a project announcement and ii) Land value reference assessments according to actual use without incorporating the valuation increases foreseen by the urban project.

This mechanism had a significant impact on Metrovivienda's¹⁷ ability to realize projects. The below graph shows the values for land acquisition across several projects (in 2010 pesos). The OUNU project—applying the Project Announcement mechanism—shows the lowest expropriation value in the company's history.

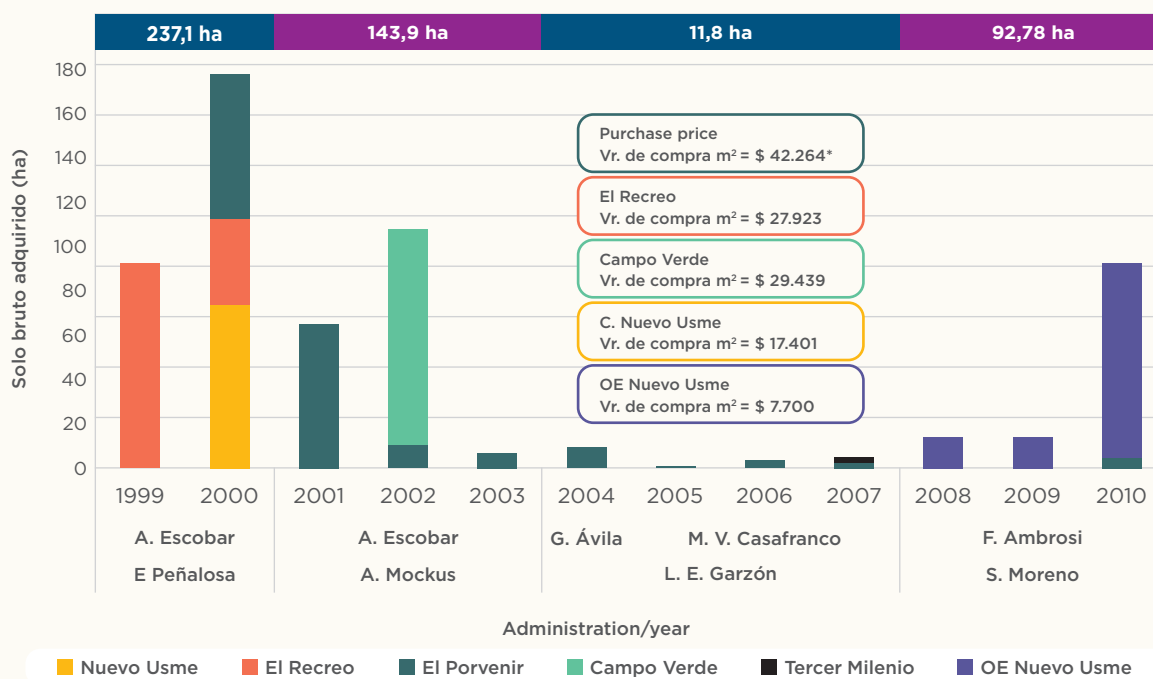
This case, in turn, served as an example for other Colombian cities, leading, ultimately, to a national regulatory decree detailing how to implement and operate the mechanism—Decree 2,729 of 2012.

PROCEED ►

¹⁶ Free translation from: "Ad de Proyectos", which, according to Pinilla (2014), is an existing Colombian legal mechanism (Law 9 of 1989), but which was only implemented for the first time by the Plan de Ordenamiento Territorial de Bogotá (2000) with the formalization of Decree 266 of 2003. Available at: https://www.lincolinst.edu/sites/default/files/pubfiles/instrumentos-notables-politicas-de-suelo-america-latina-full_0.pdf

¹⁷ Metrovivienda is an industrial and commercial company from the City of Bogotá that promotes the construction and acquisition of affordable housing in the city. It acts as a real estate operator that organizes and provides a diverse supply of affordable housing, while supporting efforts towards an inclusive and environmentally sustainable city. Available at: <http://www.metrovivienda.gov.co/httpdocs/index.php/2013-04-02-16-45-18/2013-04-09-15-25-20>

↓ **FIGURE - COMPARISON OF LAND ACQUISITION COSTS ACROSS METROVIVIENDA PROJECTS IN COLOMBIA.**



Total gross land acquired: 485,5 ha

*Includes some construction of legalized neighborhoods and expropriation payments of the land's value by up to 100%

Source: Pinilla (2014)

MAIN RECOMMENDATIONS

- **Urban projects should include plans for expropriation and infrastructure development in fulfillment of TOD principles:** increased building and population density, diversity of land use, better urban and environmental quality, and diverse forms of project financing.
- **Establish a clear relationship and institute better coordination between expropriation efforts and municipal/metropolitan urban planning:** this would create better synergy for government-led urban projects and infrastructure development; expropriation addresses both project needs and collective interests.

- **Include expropriations in a project's early phases of planning and strategy development:** doing so will reduce the costs associated with expropriation and ease the land valuation process to support more effective land value capture strategies.

LEGISLATIVE PROPOSAL

There are currently several bills in progress that seek to tackle the obstacles to expropriation, mainly surrounding its financial barriers and the lack of public funds. PL 11.277/2018, for example, is among them:

- According to the proposal, States, Municipalities – with authorization from Congress – and the Federal Government have the power to expropriate municipal assets when authorized by their respective legislative assemblies. The bill’s main innovation is to allow, in two cases, expropriation even without legislative authorization: when there is an agreement among participating executive powers or when the enterprise is defined as a priority by law.
- Another innovation is the inclusion of new actors authorized to conduct expropriation processes such as companies that participate in public-private partnerships and public consortia (Brazil, 2019). This bill would allow for expropriation both for infrastructure development and for allocating land to sell in the market as strategized and led by the public sector.

B.2 Implement instruments for guiding urban development in TOD areas

This section enumerates the key urban planning instruments already present in Brazilian planning which can support the development and implementation of TOD projects. It also presents strategies for overcoming obstacles towards applying the instruments in different municipal contexts.

A number of these mechanisms can be found in the City Statute, but several municipalities have also developed other instruments that are compatible with TOD strategies.

Under the Statute, urban planning instruments are classified by type:

↓ **TABLE-** CITY STATUTE INSTRUMENTS THAT PERTAIN TO TOD

Source: Developed by the authors based on BRASIL (2001).

INSTRUMENTS TO INDUCE URBAN DEVELOPMENT

Mandatory Parceling, Building and Use (PEUC)

Progressive IPTU

Expropriation with Indemnities

Special Areas of Social Interest

Right of Preemption

Sale of Building Rights

Real Estate Consortium

These tools increase the municipality’s capacity to intervene and to fulfill property’s social function as opposed to merely standardizing and supervising the use and profitability of urban land.

The Civil Code, in turn, includes two instruments:

- Dation in Payment
- Abandonment

The table below offers strategies for how these and other instruments can be applied in support of TOD:

DEFINIÇÃO

RECOMENDAÇÕES PARA
APLICABILIDADE COM DOT**PEUC +
Progressive
IPTU +
Expropriation
with
government
bonds**

The PEUC requires that idle properties (whether occupied or not) be built on or used within a certain period to meet their social function as outlined in the regulation. If the requirements are not met, the municipality can apply a progressive IPTU tax, whose rate will increase progressively for up to 5 years and up to a limit of 15%. If, at that point, the owner still does not comply with the pre-determined social function, the municipality can turn to expropriation, as compensated through debt securities.

PEUC, when combined with the progressive IPTU tax, expropriation and debt securities, can serve as an instrument to help governments expand their land banks in TOD areas of influence.

- The possibility of expropriation as compensated by public debt securities as opposed to cash (as in standard expropriation), can bring greater agility and less reliance on cash resources for government property acquisition processes.
- The body in charge of TOD can be the same one that manages the PEUC's operations and execution, concentrating efforts with more coordinated results.
- There is a reduced cost for the public sector associated with expropriation, while enforcing mandatory participation from private property owners who do not adhere to the parameters of the TOD plan.

**Right of
Preemption**

The right of preemption - or preemptive right - gives the executive power preference for the purchase of urban property, before the property of interest is sold to private individuals. It is a useful tool to help municipalities obtain land in real market conditions without exposure to overvaluation or delays resulting from expropriation.

The municipality can define specific plots or all land located in a given zone to fall under this right. TOD areas of influence can serve as the perimeter for establishing the right to preemption, once the municipality has the budget capacity to acquire the relevant properties at market rate. These properties would in turn make up the land bank needed for the project's execution and to design the TOD strategy.

DEFINIÇÃO

RECOMENDAÇÕES PARA APLICABILIDADE COM DOT

Transfer of Development Rights

The Transfer of Development Rights refers to the option for a property owner to, by public deed, transfer or divest a property's potential to any individual, as long as that property is located in an urban area eligible for the sale of building rights and is under the maximum FAR. This instrument's use is accompanied by a requirement to donate the property or part of it to the municipality in the following circumstances:

- Collective interest in building public facilities.
- Property preservation for historical, cultural, environmental, landscape or social needs.
- Execution of land tenure regularization or the urbanization of areas occupied by low-income populations or affordable housing.

DOT areas of influence could adopt instrument in two ways:

- For areas requiring expropriation, the public sector actor could negotiate with property owners to transfer of the right to build (FAR) for the total area or part of it (to support road and sidewalk expansion, for example).
- To amass development rights outside of the TOD area of influence to encourage a greater population and built environment density in proximity to transit.

Special Areas of Social Interest

Special Areas of Social Interest (ZEIS) are areas within the urban perimeter designated for residential use, either with established access to infrastructure and services or with a guarantee for their implementation. These are areas predominantly intended for low-income housing; the designation does not depend on the prior existence of residential uses or whether the area was empty or underutilized. They thus must be established by law (ideally in the Master Plan, but can be done by general law).

- ZEIS should be defined and demarcated within TOD plans as priority areas for which to establish residential land banks.
- It enables greater building and population densities as associated with a higher quality of life in TOD areas of influence, which, in turn, combines an increased passenger demand and a reduced need to travel in close proximity to transportation infrastructure.
- It ensures social diversity in TOD areas of influence, with different forms of public and private real estate financing strategies. Establishing ZEIS on empty or underutilized land is synergistic with land banks in support of affordable housing for TOD projects.

	DEFINIÇÃO	RECOMENDAÇÕES PARA APLICABILIDADE COM DOT
Real Estate Consortium	<p>The real estate consortium is an urban instrument that establishes a partnership between the public and private sectors in support of urbanization or development (as may be outlined within TOD-related plans) when the owners of empty or underused property are without the resources to do so themselves. The instrument allows the owner transfer property to the municipal government; the latter subsequently develops or makes improvements to the land. Following the execution of the improvements, the former owner either receives a parcel or a portion of the development corresponding to the value of their property prior to the improvements. This instrument needs to be regulated by law.</p>	<p>This instrument's main TOD-related advantage is that there is no requirement for immediate resource expenditure (as in urban expropriation) and the property can be incorporated into a project regardless of an owner's capacity to participate.</p>
Solidarity Quota	<p>São Paulo's PD introduced the Solidarity Quota for developments larger than 20,000 square meters. It requires that an additional area equivalent to 10% of the development be designated for affordable housing. The goal was to assemble a land bank to meet the needs of low-income families (Silva, Borges 2019).</p>	<p>This instrument is highly compatible with TOD strategies, as it helps to develop a land bank in support of affordable housing development in TOD project areas, without requiring the government to expend resources for expropriation or real estate purchases. It can further support built environment densification alongside population densification, expanding passenger demand in close proximity to transit.</p>
Maximum lot size	<p>Another contribution made by São Paulo's PD, this instrument works to ensure land use optimization in areas that have benefitted from public investment by setting a minimum number of housing units required for a certain area of land. It also allows for diversity in unit size, encouraging income diversity.</p>	<p>This instrument supports the expansion of an area's built environment in order to house a greater number of diverse individuals in addition to helping to avoid gentrification and the displacement of existing residents.</p>

MAIN BARRIERS

The main reasons for the low implementation rates of existing urban planning instruments include:

- A lack of training for municipal technicians and limited institutional capacity to monitor both instrument implementation and day-to-day management.
- Conflicts between individual and speculative property interests and instruments working towards the collective interest, including in municipalities where there are specific departments tasked with planning, applying, and monitoring the instruments provided for in art. 182 of the Federal Constitution (FROTA, 2016 and SÃO PAULO, 2019).
- The general nature of the instruments outlined in the Municipal Master Plans, which do not provide for concrete instructions for their application, often depending instead on complementary laws for more a more detailed descriptions and use cases (yet even those are not always presented or formulated).
- A misrepresentation of the time needed to use the instrument and a resultant misalignment with the schedule for the urban project itself.
- Establishing urban parameters for TOD areas, including minimum, base and maximum utilization coefficients—it is important to identify a base coefficient with an appropriate index for possible land value capture.
- Understanding the real estate dynamics of the area in question so that the applied planning instruments are oriented around the real estate market's capacity as well as the local social and economic dynamics over the short, medium, and long terms.
- Demarcating Special Areas of Social Interest (ZEIS), both in areas already occupied by informal settlements and in urban voids, in pursuit of expanding social diversity and reducing the possibility of gentrification in the area targeted for regeneration.
- Understanding each TOD area of influence has unique characteristics and may or may not be of interest to the real estate market and other private actors.

MAIN RECOMMENDATIONS

The following actions can assist in the process of designating strategic areas for the purpose of implementing such instruments:

- Conducting a territorial analysis, with an updated municipal geospatial database.
- Master plan revisions have the potential to embed TOD concepts and strategies into existing urban instruments, facilitating their implementation.
- Formulating and developing PDUIs across several Brazilian metropolitan regions will facilitate the identification of strategic projects and areas of priority for investment. Incorporating TOD strategies into these efforts could offer a tool to identify areas for shared application with the urban planning instruments provided for in the City Statute.

B.3 Use properties owned by different public entities in TOD areas

This section offers recommendations to support the creation of a land bank which could be used for the following purposes:

- Implementing transportation infrastructure provided for by the TOD proposal.
- Creating areas with uses that are unprofitable, but of extreme importance for urban, environmental, and social needs within TOD areas of influence.
- Transforming areas through new (profitable) land uses.
- Generating financing mechanisms for the interventions provided for in the TOD proposal.

Brazil's three levels of government possess land and assets across the country that can and should form part of TOD projects. In doing so, these properties could fulfill their social function, bringing urban benefits to the community in alignment with existing TOD strategies.

The Secretaria do Patrimônio da União (Federal Patrimony Secretariat—SPU), currently linked to the Ministry of Economy, is responsible for the management of federal public properties. Its main function is to manage the nation's real estate assets and to ensure their conservation. Ac-

cording to art. 20 of CF/1988, the nation's goods are classified as: (i) Goods for common use by the people (inalienable): beaches, squares, streets, sea, rivers, etc.; (ii) Special use goods: all those belonging to public administration services; and (iii) Domain goods: with no defined use, such goods can be made available for private use.

There are also notably marginal lands and those owned by the Navy as demarcated according to rules laid out by SPU protocols¹⁸, as well as properties incorporated into the nation's assets from federal entities that have ceased to exist. This includes all properties no longer operating, such as, for example, those no longer used for rail transport, including the defunct railway branches of the former Rede Ferroviária Federal S.A.—RFFSA (a company disbanded by Federal Law No. 11,483/2007).

The federal government has instruments to carry out transfers of rights for such properties, to both other federal as well as private entities. The form of instrument applied depends on each property's use for the city where it is located and on the public interest for the use proposed by public and/or private actors. In the case of public land banks for urban projects, including TOD projects, the main instruments would be: alienation¹⁹, assignment of rights²⁰, declaration of public service interest²¹ and domain transfer²².

¹⁸ Marine lands are those located within 33 meters from the coast as counted from the point where the sea water reaches land, using as a reference the average of the maximum monthly tides of the year 1831. The line formed by these points is called the Average Preamar Line (LPM) (Brasil, 2017).

¹⁹ Alienation includes "any transfer of property, remunerated or free, in the form of a sale, exchange, donation, donation in payment, investiture, legitimation of ownership, or concession of domain" (Meirelles, 2001).

²⁰ Assignment of rights is the instrument by which a transfer of rights for a given asset is carried out. The seller, known as the assignor, passes on to the buyer, called the assignee, the rights to the asset that is the object of the assignment, which may be movable or immovable. (Moura, 2016) - Available at: <https://jus.com.br/artigos/53885/cessao-de-direitos#:~:text=Cess%C3%A3o%20de%20Direitos%20%C3%A9%20th,may%C3%A1%20be%20m%C3%B3vel%20or%20im%C3%B3vel>. [accessed 09/07/2020]

²¹ Provided for in Law 2,398/1987, this instrument should be applied when there is an interest in reserving an area for the implementation of a public interest activity or program, such as, for example, for the implementation of housing projects, ports, land regularization, etc. It should be noted that it is not a 'destination' instrument, as it does not transfer domain and/or rights over the area (SPU-PR, 2015) - Available at: https://www.gov.br/economia/pt-br/access-to-information/audits/planning-development-and-management/files/2015/relatoriogestao_spu-pr_2015.pdf [accessed 09/07/2020]

²² In Brazil, the contract itself does not transfer the domain (ie ownership). A real estate transfer occurs through the transfer of the title in the Real Estate Registry. According to art. 1.245, §1, of the Civil Code, "as long as the new title is not registered, the seller remains the owner of the property". Available at: <https://www.scafone.adv.br/quem-nao-registra-nao-e-dono-e-quem-registra-pode-nao-se-lo.html> [accessed 09/07/2020]

The national government can also transfer the land to other federal entities through sale, exchange, or donation. There are no specific requirements in such situations; each case is treated uniquely and negotiated individually, according to Normative Instruction 04, of August 11, 2010, which also applies to private individuals.

In the case of state properties, as explained by Cardoso (2010), the nation's assets define the state assets (art. 26 of the CF/1988). The precariousness of the demarcation of national assets thus directly interferes with what would be demarcated as state assets. States can only build land banks with properties that they already own as acquired through expropriation.

Municipal assets, on the other hand, are defined as part of the public urban land reserve for public use as provided for in the Lei Federal de Parcelamento Urbano (Federal Urban Land Subdivision Law No. 6.766). It is up to each municipality, in other words, to allot the areas in the reserve for public use.

In most cases, 35 to 40% of the land is preserved for public rights of way²³, with 20% allotted for the road system, 15% for green areas, and 5% for institutional areas. Although the mechanism provides for a municipal land bank, each project is treated as stand-alone; each subdivision project is approved by the municipality.

MAIN BARRIERS

An analysis of the current situation with public properties and assets and of the different government entities involved notably reveals some barriers that TOD projects face:

- The absence of a comprehensive public database of nationally-owned properties, making it difficult to coordinate with state and municipal governments on urban planning and infrastructure-related projects.
- The need for a clear central policy on the sale of properties to third parties (private individuals) for use in urban projects led by municipalities, states, or metropolitan regions.
- Political and party differences can influence the availability of publicly-owned lands for urban projects. Leadership for urban projects is often at the municipal level and dealings between mayors and state and federal governments can be difficult and can at times even preclude the execution of projects.
- Municipal land banks depend on private allotment, which means that the land donated to the municipality adheres to the needs of the private sector as opposed to municipal needs.
- A lack of property standardization combined with ownership challenges (including for public properties) results in blocked processes or confounded timelines, which, in turn, demands costly and time-consuming alternatives.

²³ <?> A public right of way is understood to be any road or street intended for circulation or public use. The 'preserved' land, in turn, is the portion of land that has not been subjected to subdivision, as defined by Law No. 6.766/1979.

MAIN RECOMMENDATIONS

Federal entities have land banks in different parts of the country, often in connection with transportation infrastructure networks. Other entities such as water, sewage, drainage, or telecommunications companies (among others) may also have urban land in TOD areas of influence and could thus serve to contribute to realizing TOD projects. The following recommendations are thus proposed:

- Establish clear and easy processes for government entities to participate—with their properties—in TOD projects.
- Develop a transparent and easily accessible inventory, categorization, registration, regularization, and georeferencing system for all public properties owned by the federal government.
- Municipalities should present a clear TOD strategy to fulfill the criteria needed for approval (under Law No. 6.766 / 1979) for projects requiring federal land parcels.
- Develop mechanisms for exchanging land across government bodies: one entity could turn over the land parcel in an area of interest for the TOD project and receive another parcel in a different location in the city in exchange.

MAIN OPPORTUNITIES

- State assets, marginal lands, and Navy-owned property—all managed by the SPU—are invariably areas with changing dynamics, making it difficult to fully demarcate them; yet they also have the opportunity to support projects in coastal areas.
- Although the SPU has registered only a small portion of railway properties, such areas have great potential relevance for municipalities across Brazil. They could notably support TOD projects (both local and regional) with transportation infrastructure development and urban regeneration.
- The Real Estate Disposal Plan, as led by the SPU, notably catalyzes the disposal of vacant properties which have not been used for at least two years, yet there is as of yet no codified administrative or collaborative process for communicating with states or municipalities regarding properties of potential interest that are to be sold.



FINANCING AND LAND VALUE CAPTURE

Implementing a viable financing model for urban infrastructure and services is a chronic challenge for cities. The use of instruments as part of TOD projects to capture resultant land value gains¹, known as land value capture, is thus an opportunity for cities to adopt more sustainable tax practices. Public transit infrastructure projects in general lead to real estate appreciation for their surrounding areas, which can (and should) be recovered by the government to finance new investments. In addition to the infrastructure itself, the densification of buildings and population in TOD areas through regulatory changes increases the potential values to be captured and attracts potential public transit users, thus contributing to the financial sustainability of the system (Suzuki, Murakami, Hong, Tamayose 2009).

Appreciation around the stations therefore has two main sources that are clearly identifiable: investment in infrastructure and urban regulations—both the direct result of public action. Without recovery instruments, such public action will result in private benefit, counter to equity guidelines and redistributive policies. Yet LVC instruments and other ways of increasing revenues

have not yet been systematically applied by Brazilian municipalities. According to data from the Frente Nacional de Prefeitos (National Mayor's Front) in 2018, only 51% of municipalities' revenues came from their own tax base, while the rest came from intergovernmental transfers from states or the national government (FNP 2019).

An increase in self-generated revenues, primarily through LVC instrument adoption, is especially relevant in the context of serious fiscal problems and budgetary rigidity, which have limited how much can be allocated to the investments cities poorly need². Strengthening existing sources of funds and identifying others with the potential to meet the demands of urban projects is a challenge that is, to a large extent, shared with other Latin American cities. This strategic line has the objective, therefore, of presenting ways to finance investments through the recovery of real estate value increases, addressing the barriers and difficulties encountered in the use of such mechanisms, as well as potential solutions and recommendations for their implementation, as accompanied by examples from both national and international cases.

¹ Furtado (1999) addressed the concept of land value capture as specifically applied to urban lands, including recovering the partial or total value of public territorial investments and regulatory changes (which naturally increase the value of private property for the property's owner) for the collective whole.

² For more on this topic, see Vetter and Vetter 2011.



STRATEGIC LINE 4: FINANCING AND LAND VALUE CAPTURE

1st Guideline:

Improve traditional municipal revenue collection mechanisms that facilitate TOD project implementation



Actions

Properly collect property taxes and update property values when implementing TOD projects

Introduce variances that optimize the applicability of the Special Assessment Tax for TOD projects

2nd Guideline:

Properly implement land value capture tools and instruments



Actions

Introduce and perfect the use of the Sale of Building Rights (Outorga Onerosa do Direito de Construir), especially for medium and large cities

Take advantage of Urban Project Consortia (Operações Urbanas Consorciadas) for TOD projects

Mobilize land value capture as a mechanism to catalyze affordable housing in TOD areas

3rd Guideline:

Diversify forms of participation to improve coordination across TOD investments among public and private actors



Actions

Sale or renting of land

Business Improvement Districts (BIDs)

A Improve traditional municipal revenue collection mechanisms that facilitate TOD project implementation

The term 'self-generated resources' encompasses all forms of revenue collected by a governmental entity itself. This includes income, real estate, and service taxes, as well as other forms of non-tax revenue. For municipalities, these resources signify the most stable and predictable sources of revenue, as they depend exclusively on municipal management (Blanco, Moreno, Vetter, Vetter 2016).

According to CF/88, art. 145 (and art. 5 of the National Tax Code), the Brazilian tax system includes taxes, fees, and special assessment charges as municipal revenue sources. Those most pertinent to TOD—as relating to land or infrastructure provision—include:

- **Imposto Predial e Territorial Urbano (Property and Urban Territorial Tax—IPTU):** levied on real estate.
- **Imposto de Transmissão de Bens Imóveis (Real Estate Transfer Tax—ITBI *inter vivo*):** levied on transactions that involve the transfer of ownership or real rights over real estate as paid for by the property purchaser.
- **Contribuição de Melhoria (Special Assessment Tax—CM):** as generated by the appreciation of real estate resulting from public works.
- **Fees:** as generated to support public services provision or the exercise of police power.

Among the various self-generated municipal resources, Smolka and Ambroski (2000) identify real estate and special assessment taxes as areas with potential for a budgetary increase, as they enable the recovery of a portion of the land value added.

↓ TABLE - FUNDING SOURCES FOR MUNICIPALITIES

Source: Developed by the authors based on Suzart et al (2018)

MUNICIPALITIES					
SOURCES OF FINANCING					
SELF-GENERATED	<i>IPTU</i>	<i>ITBI</i>	<i>ISS</i>	<i>CM</i>	TAXES
Mandatory Intergovernmental Transfers	National	100% of the income tax collected at the source, above the amount paid by municipalities	50% of the ITR property tax on properties located within the municipality	70% of the Tax on Operations of Credit, Exchange and Insurance	Municipal Participation Fund
	State	50% of the IPVA licensed in the municipality	25% of the ICMS	25% of the 10% IPI tax passed by the states to the national government	25% of the 29% CIDE tax passed by the states to the national government
Voluntary Transfers	Intergovernmental: agreements and adjustments, among others, as agreed upon with the national or state government.				

MAIN BARRIERS

A brief diagnosis of municipal tax collection in Brazil would indicate that there are important barriers to be overcome:

- In general, most self-generated municipal resources come from taxation of economic activities or real estate: while the former has greater variability based on economic performance, IPTU is usually less volatile, as linked to property values.
- A strong dependence on intergovernmental transfers: In 2018 (FNP 2019), 49% of municipal revenues came from intergovernmental transfers by states or the national government, with the remainder from municipal tax bases.
- Revenue collection capacity varies widely: more generally, small municipalities with small populations have lower levels of self-generated resource collection (IPTU or Contribution of Improvement) as compared to other sources of revenue (Dualde 2013; Furtado & Acosta 2020).

A.1 Properly collect property taxes and update property values when implementing TOD projects

The IPTU has played a secondary role in municipal tax collection in Brazil in recent years, with the Municipal Service Tax (ISS) treated as more relevant. It is, nonetheless, an important source of

municipal revenue. One of the main advantages to the IPTU is its fixed tax base, making it a revenue stream that is stable and reasonably independent of the economic cycle. The IPTU is notably a high-visibility tax, as a direct tax on property values (Afonso et. Al. 2012)³. Another advantage is the fact that it is applied to the property and not to the individual, making evasion difficult, as property cannot be hidden unlike income or other assets (Morales 2007)⁴.

MAIN BARRIERS

Despite its inherent advantages, there are nonetheless barriers to property tax collection, management, and updating (according to Afonso, Araújo, Nóbrega 2013):

- **There is strong public and political pressure against reappraising property values (PGV):** the IPTU is the only tax that requires legislative sanction for reappraisal (De Cesare 2010).
- **Incomplete or outdated property registration information:** ideally, the municipal real estate registry should be frequently updated so that the tax is levied on all urban properties and the amounts regularly updated.
- **Several properties have partial or complete exemptions according to criteria established by municipalities (size, use, age, etc.):** in São Paulo, for example, 40% of residential properties are exempt from payment (De Cesare 2010)⁵.

³ Afonso, J.R; Araujo, E.; e Nóbrega, M. (2012). The Urban Property Tax (IPTU) in Brazil: An Analysis of the Use of the Property Tax as a Revenue Source by Brazilian Municipalities. Lincoln Institute of Land Policy.

⁴ Morales, C. (2007). Los Impuestos a la Propiedad Inmobiliaria en el Financiamiento de las Ciudades. In Erba, D. (2007). Lincoln Institute of Land Policy.

⁵ De Cesare, C. (2010). Overview of the Property Tax in Latin America. Working Paper. Lincoln Institute of Land Policy.

- **There is no tradition of auctioning defaulted properties, despite the large number of such properties in Brazilian municipalities:** the judicial process is time-consuming and costly.
- **The Fundo de Participação dos Municípios (Municipality Participation Fund—FPM) is seen as more relevant and more easily administratively managed for small- and medium-sized municipalities:** yet the FPM takes neither the potential for self-generated resources nor other forms of resource transfer into account. As a result, it discourages smaller municipalities from fully exercising their tax powers, instead favoring taxes that are more easily collected and administered (such as the Service Tax - ISS) (IPEA 2018).

It is also worth noting that there are significant differences in property tax collection across Brazilian regions. IPTU represents a larger proportion of municipalities' revenue in Brazil's Southeast Region (at 31%, larger than the national average), while lower averages can be found in the North and Northeast regions, paralleling the lower Human Development Indexes (HDI) in those regions (Afonso, Araújo, Nóbrega 2013). Yet this does not mean that the tax is properly applied in the regions exceeding the national average; studies⁶ show that the intake is still much lower than its full potential even in capitals and large metropolitan areas.

MAIN RECOMMENDATIONS

Better collection and management of the IPTU would help to increase municipal revenues and, with that, the possibility of TOD implementation as it relates to both land itself and the built environment. The resultant recommendations include:

- **National level:**
 - Promote qualitative improvements in property tax collection through amendments to the Código Tributário Nacional (National Tax Code—CTN; Law No. 5.172/66), which defines general tax rules, such as removing the obligation for City Council approval and requiring registry updates.
- **Municipal level:**
 - Systematically update the PGV and the real estate registry with market prices, especially in TOD areas
 - Integrate real estate data collection and registry processes through a georeferenced database and consistent coordination across municipal institutions (departments of planning, revenue, urban planning, etc.).
 - Auction defaulted IPTU properties for TOD projects to create the land bank necessary for the realization of the proposed urban project.
 - Regularize residential land tenure and charge IPTU in irregular settlements⁷.
 - Review the rates charged for areas or land uses, in alignment with planning strategies.

⁶ IPEA (2018); De Cesare (2000); e Afonso, Araújo, Nóbrega (2013).



Source: MK photograp55. Accountants filling in tax information online using smart phones. Unknown date. Shutterstock, consulted in 2020. www.shutterstock.com

- Review the criteria for exemption from collection to better align with territorial and fiscal strategies, with the objective of reducing the total number of tax exemptions.
- Strengthen training for real estate appraisal personnel.
- Communicate the benefits provided by IPTU.
- **Financing entities, banks, and multilateral funds:**
 - Support the financing of geographic and cadastral databases as well as technical analyses of market values to ensure that the Planta Genérica de Valores (Real Estate Value Database—PGV) and Cadastro Técnico Multifinalitário (Multipurpose Technical Cadastral Database—CTM)⁸ are regularly updated.

⁷ According to Smolka and De Cesare (2012), land and property tax exemptions may increase land values, resulting in evictions and/or gentrification and expanding real estate speculation in exempt areas.

⁸ The Multipurpose Technical Cadastral Database (CTM) is a cartographic and alphanumeric database that documents the urban (and rural) organization by real estate unit, primarily by plots and buildings, but also by street axes - Available at: <https://urbanidades.arq.br/2010/10/15/cadastre-tecnico-multifinalitario>. CTM plays an important role in urban planning, as it offers the basic information necessary for the development of urban plans and the management of urban and rural areas (Pereira 2009). Ministerial Ordinance 511, of December 8, 2009, establishes guidelines for the creation, implementation, and updating of CTM in Brazilian municipalities.

BRAZILIAN MUNICIPALITIES X SELF-GENERATED RESOURCES

Most Brazilian municipalities have implemented IPTUs within their urbanized areas. In 2019, IPTU accounted for, on average, 9.6%⁹ of municipal revenues. Yet among cities with updated value registries, IPTU accounted for up to 20% of total revenues (IPEA 2018). A study conducted by the Institute of Applied Economic Research (IPEA) across 53 Brazilian cities (small, medium, and large) found that those cities, on average, doubled their IPTU collections, boasting increases from 0.48% to 0.86% of their respective Gross Domestic Products - GDPs (IPEA 2018).

The critical challenge lies in developing, updating, and approving real estate values (PGVs)—a task that falls to finance departments within municipalities. There are generally no public indicators for land or property values, hindering the formation and validation of reference prices. Without either resources or political interest in updating these reference values, real estate often ends up undervalued, which limits the resultant collection and use for various urban instruments, such as construction rights.

Special Assessment Taxes, in turn, account for only 0.1% of municipal revenues in Brazil, making them the most underutilized instrument with the greatest potential for expanded use in small and medium-sized cities, and, occasionally, larger cities. The instrument's greatest obstacles, according to Furtado & Acosta (2020)¹⁰, include political and legal challenges as well as the complexity of calculating respective contributions and identifying pertinent areas of influence.

On the other hand, some cities, including Campo Grande (MS) and other municipalities along the coast of São Paulo, have used the real estate transfer tax (ITBI) to collect considerable revenues. In 2013, the revenue collected from ITBI surpassed that generated by IPTU in 43% of Brazilian municipalities (Afonso, Castro & Santos, 2016). Santos and Cremonez (2017)¹¹ show that São Paulo's cities had a higher growth of ITBI per capita than that of all other states following the passage of the Lei de Responsabilidade Fiscal (Fiscal Responsibility Law). Although the ITBI has few rigorous studies, this evidence nonetheless demonstrates that there is room for greater ITBI tax collection, which accounted for only 2.4% of municipalities' available revenue in 2019.

An analysis of real estate taxes and contributions (IPTU + ITBI + CM) in municipalities across different Brazilian states evinces a great disparity in the effective tax rates and, as a result, in tax collection itself. It is important to note that this, in turn, is positively correlated with Human Development Indicators and infrastructure investment.

Inadequate tax collection leads to a dearth in revenue, which, in turn, affects a city's investment capacity. It also allows for the speculative retention of land and property by large local owners, making it even more difficult to carry out urban improvement projects¹².

⁹ Afonso e Castro 2020

¹⁰ Furtado, F. & Acosta, C. (2020). Recuperación de plusvalías urbanas en Brasil, Colombia y otros países de América Latina: conceptos, instrumentos e implementación. Working Paper WP20FF1SP, Lincoln Institute of Land Policy.

¹¹ Santos, R. & Cremonez, G. (2017). Arrecadação do ITBI no Brasil: Uma análise a partir do Estado de São Paulo. *Planejamento e políticas públicas*, Brasília, 48 (1). http://repositorio.ipea.gov.br/bitstream/11058/8004/1/ppp_n48_arrecada%C3%A7%C3%A3o.pdf

¹² The progressively-increasing property tax (progressive IPTU) is a constitutional mechanism that allows the imposition of increased taxes over time on vacant or idle lots. It is intended as an instrument to reduce economic interest in speculative processes (Furtado & Leal de Oliveira 2002; Furtado & Acosta 2020). Nonetheless, the tax has encountered political and technical difficulties in its implementation (such as the definition of vacancy or underutilized property), which limits its impact among municipal urban policies (Furtado & Acosta 2020: 11).

A.2 Introduce variances that optimize the applicability of the Special Assessment Tax for TOD projects

The Special Assessment Tax (CM) is an instrument common to several parts of the world, boasting an array of use cases¹³. It is a tax or charge levied on real estate owners within a specific area to recover the cost of investments or resultant valuation increases. It is charged only once and, in order to be effective, the process itself must be fully transparent.

CM has been used extensively in Latin America to finance urban infrastructure, especially for projects related to roads, paving, public transportation, basic sanitation, and parks. In Brazil, the Special Assessment Tax is regulated by Decree-Law No. 195, 1967, and can be applied to the following types of projects:

- Opening, widening, paving, lighting, afforestation, rainwater drainage, and other improvements to squares and public roads.
- Construction and expansion of parks, sports fields, bridges, tunnels, and viaducts.
- Construction or expansion of transit systems, including all works and buildings necessary for the system to function.
- Services and construction related to drinking water supply, sewage, electrical and telephone network installation, transportation and communications in general or relating to

the supply of gas, funiculars, lifts, and facilities for public convenience.

- Protection against droughts, floods, erosion, and drainage as well as dikes, piers, ports and channels, and the regularization of waterways and irrigation.
- Construction of railways and the construction, paving, and improvement of highways.
- Construction of aerodromes and airports and access thereto.
- Landfills and beautification efforts more generally, including expropriations for the development of a landscape plan.¹⁴

The tax is applied within an identified area of influence for the public work in question; the amount charged is determined either by apportioning the pertinent intervention costs or by calculating the value of the properties (whichever is less). The maximum period to begin charging is 5 years following the project's conclusion; exemptions for some types of properties are permitted (churches and temples, public facilities, and even some private properties in accordance with specific laws)¹⁵.

Although Brazilian legislation allows national, state, and municipal governments to apply the instrument in different contexts, it has been most commonly used for road paving projects with limited urban or budgetary relevance (Sotto 2015). Its use is thus still not widespread across Brazil, accounting for only 1% of the total real estate taxes collected by Brazilian municipalities¹⁶.

¹³ According to the World Bank (2018), a tax on landowners who benefited from some type of public investment (roads, bridges, aqueducts, etc.) can be traced back to as early as 1500. Tools for recovering real estate valuation were used in England between 1650 and 1801 to build the canals along the Lea and Thames rivers.

¹⁴ Decree-Law No. 195, of February 24, 1967, art. 2.

¹⁵ The instrument accounts for capacity to contribute, which, according to Ricardo Ribeiro, consists of an economic measure determined by the legislature as a sign of wealth to allow for taxation.

¹⁶ Its use is more widespread in the South and Southeast regions. Between 2000 and 2010, the states of São Paulo, Paraná, and Santa Catarina were the ones that obtained the highest revenue from CM: approximately 49% of the total of US \$306,857,724.78 collected in the Brazil (Pereira, et. Al. 2013).

Despite its limited use, the tax's many strengths include:

- Transparency about the real cost of public works, helping citizens to monitor the municipality (control of public spending).
- Beneficiaries develop an understanding of the real valuation of the property, since the tax is charged after the work is finished.
- Evasion is made difficult, since it is linked to property ownership.
- Municipalities are strengthened financially, as it generates new resources as well as strengthens social justice and the distribution of the benefits of urbanization, according to the fundamental principles outlined in the City Statute.
- Property appraisals can be challenged by owners, causing delays in the implementation process and in the project's start date.
- There is a widespread lack of awareness of the tax by local officials.
- The procedure for collecting the tax is complex, encouraging and easing judicial challenges by taxpayers.
- It is methodologically difficult to establish the area of influence and the degree of impact of a project on its surrounding buildings (Furtado & Acosta 2012, 2020; Borrero Ochoa and Rojas Ruiz 2020).
- Since the charge is calculated based on the lowest amount (between the apportionment of project's costs and assessed real estate values), the potential arises that the charge will be less than the project's total cost.

MAIN BARRIERS

The main barriers for implementation as faced by Brazilian municipalities include:

- Strong public and political pressure against updating the assessed values necessary for the Special Assessment Tax, making it difficult to apply the tool. According to Borrero Ochoa and Rojas Ruiz (2020), political will is the most important factor determining the instrument's implementation in Latin America¹⁷.
- Collecting the contribution only after the project's execution means that it is not an instrument for financing public works, but rather only a mechanism for reimbursing expenses.

MAIN RECOMMENDATIONS

Recommendations to support the implementation of a Special Assessment Tax for TOD projects include the following:

- Federal and state governments should use the instrument as a way to recover public investment in (state and federal) projects through intergovernmental agreements.
- A methodological guide for TOD projects should be developed that draws on studies and existing data in order to define the criteria for determining a project's area of influence, its value generated, its impact on the value of the properties in question, and its mechanism for tax collection.

¹⁷ Borrero Ochoa, O. & Rojas Ruiz, J. (2020). Contribución de Mejoras en América Latina: Experiencias, desafíos y oportunidades. Lincoln Institute of Land Policy.

- Municipalities:
 - TOD areas of influence should be incorporated into Municipal Master Plans alongside the Special Assessment Tax.
 - The tax should be used in a manner complementary to other land value capture strategies provided for as part of the City Statute, such as the sale of building rights. This would help facilitate both the recovery of a project's costs and the real estate valuation process following a project's completion.
 - Communication strategies (i.e., social marketing) should be developed for the tax.
 - Community participation should be encouraged to help identify projects that could be financed through a Special Assessment Tax.

Source: Brastock. Aerial flying over a train bridge above the river at Barra Da Tijuca, Rio de Janeiro, Brazil. Outubro, 2019. Shutterstock, consultado em 2020. www.shutterstock.com



THE BENEFITS OF THE SPECIAL ASSESSMENT TAX FOR PARANÁ AND PARANACIDADE

Before 1990, the municipalities of Paraná—alongside the vast majority of Brazilian municipalities—boasted only limited use of the Special Assessment Tax to finance public works. Beginning in 1996, however, the Paraná Urbano program¹⁸ has been financed directly through a Special Assessment Tax, as facilitated by technical assistance from the state in implementing and managing the instrument through Paranacidade¹⁹.

The effort's success was confirmed in an assessment conducted by the state government: between 1991 and 1998, 50% of the financial resources invested in public works were returned to public coffers. Measures were notably taken to increase the effectiveness of the CM's collection in the form of an Instruction Manual supporting the instrument's implementation, containing procedures for the preparation and publication of notices, draft laws, and proposed reforms of municipal tax codes. Other important interventions include the following:

- Before the state approves any public works project, it first verifies that a Special Assessment Tax is provided for within the municipality's tax legislation.
- In order for municipalities to obtain financing, they must first comply with the tax obligations related to the Special Assessment Tax and include it on the municipality's balance sheet.
- Requests are made for the reformulation and republication of public notices that fail to respect the minimum ceiling for recovering the value of the investment (the operation rules of the Paraná Urbano program set a minimum ceiling at 80% in compensation via Special Assessment Tax).
- Tax collection is monitored through the recording of revenue in the municipality's general balance sheet.
- Municipalities that prove that they collected at least 75% of the amount provided for in the year prior can receive financial awards of up to 100% of the project's value.
- Guidance is provided for the notice's publication to be made between the signing of the project contract and the date of the project's final delivery.

PROCEED ►

¹⁸ A loan program by the Paraná State Government along with the Inter-American Development Bank (IDB), which established the fiscal requirements for investment recovery within its terms of agreement as signed by Paraná's municipalities.

¹⁹ An institution linked with Paraná's Department of Urban Development.

With these measures, the Special Assessment Tax instrument became one of the main mechanisms in Paraná for recovering investments. The city of Maringá's experience is particularly notable as it presents interesting solutions to several barriers to the instrument's implementation:

- Its municipal tax code defines the criteria for collecting the tax, thus instituting legal parameters for the tax's collection.
- An administrative body was assigned to carry out the collection process.
- An alternative for calculating assessed values was introduced in the form of two appraisal streams: one for the collection of IPTU (which is updated sporadically) and another for the collection of ITBI and CM, which is updated annually.
- The distribution across beneficiaries was simplified: the relevant information and spreadsheets are easily accessible and understandable.

B Properly implement land value capture tools and instruments¹⁹

In addition to the potential growth in self-generated resources, municipalities can also increase their revenues using land value capture tools (Vetter, Vetter 2011). According to Blanco, Cibilis and Muñoz (2016), by increasing public revenues, LVC mechanisms make it possible to finance infrastructure and promote more coherent urban development in close partnership with TOD efforts. In paying for infrastructure with the added value that it generates, public spending is optimized and spatial justice supported, since "it is legitimate that the value generated by public invest-

ments remains in the hands of the government, contributing to the distribution of funds within its territory. Further a general lack of resources to support infrastructure investment results in a strong need for LVC mechanisms in the agendas of municipal and state governments"²⁰ (World Bank 2018, p. 106).

In Brazil, the most well-known and applied LVC tools are²¹:

- **Sale of Building Rights** (Outorga Onerosa do Direito de Construir—OODC): an urban policy instrument that establishes financial compensation in exchange for the right to build

¹⁹ Theoretical notes on land value capture, urban land price development, and the legitimacy of land value capture by public authorities can be found in Furtado (2004) and Sotto (2015).

²⁰ "é legítimo que a valorização gerada por investimentos públicos permaneça nas mãos do poder público, contribuindo para a distribuição de bônus e ônus no território. Adicionalmente, a situação generalizada de falta de recursos para investimentos e carência de infraestrutura, é um forte apelo para que mecanismos LVC entrem na agenda dos governos municipais e estaduais."

²¹ The City Statute's Article 35 defines the Transfer of Development Rights (TDC) as the instrument through which the owner, with authorization from municipal law, can "exercise elsewhere... the right to build provided for in the master plan or in urban legislation resulting from it," for the purpose of facility building, environmental preservation or regularization programs, and affordable housing. Internationally and in Brazil, the instrument has been used mainly in programs for environmental and historic preservation and as compensation for expropriation. In Porto Alegre, for example, TDC was used to compensate owners affected by the construction of the 3ª Avenida Perimetral (see Uzon, 2007 at <https://www.lincolninist.edu/publications/other/movilizacion-social-la-valorizacion-la-tierra-full.pdf>). This chapter does not incorporate TDC in its analysis due to its limitations as a mechanism for financing and for capturing surplus value. Nevertheless, it recognizes its usefulness in facilitating expropriation and restitution.

above a building's established floor area ratio (FAR)²² as adopted by the municipality up to the limit of a maximum FAR (Brasil 2012). The amount stipulated for the incremental construction potential is paid at the time of the project's licensing and is mandatory as part of urban development²³.

- **Urban Project Consortium (Operação Urbana Consorciada—OUC):** an instrument that gives local governments the power to carry out urban projects in conjunction with the private sector (owners, residents, permanent users, and private investors), within parameters pre-defined by the Master Plan. It can be either directly applied to the sale of building rights or through Certificados de Potencial Construtivo Adicional (Certificates of Additional Construction Potential—Cepacs)²³. The funds raised are managed in a special fund and can only be used within the scope of the project, according to a project plan approved by municipal law.

In other countries, there is also the potential for land readjustment:

- **Land readjustment:** as outlined in previous chapters, land readjustment allows for the “redesign” of a portion of urban land, both in terms of road layout and individual urban plots, whose limits are reconfigured to “liberate” land for public use or direct sale in order to finance urban improvements in the area. Such improvements should generate sufficient appreciation for private lots in order to compensate their owners for the changes made by the project.

B.1 Introduce and improve the sale of building rights (Outorga Onerosa do Direito de Construir), especially as an instrument for medium and large cities

Several Brazilian cities have implemented, with varying degrees of success, instruments related to charging for additional building rights. Municipalities such as São Paulo, Rio de Janeiro, Curitiba, Porto Alegre, Natal, Fortaleza, Criciúma, São Bernardo do Campo, Brasília, Joinville and Balneário Camboriú, among others²⁴, have applied the instrument.

Nonetheless, there are still a number of barriers to the instrument's successful implementation in Brazil, due mainly to resistance from the real estate market as well as the tool's inherent management challenges for municipal administrations, such as regularly updated databases on real estate values and the availability of professionals who are available and trained for economic and financial urban analyses—skills generally lacking among Brazilian urban planners²⁵.

Similarly, the lack of national regulations establishing a single, pre-determined FAR (to be applied evenly across a city's urbanized area and equal to one time the land area), undermines efforts to homogenize the concept of buildable land—which serves as the theoretic basis for the sale of building rights (OODC)—such as when to apply the instrument, and how to approach the accompanying calculations²⁶.

²¹ The Portuguese term *coeficiente de aproveitamento* is translated in this document as floor area ratio (FAR) as it is known in the United States.

²² The potential applications for OODC resources are provided for in items I to IX of art. 26 of the City Statute. Brazilian law also defines the possibility of charging for land use changes, in an instrument dubbed Onerous Use Change Grant (Outorga Onerosa de Alteração de Uso—OOAU), with conditions similar to the OODC.

²³ Cepacs are securities issued by the municipal government, backed by building rights. They can be sold at auction or used by the city to pay for the efforts required by the project.

²⁴ Various authors. Available at: <https://rbeur.emnuvens.com.br/rbeur/article/view/183> and <http://www.anpur.org.br/ojs/index.php/anaisenanpur/article/view/140/137>


²⁵ Furtado and Araújo (2017) explain that investment in research and training is necessary to improve the instrument's use, including in topics such as: methodology and calculations, defining incentives, and drafting standards.

²⁶ Brazil's conceptualization of buildable land is outlined in the Carta de Embu (CEPAM - Fundação Mayor Faria Lima 1976). For details on single and basic FAR, see Recommended Resolution No. 148 of the Council of Cities, of June 7, 2013.

MAIN RECOMMENDATIONS

The former Ministry of Cities developed a comprehensive guide in 2012 for the implementation of the sale of building rights (OODC) in municipalities, offering recommendations and guidelines for applying the instrument. No program that actually encouraged and supported cities to adopt the instrument in an effective manner, however, was subsequently developed. In order for the instrument to be adopted more widely, it is thus necessary to develop a program that both offers technical training and sets institutional conditions at the municipal level.

Although support from other levels of government is valuable, the capacity and potential for using the tools pertinent to the sale of building rights reside with the municipalities themselves. It is thus urgent to develop an urban legal framework that:

- Links TOD's axes of densification and urban regeneration with the sale of building rights (OODC). The maximum FAR permitted should be, if possible, higher for those TOD areas than in the rest of the city, while still maintaining the area's quality of life.
 - Establishes a single FAR that can be applied across the board, above which it would be possible to sell building rights (OODC): a proposal presented in previous chapters of this document.
 - Takes the full construction potential of densification into account, based on location and related TOD projects. The areas planned for TOD projects should in fact have priority for the allocation of additional construction potential.
 - Establishes clearly and simply the methodology for calculating the OODC, consistent with market values, and defines which areas can be considered for land use conversion fees. The TOD project area can serve as a reference.
 - OODC Formula: offers a cost-benefit analysis for reductions in or exemptions to the OODC (such as planning or social interest factors, for example), as well as its ability to achieve its objectives (low-income housing production, density increases, and new land uses, among others), especially for TOD projects, where population density should incorporate all income groups.
 - Offers incentives for the integration of public transit corridors into the urban fabric, along with lively and active facades. Priority should be given to open commercial areas and space dedicated to parking lots should be limited.
- 

SCENARIOS EXAMINING THE POTENTIAL IMPACTS OF THE SALE OF BUILDING RIGHTS IN SÃO PAULO

São Paulo boasts extensive experience in managing building rights. After initially instituting OODC in the city's urban core, the city has since expanded the program to encompass all of São Paulo's urbanized area, raising, on average, R\$600 million per year.

A study conducted by Borges, Franco, and Franco (2019) draws on the TOD projects outlined in the city's Master Plan (2014) and Zoning Law (2016) to offer potential scenarios for the sale of building rights in the municipality of São Paulo out to 2035, as well as potential opportunities to apply the resultant revenues to climate change adaptation and mitigation efforts. The three scenarios are as follows: the first explores a zoning revision that would increase the overall permitted FAR, leading to a 30% reduction in the OODC's value potential. There is a corresponding drop in revenue as compared to the second scenario, in which the current zoning would be maintained. The final scenario foresees the implementation of all of the Master Plan's projects along with updates to all of the reference land values. The result would be a collection of nearly R\$13 billion over the period in question.

The case of São Paulo thus demonstrates the instrument's potential for raising capital and for channeling those funds into investments and urban development.

↓ TABLE – ANALYSIS OF POTENTIAL REVENUES AND INVESTMENTS FROM THE SALE OF BUILDING RIGHTS IN SAO PAULO

Source: Borges, Franco e Franco, 2019. The Impact of Building Rights on Climate Change Mitigation and Adaptation in Urban Oriented Transformation Areas in The City of São Paulo: Historical Analysis and Future Scenarios.

VARIABLES / SCENARIOS	Revised zoning scenario (30% drop in OODC values)	Scenario with no zoning revisions and implementation of anticipated projects	Scenario with property value reappraisal and implementation of anticipated projects
Estimated revenues (annual and by period) from the rights to build (OODC and Cepacs) in the city of Sao Paulo from 2019 to 2035	R\$ 547 million per year R\$ 9,3 billion per period	R\$ 683 million per year R\$ 11,6 billion per period	R\$ 752 million per year R\$ 12,8 billion per period
Permeable area (millions of m ²) and drainage capacity (thousands of m ³) of new companies paying for building rights	1,77 million m ² 65,7 thousand m ³	1,77 million m ² 60 thousand m ³	1,63 1,77 million m ² 60,5 thousand m ³
Affordable housing units (produced and land designated)	34.883 residential units	43.512 residential units	47.929 residential units
Bus lanes (km)	89 km	111 km	123 km
Bicycle lanes (km)	973 km	1.214 km	1.337 km
Reconstructed sidewalks (millions of m ²)	1,7 million m ²	2,1 million m ²	2,4 million m ²
Built greenspace (millions of m ²)	1 million m ²	1,3 million m ²	1,4 million m ²

B.2 Take advantage of Urban Project Consortia (Operações Urbanas Consorciadas) for TOD projects

The City Statute defines Urban Project Consortia (OUCs) as an instrument for carrying out urban improvement projects in partnership with the private sector. They can be established either through Certificates of Additional Building Potential (Cepacs)—as traded on the stock exchange—or through the sale of building rights (OODC), either via title or certificate.

In principle, the associated governing measures offer an advantage to OUCs that use Cepacs. Cepacs require a prospectus containing the most important information about the project as part of their stock exchange launch. The prospectus and its amendments must be submitted to the Comissão de Valores Mobiliários (Securities and Exchange Commission—CVM)²⁷ for approval in order to legitimize investors relations and to enable the securities to be traded on the stock exchange. These, in turn, can also be traded in secondary markets between private actors. Yet in practice, the same conditions can also be offered by urban projects without the use of Cepacs, as provided for as part of both general and specific municipal legislation (Brasil 2015).

MAIN BARRIERS

Nonetheless, there are several barriers to the implementation and management of OUCs:

- Their preparation requires high levels of financial and legal capacity, including the submission of documents to the Securities and Exchange Commission.

- The announcement of an urban improvement project associated with higher building intensities can generate an increase in land and property prices in the OUC area. This appreciation, in turn, tends to accelerate the supply of housing targeted for higher income sectors (Sandroni 2011; Sandroni 2016), driving towards social exclusion (Sandroni 2016: 61) and gentrification (Nascimento Neto & Antonio-Moreira 2013).
- Revenue Flow Volatility: the revenue flow resulting from the sale of Cepacs is not continuous, depending instead on market conditions (market cycle, base price, auctioned quantity) and external factors, such as political stability (Sandroni 2010). Similarly, revenue also depends on the pre-existing standards and the maximum number of certificates issued.
- The sale of development rights via OODC or Cepacs is most effective in fast-growing real estate markets, with high demand for land and developed stock markets. Its implementation is more difficult in small or unattractive real estate markets, however.
- A market contraction can lead to competition between the projects associated with the consortia as a result of limited capital and can thus jeopardize the development and success of one or more of the projects (Furtado & Acosta 2020).

MAIN RECOMMENDATIONS

Project implementation through Urban Project Consortia represents a significant opportunity for TOD-related projects. To be successful, projects should make use of as many tools as necessary; land value should be added to first and foremost address territorial inequalities as opposed to solely as a tool for executing public works. It is thus necessary to:

²⁷ See, for example, the Prospecto de Registro da Operação Urbana Consorciada Faria Lima in São Paulo. http://sistemas.cvm.gov.br/dados/Cepac/RJ-2004-04752/20191104_Prospecto%20Atualizado.pdf

- Limit gentrification and prioritize the infrastructure build-out that helps to reduce social and spatial inequalities, by establishing mandatory minimum percentages and allocating OUC resources to affordable housing, as well as identifying Special Zones of Social Interest (ZEIS) within the project's perimeter.
- Provide legal security through clear and fair rules for urban developers, demonstrating the feasibility of carrying out the urban improvements proposed in the project. To achieve this, it is necessary to avoid the overlapping of different laws for urban projects in specific areas which can generate uncertainty in how the law might be applied.
- Take into account the cyclical nature of the sale of building rights and their relation to the size of the local real estate market in OUC modeling efforts. Municipalities can restrict building rights elsewhere in order to maximize revenue potential or can implement a series of Cepac auctions over the course of the project's development cycle in order to incorporate value increases resulting from the project in the sale price.
- Integrate Urban Project Consortia within a broader city development plan, as opposed to as isolated interventions, in order to promote coordinated city planning and to reduce competition between projects (Furtado & Acosta 2020).

B.3 Mobilize land value capture as a mechanism to catalyze affordable housing in TOD areas

One of the most important aspects of TOD implementation is the creation of a housing mix that can adequately serve all income groups and, in

particular, provide affordable housing—something generally considered economically unfeasible for private developers. Such units are thus usually subsidized by government programs or by the resources generated as part of the project's implementation.

Further, TOD projects have the potential to reduce transportation costs and to increase employment and mobility options for low-income individuals by bringing them closer to public transit stations. In this sense, housing and transportation should be considered in tandem to reduce development gaps and spatial segregation and to minimize the displacement of individuals with more limited purchasing power.

MAIN BARRIERS

- Providing affordable housing along the necessary timeline: with current demographic growth and income trends, meeting the housing demand seems in many ways a distant goal, especially in medium-sized cities in developing countries. Thus, obtaining the amounts necessary to meet this demand constitutes the main obstacle to the provision of affordable housing.
- The price of land: obtaining empty or under-occupied land tends to be more difficult in areas with existing infrastructure and a higher degree of verticalization, where the land value is higher.
- Including affordable housing projects in joint ventures may generate opposition from real estate developers and residents of the region.

MAIN RECOMMENDATIONS AND OPPORTUNITIES

There are a number of measures that can be taken to improve efforts to meet the demand for affordable housing:

- Allocate a portion of the funds raised from urban development efforts to building affordable housing (integrated with medium or high-capacity transportation systems) at the municipal level. In the case of São Paulo, for example, at least 30% of the revenue collected from the sale of building rights must be used for land acquisition or affordable housing programs.
- Stimulate production of affordable housing by real estate developers using one of three methods: (i) an exchange of affordable units for additional construction potential; (ii) discounts to the cost of building rights; (iii) direct payment through Cepacs or OODCs, as shown in the Curitiba model.
- Diversify the methods for addressing the demand—such as housing programs, slum urbanization, land regularization, housing reform or improvements and rent support—incorporating an array of financing sources, including state and federal resources or direct or indirect subsidies through Public-Private Partnerships (PPP).
- Use mechanisms such as the “solidarity quota²⁸” to mobilize private contributions and make affordable housing projects viable²⁹.
- Analyze the feasibility of adopting instruments such as the Anuncio De Proyecto—an instrument widely used in Colombia, which consists of freezing the value of land at the value prior to the project’s announcement to avoid the land value increase resulting from subsequent speculation (Borrero Ochoa 2013). This instrument can be particularly useful in reducing the financial burden to purchase the properties intended for affordable housing within TOD project areas.
- Define and codify a clear housing policy that lays out the city’s need for affordable housing and offers guidance for specific urban projects in the form of affordable housing construction goals.

²⁸ An instrument inspired by inclusionary zoning in the United States, affordable housing development under “solidarity quotas” can occur in several ways: 1. Including low-income units in developments targeted for higher income groups; 2. Developing affordable housing in other parts of the city or 3. Offering payments in cash or land to support affordable housing development. In any form, “solidarity quotas” signify private contributions to address community needs and thus almost always, when combined with public subsidies, ensure the expansion of affordable housing in areas that otherwise wouldn’t be accessible for lower income groups. (Rolnik and Santoro, 2013) - Available at: https://www.lincolinst.edu/sites/default/files/pubfiles/rolnik-wp14rr1po-full_0.pdf

²⁹ This instrument is detailed at greater length in previous chapters of this document.

CURITIBA'S EXPERIENCE WITH THE SALE OF BUILDING RIGHTS AND ALTERNATIVE TAX COLLECTION METHODS

Curitiba, a TOD advocate since its 1975 Master Plan (Law No. 5,234/75), has been one of Brazil's pioneers in the sale of building rights. The city's first efforts can in fact be traced back as far as 1982 (Law 6337/82) in pursuit of preserving buildings of cultural value. The OODC was then introduced in 1990 (Law No. 7,420/90) and 1991 (Law No. 7,841/91) to help finance affordable housing.

These laws authorized the right to build above the permitted FAR in certain areas of the municipality in exchange for payment of either cash or a land equivalent of 75% of the value of the increased area. The resultant agreements were subsequently absorbed and improved in the city's master plans and zoning regulations. The result was the densification of targeted sectors and a corresponding increase in the revenue collected through the sale of building rights.

Law No. 13.909 was implemented in 2011 in order to establish a new axis for urban expansion through the Linha Verde Urban Project Consortium (later regulated by Decree 133/2012). The initiative provided for the issuance of up to 4.83 million Cepacs, starting at R\$200 a Cepac (updated to R\$336 in 2014). This program is expected to raise approximately R\$1.2 billion to cover the program's costs, including the implementation of a BRT (Bus Rapid Transit) system along an old highway cutting through the city.

With an expected duration of 25 to 30 years, the project extends over a land area of 20 million square meters as divided into three main sectors: North, Center and South. Three distributions³⁰ had been completed by March 2020, totaling 12 auctions. Yet just under R\$45 million was collected over the project's first eight years, equaling less than 4% of the expected total value despite representing nearly one third of the project's timeline. The municipality has had to resort to international loans to support the project's continued execution.

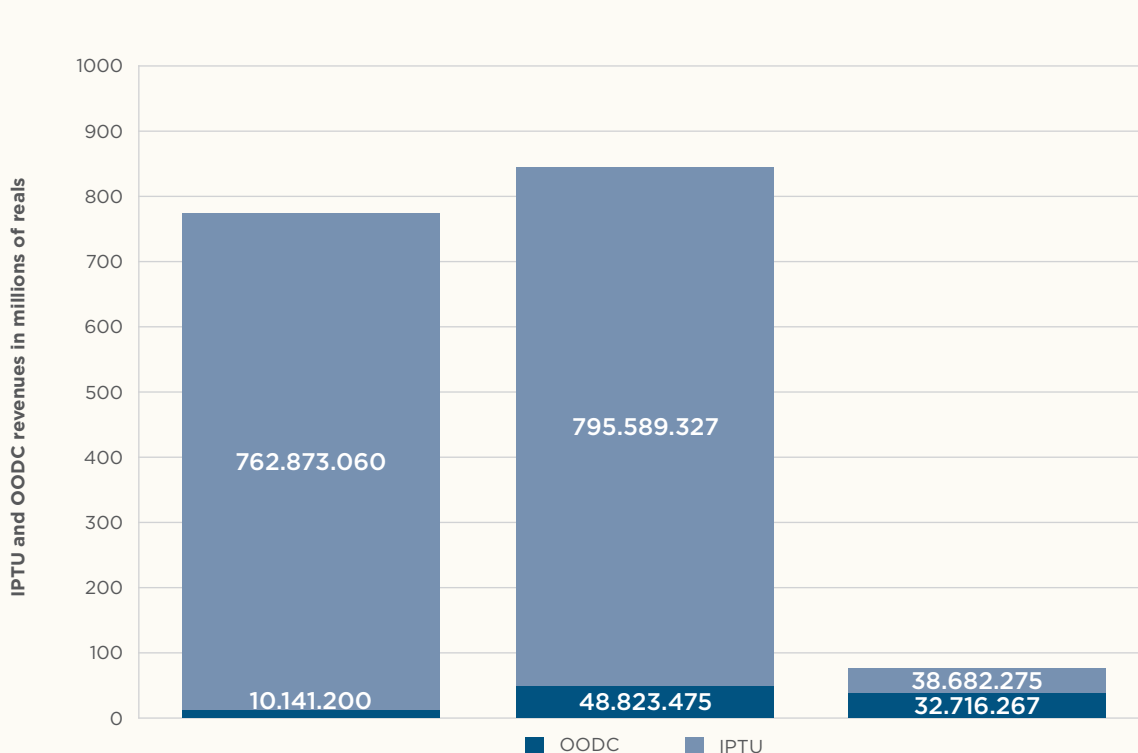
As part of its improvements to the city's revenue collection approach for building rights, Curitiba adopted measures to progressively increase IPTU tax rates, which were, at the time, very low. Its property value database was updated significantly in 2014 resulting in a real increase in tax collection of 50% by 2018 (discounting inflation). A new Master Plan was approved in 2015 (replacing the 2000 version - Law 14.773/2015) which transformed the sale of building rights (OODC) from an amendment into official law—changes that were subsequently incorporated into the zoning plan in September 2019.

PROCEED ►

³⁰ Each intervention or group of interventions is subject to a Cepac distribution. To obtain the maximum amount of securities that can be offered, divide the project's total cost by the share's minimum value. The Linha Verde Urban Project Consortium thus has planned for several Cepac distributions, each of which may be executed by one or more auctions. The Municipality of Curitiba can only conduct a new distribution to finance a new intervention or group of interventions if (i) the previous intervention or group of interventions is completed; or (ii) the totality of Cepacs issued to cover the previous intervention or group of interventions has been successfully distributed, either privately or publicly; or (iii) it has been proven that the necessary resources to conclude the previous intervention or group of interventions have been secured. (Curitiba City Hall 2016)

Currently, potential increases in IPTU or OODC collection could amount to an additional R\$70 million per year for the city (as exhibited in the simplified model below), resulting in funds that could be used for affordable housing, expanding the mobility system, building parks or public space and an array of other purposes already provided for in the legislation.

↓ **GRAPHIC - APPRECIATION SCENARIOS FOR THE SALE OF BUILDING RIGHTS AND IPTU IN CURITIBA**



Source: Developed by the authors based on FINBRA 2014, 2016, and 2018 (National Department of the Treasury), CBIC

C Diversify forms of participation to improve coordination across TOD investments by public and private actors

The expropriation process—often both time consuming and lengthy—serves as one of the key obstacles to TOD project implementation, compromising a project’s viability. This, in turn, can discourage the public sector from acting; a four-year political term is too short to move through all phases of planning, expropriation, and implementation for

complex projects. Public/private partnerships thus offer an alternative to diversify financing portfolios for TOD projects, helping to manage risk and uncertainty and to use public goods to help trigger urban development.

This guideline, unlike previous ones, seeks to present various tools that are being used in urban projects around the world that could serve as examples for TOD project implementation in Brazil. Brazilian cities already boast some initial experience or discussions for some of the tools, yet they are not yet widely disseminated or implemented. The intention is thus to encourage a broader set of actors to participate in TOD project financing and, in turn, to reduce dependence on public resources.

C.1 Sale or rent of land

This consists of selling or renting public land, usually through auctions, to generate additional municipal revenue (Lozano-Gracia et. Al. 2013). Public land is one of a city's most important yet often underutilized assets (Peterson 2009). The sale of land, especially when located in strategic areas with high property values, can finance urban renewal and infrastructure development processes as linked to TOD projects. The Mumbai Metropolitan Region Development Authority (MMRDA) in Mumbai (India), for example, successfully held two land lease auctions (for 80-year leases) in the Bandra - Kurla commercial complex. The auctions raised approximately \$1.2 billion—10 times MMRDA's investment in infrastructure from 2004-2005. The auction proceeds were used to develop additional infrastructure, including a new metro system (Suzuki et. Al. 2015; Peterson 2009).

MAIN BARRIERS

- A disconnect between the amount collected and urban development plans.
- A lack of transparency or accountability in fund collection and allocation for revenues obtained from auctions or from renting or selling land. This can lead to corruption (Peterson 2006).
- Limited revenue sources as a result of public land scarcity in strategic and central areas with high property values.
- Difficulty in establishing an appropriate base price or an auction mechanism to allow the public entity to maximize profits. This can lead to the sale or rent of land below market value and encourage speculation.

MAIN RECOMMENDATIONS AND OPPORTUNITIES

- Conduct a public land inventory in TOD areas of influence in order to identify vacant or underutilized land, as well as encourage the conversion of obsolete facilities and surface parking.
- Establish investment and expenditure plans for the resources obtained through TOD project auctions, as aligned with municipal or metropolitan development plans as well as those of the public transit managing authority.
- Promote institutional mechanisms for transparency and accountability to ensure resources are used to finance essential infrastructure as opposed to current expenses. One option would be to allocate funds received into a special account using a Multi-Year Plan.
- Combine land sales with other financing mechanisms, such as OODCs, Cepacs, and others.
- Encourage the sale of land through transparent mechanisms with large-scale participation from developers or consortia who have the financial capacity to participate in large-scale TOD projects.

EXPERIENCES AND APPLICABILITY IN BRAZIL

- Brazil's national government can make significant contributions to these efforts by donating or providing land in urban development areas. The SPU has thousands of properties distributed across all Brazilian states. Many are in central areas of large and medium-sized cities, as well as along the old axes of the federal rail network. The strategic value of these state-owned real estate assets is evident, making it essential to strengthen SPU's participation in TOD projects. The national government could leverage its assets to set up companies to participate in joint ventures for local real estate development. Any such effort should be accompanied by minimum standards as aligned with TOD strategies, requiring compensation consistent with land contributions, rights to build, and the assets' valuation over time.
- Mobilizing existing public real estate assets has proven an important facilitator in TOD projects. National and state governments can be partners in municipal projects, ensuring that objectives of common interest are considered. Methods of separating a project's assets from other public assets are thus necessary, such as Special Purpose Entities (SPE), guarantee funds for Public-Private Partnerships, and trusts³¹, in order to offer guarantees for public sector and private investor financing.
- Public-Private Partnerships can be seen as a way to finance the construction and operation of public transit and other forms of infrastructure. Surplus revenue from land value capture tools should be used as an advance payment guarantee for projects, transit services, and other urban operations as well as for obtaining financing.
- Special Purpose Companies (SPE)³² and Real Estate Investment Trusts (FII)³³ can be used as a platform for public-private collaboration on TOD projects. According to Brega (2014), "the capital of each [body] can consist not only of funds raised by the market, but also of properties contributed by owners participating in the project and of assets expropriated by the Administration to carry out the urban renewal."
- One method to mobilize state or national assets (whether land or property), is the creation of inter-governmental consortia with municipalities. Consortia, provided for in the Consti-

³¹ A trust (whether public or private) is a legal body by which the ownership or management of property, assets or funds is transferred in order to achieve a particular public or private purpose. It is created to offer higher security returns for the funds invested in a project. For TOD projects, a trust can receive and manage public land, provide capital for investments, and establish land trading mechanisms, among other tasks. Trusts do not work in the same way in Brazil as internationally, however, as trusts are only possible in matters of inheritance. A review of the legislation relevant to instrument's use should be carried out in Brazil.

³² SPEs, project implementation instruments widely used by real estate developers, facilitate project financing by separating revenues and the assets generated by them (resulting in greater financial transparency). In the case of public-private partnerships for urban projects, SPEs can be legally established by City Hall as public or semi-public enterprises. They can also be created by the winner of a tender for a concession or for a PPP. In such a case, in addition to the capital contributed by the holding company, the municipality and the owners of properties within the bounds of the urban project can also participate in the SPE's capital. Funds can be raised through the issuance of debentures and the securitization of real estate receivables backed by rents and installments from buyers of future real estate units. Real estate financing can be provided through collateral from assets not affected by the performance of the public work or service in question. (Pinto 2013 and Brega 2014)

³³ Governed by Law 8.668/1993, an FII is not a legal entity, but rather a real estate community whose assets are divided across several investors (shareholders). It is a closed community subject to its own legal regime and managed by an administrative institution that holds fiduciary ownership of the assets and rights that comprise it. Each real estate trust has its own rules and must observe transparency regulations subject to the supervision of the Securities and Exchange Commission. An FII's manager is remunerated through an administration fee, while investors hold shares, which act as tradeable securities on the secondary market. Their redemption is only permitted in the event of the trust's liquidation, which can be either fixed or indefinite. In this case, a public company or a concessionaire manages the projects and services, albeit without equity, which is held by FII shareholders. The municipality, participating property owners, and external investors can all be shareholders (Pinto 2013 and Brega 2014).

tution and regulated by Law No. 11,107/2005, can be a fundamental tool for making economic projects feasible, since they formalize and align the interests of public and private agents. They can also help facilitate expropriation processes—an essential aspect of TOD systems.

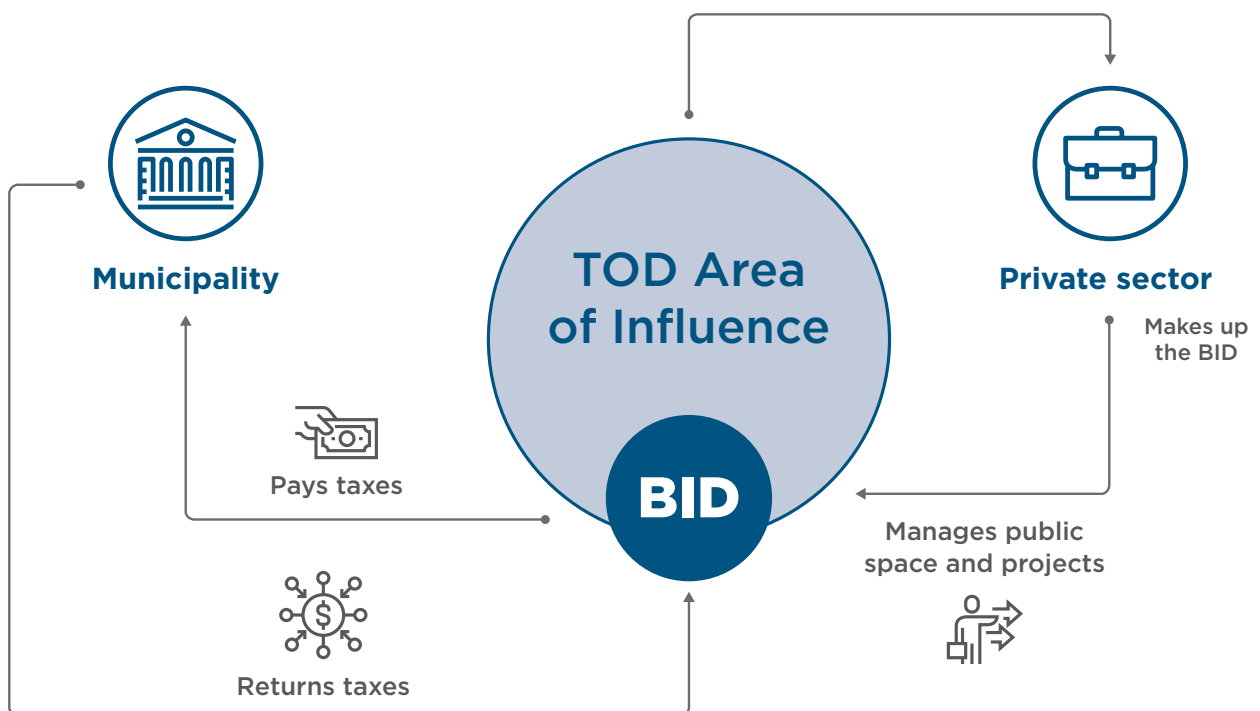
C.2 Business Improvement Districts (BIDs)

This classic association model, as applied abroad, allows entrepreneurs and owners in commercial

districts to organize themselves to collect, on a voluntary basis, maintenance and improvement fees for public areas (street cleaning, landscaping, security, capital investment, urbanization, and improvements for active mobility, among others), thus taking control of their management. Once established, however, the fees associated with Business Improvement Districts³⁴ (BID) are mandatory, as collected by the Government and returned to the BID management to be used only in the district itself.

↓ **FIGURE – OVERVIEW OF THE FUNCTIONING OF A BUSINESS IMPROVEMENT DISTRICT**

Source: Developed by the authors



34 This fiscal instrument is also known as *Business Improvement Area (BIA)*, *Business Revitalization Zone (BRZ)*, *Community Improvement District (CID)*, *Special Services Area (SSA)*, or *Special Improvement District (SID)*, among others.

BIDs are established in commercial areas and taxes can be set in addition to property taxes or other commercial real estate taxes³⁵. A BID's proposal can lay out the methodology for calculating the charge and who pays. In some countries, it is charged in tandem with commercial taxes.

MAIN BARRIERS

- Difficulties in organizing and forming alliances between community representatives and the private sector, especially in low-income neighborhoods with high levels of institutional, spatial, and cultural fragmentation (Lee 2016).
- Limited accountability and the weakening of local governance models, as determined by the rules laid out for the BID (Lewis 2010)³⁶.
- The lack of a legal framework to regulate the commitments and contributions of public authorities and BID participants.

MAIN RECOMMENDATIONS AND OPPORTUNITIES

- Assist the community to develop a joint vision, involving key representatives from both local inhabitants and the business sector.

- Generate a plan for activities and investments as coordinated and supervised by the local authority or other agencies outside the BID (Wolf 2008 in Lewis 2010).
- Establish a legal framework for the creation of BIDs and similar agreements that specifies the roles and commitments of the public sector and the private partners. Within the scope of TOD projects, an investment plan agreed to by both public and private sectors should be defined. Private sector contributions should complement public investment, not replace it.

EXPERIENCES AND APPLICABILITY IN BRAZIL

A Proposta de Emenda Constitucional (Constitutional Amendment Proposal—PEC) and supplementary law were drafted in Brazil in 2009 authorizing municipalities to create a new tax, CARE, which would be managed by Organizações Privadas de Revitalização Econômica (Private Organizations for Economic Revitalization—OPREs). This model was clearly inspired by the BID concept, with additional tax revenues within a predetermined area being dedicated to that area's conservation and improvement.

³⁵ In the case of ownership, see: <https://clerk.lacity.org/business-improvement-districts/what-business-improvement-district>. In England, a percentage of the "business rate," a commercial real estate tax, is deducted. See: <https://www.gov.uk/guidance/business-improvement-districts>.

³⁶ Lewis, N. (2010). Grappling with Governance: The Emergence of Business Improvement Districts in a National Capital. *Urban Affairs Review* 45(6): 180-217.

THE BRAZILIAN CARE TAX INSTRUMENT

In 2016³⁷, PEC 415/2018 and a supplementary bill by Federal Deputy Pedro Paulo (PMDB/RJ) proposed the creation of CARE, as inspired by the BID concept. It is designed as a tax collected by municipalities and the Federal District (DF) from non-residential property owners in Áreas de Revitalização Econômica (Areas of Economic Revitalization—AREs).

CARE uses the fair market value of non-residential properties (as determined for IPTU collection); its rate is to be established by municipal law, and can be set at a maximum of 5% of a property's fair market value.

AREs, in turn, must be non-profit and proposed by OPREs with the sole purpose of managing a multi-annual work plan and budget for the area. Their implementation and operation are subject to a city's master plan and other municipal laws.

An OPRE must consist of the owners or proprietors of non-residential properties located in the same urban geographic area as the organization's future activity and representing at least 1/10 of the fair market value of the total built environment within the ARE. If more than 50% of the owners or those who represent more than 50% of the area's market value are against the CARE proposal within 30 days of its initial public hearing, the proposal is considered rejected.

OPREs must also have a Board of Directors with municipal participation and governance mechanisms that allow for transparency and accountability. They are required to disclose their multi-annual budgets including the difference between the amount expected to be collected in each area and the anticipated expenditures in the area. Up to 2% of the total revenue can be collected as an administrative fee by the municipalities or the DF (the collecting bodies). The body's revenue and other resources are not integrated with the public budget, however, and cannot be reallocated by the municipality.

³⁷ Bill can be found at: https://www.camara.leg.br/proposicoesWeb/prop_mostrarintegra?jsessionid=A070508E5B5661722668015B1236B620.proposicoesWebExterno2?codteor=1517986&filename=PLP+334/2016



Source: Nr-stock. Conceptual design of the engineer for traffic and communication, work on the project of building a modern roadway. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

SUSTAINABLE MOBILITY AND PUBLIC TRANSPORTATION

Urban projects that are integrated with public transportation should also be coordinated with urban mobility strategies aimed at reducing individual car use in order to increase the efficacy of TOD projects (Guo et al. 2011).

Cities like New York, Tokyo, London, Paris, Barcelona, and others have already adopted such measures, with a number implementing what has been dubbed Transportation Demand Management (TDM)¹ strategies. Policies and legal and regulatory incentives in these cities are targeted at reducing the number of trips taken, especially by private car, and encouraging use of public and non-motorized transportation.

According to Suzuki, Cervero and Iuchi (2013), TDM is the “software” that supports transportation infrastructure, through an array of well-accepted actions: (i) reducing and eliminating subsidies for fossil fuel use; (ii) adapting and improving public space for pedestrians and cyclists; (iii) adopting parking fees in public areas; (iv) setting higher costs for new vehicle registrations; (v) implementing tolls to limit access to certain areas; and (vi) determining days for vehicle bans based on license plate number, such as São Paulo’s vehicle rotation system.

In Brazil, Law No. 12,587/2012, art.23—which instituted the PNMU guidelines—presents a legal basis for the adoption of TDM measures and instruments:

“Federal entities may use, among others, the following instruments for the management of transportation and urban mobility systems:

I - restriction and control of access and circulation, permanent or temporary, of motor vehicles at pre-determined locations and times;

II - stipulation of emissions standards for specific places and times, which may condition access and circulation to urban spaces under control;

III - application of taxes on urban transportation modes and services for the use of urban infrastructure, aiming to discourage the use of certain modes and mobility services, linking the revenue for use exclusively on urban infrastructure intended for public and non-motorized transportation and to finance public subsidies for public transportation fares, in accordance with the law;

IV - dedication of exclusive space on public roads for public transportation services and non-motorized modes of transport;

V - development of parking policies governing public and private use, with and without payment, as an integral part of the National Urban Mobility Policy;

VI - control of the use and operation of road infrastructure intended for the circulation and operation of freight transport, granting priorities or restrictions;

VII - monitoring and control of greenhouse gas emissions from motorized transport modes, permitting access restrictions on certain routes due to the critical nature of emission rates.

Despite the regulatory advances introduced by the PNMU, the TDM instruments described in the law are still rarely-used in Brazil. As already shown

¹ “A set of strategies aimed at changing mobility patterns (how, when, and where an individual moves) in order to increase the efficiency of transportation systems and achieve specific public policy objectives aimed at sustainable development. Transportation demand management strategies prioritize the movement of people and goods over vehicles, with a focus on efficient means of transportation such as walking, cycling or public transport, working at home, car-sharing, etc.” (Medina. ITDP México, et al. 2012)



Source: Yuttana Contributor Studio. Young travelers use smartphones to check in and find easy and convenient travel destinations. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

in **Chapter 1**, Brazil is in a period of transition from individual-vehicle-oriented planning to people-oriented planning, which favors public transportation and non-motorized modes.

One of the main challenges is thus for the various departments and administrators in charge of urban planning and mobility to invest in innovative, TDM-related solutions. Transit-oriented development is a good example of this, as it proposes to increase the efficiency of public transit through aligning real estate and

housing development with mobility and transportation infrastructure, in two phases that run parallel to TDM efforts²:

- Developing a TOD strategy, taking both political and institutional factors into account; and
- Developing TOD projects, integrating new concepts and instruments.

Three guidelines and nine actions related to TOD strategies and projects for managing transportation demand are presented below.

² UITP. Integration of public transit and urban planning: through a virtuous circle.



STRATEGIC LINE 5: SUSTAINABLE MOBILITY AND PUBLIC TRANSIT

1st Guideline:

The public transit network



Actions

Intensify land use around stations

Create public space around stations

Ensure multimodality around stations

2nd Guideline:

Single-occupancy vehicle use



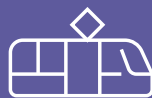
Actions

Implement parking policies that benefit sustainable mobility

Implement restrictions on individual motor vehicle movement in central areas

3rd Guideline:

Quality of service and the viability of public transit in TOD projects



Actions

Ensure coordination across the public transit network

Integrate fares across the transit system

Progressively incorporate novel shared transport services into urban mobility

Promote "Mobility as a Service"

A The public transit network

Medium- and high-capacity public transit networks are a prerequisite framework for TOD projects. A system's layout needs to align with key axes of population and activity density. Access points should be well-connected with active travel modes and with related transportation networks (including micromobility). These connections, in turn, should be linked to each other through high-quality public spaces that are integrated with their surroundings, including with housing, commercial uses, and other services. In practice, designs thus executed attract more passengers to public transit, increasing its demand and, ultimately, its efficiency.

TOD should be understood, therefore, as an integration of all travel modes with urban space itself. The actions proposed below incorporate that concept in their approach to both urban and station design.

A.1 Intensify land use around stations

For public transit to be of high quality, frequent, and reliable, it is important to ensure a minimum passenger flow. The greater the spatial coverage³ of a system connecting urban areas, the greater the user demand.

Thus, land use policies need to be aligned with the design of the medium- or high-capacity transit network (and vice versa)—allowing for a system's improvement in both quality and cov-

erage—in order to guarantee, from the point of view of mobility, a system's economic viability by increasing the flow of passengers. It is therefore necessary to promote urban densification around the network's access points. The public sector may, depending on each case, establish different 'radii of coverage' for stations and encourage the integration of multiple and diversified uses in the area, thus ensuring the necessary demand for the proper functioning of the system.

MAIN RECOMMENDATIONS

- Urban planners should monitor the functional design of the transit network, exploring opportunities to plan and design it around potential environmental and land use outcomes.
- A detailed survey of both existing and future conditions should be carried out during the transit project's development process, including parameters such as: population density, employment, demographic characteristics, availability of facilities and spaces, and real estate market dynamics.
- This survey will allow municipalities to establish land use parameters that ensure a certain population density and mixture of uses surrounding the stations taking accessibility, infrastructure, and network capacity into account, in order to ensure the public transit service's viability.
- Public authorities should also monitor the areas around stations in order to determine the accompanying impacts on urban space.

³ The term "spatial coverage" is used in transit planning to refer to the main axis of transportation and its area of influence (eg, a 500 or 1000m buffer along each side of the axis).



Source: ESB Professional. Estação Luz em São Paulo, Brasil. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com

MAIN BARRIERS

Many cities are low-density, single-use⁴, and sprawled—unfavorable characteristics to support modes other than the single-occupancy motor vehicle. Commercial activities, services, and employment are often concentrated in the center of such cities, creating a single destination for daily trips and, as a result, vehicles. Further—as a result either of private sector pressures for low-cost areas or a public sector failure to prevent urban voids, irregular occupation, or real estate speculation or simply the result of the availability of large swaths of unurbanized land—cities in many cases continue to expand in the form of single-use residential parcels far away from the urban core at low densities and often without adequate urbanization.

The urban configurations, in many of these cases, are not conducive to walking or bicycle use. And long residential distances from the urban core, combined with low densities, fail to guarantee the demand necessary to support an efficient public transit system. The result is sprawled cities served by deficient transit systems and a dependence on the individual motor vehicles, which, in turn, creates unsustainable daily travel behaviors for trips to work, schools, and homes.

To address this situation, cities need to review their strategic urban planning guidelines as outlined in master plans and land use laws. Yet it is also important to review urban perimeters and limits placed on urban expansion, which result in sprawl and make transit system operation unfeasible.

⁴ Single-use areas, as the name implies, are those that have a single use, counter to the philosophy of mixed-use and 3C cities. "The organization of space and city dynamics that still revolves around single-use buildings, streets and even blocks only serves to reinforce car dependence and stifles the interpersonal relationships that a city needs." (Lima 2014)

THE NEIGHBORHOODS OF THE GRAND PARIS EXPRESS PROJECT—FRANCE

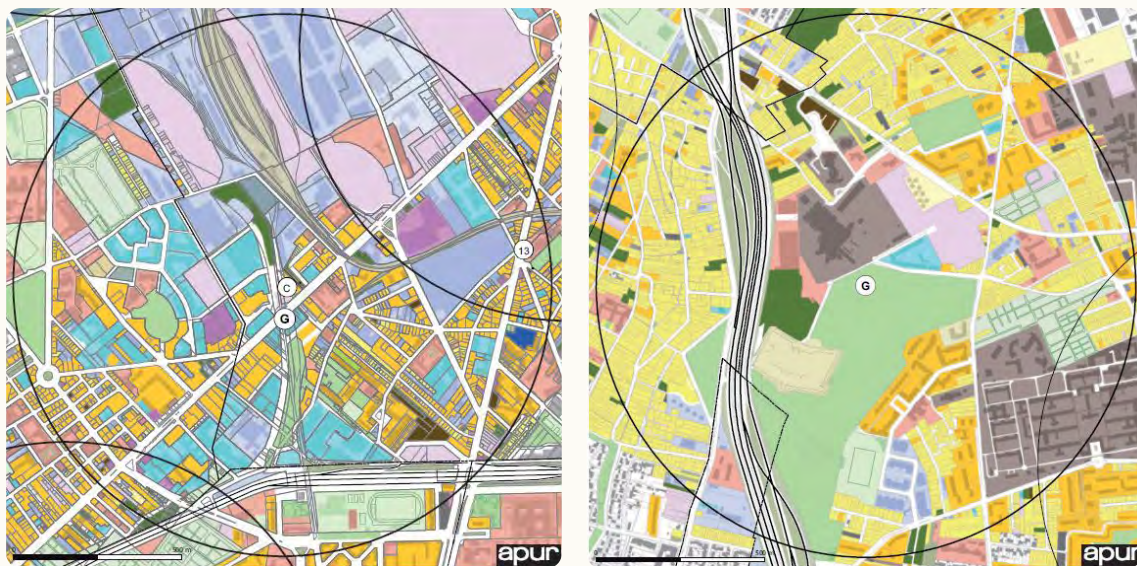
Two new metro lines connecting the center of Paris with its peripheral areas are being planned as part of the ambitious Grand Paris Express project, which includes the objective of generating new activities, uses and residential units near the new metro stations.

To measure and evaluate the changes resulting from the new stations, the Société du Grand Paris (responsible for the development of the project) is working with the Atelier Parisien d'Urbanisme⁵ to develop a study entitled "Observatory of Grand Paris Station Neighborhoods" in tandem with the process. The intention is to offer a tool to those responsible for the transit system's development to better understand the characteristics of the neighborhoods surrounding the stations, including their current conditions and the possible impacts resulting from the project's execution.

This tool will, in turn, help to catalyze a better understanding of the urban space and the existing dynamics across housing construction, economic development, energy needs, and accessibility. It will also help elucidate how the pending network will impact the area's density, equilibrium, and attractiveness.

With regard to TOD projects, this type of study helps in the choice of TOD-related programs. It gives the government a tool to carry out the necessary regulatory adjustments.

↓ FIGURE - STUDIES OF THE AREAS SURROUNDING GRAND PARIS EXPRESS STATIONS



Source: www.apur.org/fr/geo-data/observatoire-quartiers-gare-grand-paris

⁵ APUR, Atelier Parisien d'Urbanisme, is a non-profit association created by the Paris City Council.

A.2 Create public space around stations

Adequate access to stations is one of the key factors that attracts users to public transit. It is therefore necessary to design effective public spaces around these facilities, which are today often treated as merely residual areas, presenting physical barriers, narrow sidewalks, and unsafe street crossings, thus discouraging use by pedestrians and cyclists.

There are many examples of public transit projects that did not generate the desired demand because the design of the stations was not integrated with the surrounding urban reality. In these scenarios, the main problems identified include: a lack of accessibility for pedestrians; an absence of parking lots (making it difficult to introduce Park & Ride solutions, as will be discussed in greater detail as part of a.3), and a lack of integration with the street network that feeds into the transit system.

The design of a public transit station cannot be reduced simply to the building itself. It must also incorporate the surrounding area to ensure a larger-scale functional schema that results in more efficient use of the station. Otherwise, problems arise such as those already found in a

number of transit systems across Brazil. In 2018, for example, researchers⁶ identified 146 potential pedestrian routes across Brasilia for individuals to access a cumulative 50 bus, metro, and BRT stations and terminals. Of the routes studied, 51.3% had a walkability index below 50%. When dissected by mode, the walkability of metro stations (52.5%) was higher than that of BRT stations (41.4%), despite the fact that the BRT system is the city's newest transit network.

In Curitiba, on the other hand, urban planning has resulted in a very different reality. Its 1968 Master Plan identified five roads built in the 60s that could be densified—and it planned for the implementation of the world's first BRT system⁷, which entered service in 1974. Public transit demand subsequently increased by 73%.

The Paraná capital's success was due not only to the pioneering spirit in the planning of the BRT system as laid out in the city's Master Plan, but also to the project's urban design, which integrated the urban space with the stations themselves in a manner that was both functional and easy to understand for users. Further, the "iconic" station designs created a brand for the city, making it easier for the system's users to embark and disembark.

6 DOM Consulting. Pedestrian Mobility Plan of the Federal District. Brasilia. Technical study, Brasilia: State Secretariat of Transportation and Mobility-SEMOB, 2018.

7 The world's first BRT system was actually introduced in Ottawa, Canada, in 1973. Curitiba's system also dates back to the 1970s, along with the Anhangera Axis in Goiânia. Since Curitiba's system included most of the elements currently associated with BRT, including external fare collection, closed stations, and platform-level boarding, Curitiba is considered both the first Brazilian and the first city globally to implement BRT.

↓ **FIGURE** – ACCESS TO THE TRAIN IN OSTERPORT STATION IN COPENHAGEN, DENMARK



Source: Roland Magnusson. A rapid transit S-train has stopped at the Osterport railroad station. Setembro, 2019. Shutterstock, consultado em 2020. www.shutterstock.com

↓ **FIGURE** – ACCESS TO KING'S CROSS STATION IN LONDON, UK



Source: AC Manley. People wait outside the departures concourse at King's Cross Station in London. Agosto, 2015. Shutterstock, consultado em 2020. www.shutterstock.com

↓ **FIGURE** – IMAGE OF THE BRT IN CURITIBA.



Source: Alf Ribeiro. View of the passenger movement in the tube station, tube-shaped bus stop of the Integrated Transport Network, in Eufrasio Correia square, downtown of Curitiba. Janeiro, 2018. Shutterstock, consultado em 2020. www.shutterstock.com

MAIN RECOMMENDATIONS

- Expand public spaces: restricting parking on public roads can help to increase both the quantity and quality of public space surrounding public transit stations.
- Design urban space: the urban space surrounding stations should be equipped with greenery, wide sidewalks, and an environment that allows for the comfortable flow of pedestrians, wheelchairs, strollers, and bicycles. It should also have urban furniture that is capable not only of serving people, but also giving the area an identity such as trash bins, public lighting, benches, bike docks, and poles with information for users.
- Integrate with bicycle and pedestrian networks: bicycles and pedestrians should be the main suppliers of the public transit system. Integrating with pedestrian and bicycle networks allows for an increased range of action for TOD projects. Urban planning projects should thus ensure that station entrances are well-connected with such networks, in terms of both infrastructure and signaling.

A.3 Ensure multimodality around stations

TOD projects are often instigated by the development of large public transit stations and terminals. It is important for such stations to be designed in a way that facilitates transfers across modes; that they encourage multimodality such as, for example, between urban and intercity trains, the metro system, and urban and regional bus networks.

MAIN RECOMMENDATIONS

It is important to develop a categorization for station types in order to design the buildings and their surrounding areas based on the needs of each location. Stations can, for example, be large centers for cross-modal transfers, they can be in dense areas with lots of commerce, they can be in subcenters⁸ or they can be in areas with low density. Despite the specificity inherent in the act of categorization, all stations should share some characteristics:

- **Favor multimodality:** in central urban areas, transit stations connected with TOD projects should promote the integration of public transit systems (buses, metros, BRT, light rail, taxis), non-motorized modes (pedestrians, bicycles), micromobility or personal mobility devices, and mobility on-demand. Some actions that can be taken in order to encourage multimodality include:
 - Providing information on possible connections with public transit and the station's surrounding area, such as services, facilities, pedestrian routes, and/or cycle paths.
 - Integrating fares.
 - Ensuring connections that are safe and efficient.
 - Optimizing systems to reduce the need for transfers and to shorten travel times.
 - Providing comfortable, accessible, and safe routes for pedestrians and individuals with reduced mobility, especially when connecting across modes.
 - Providing bike racks and bicycles free-of-charge.
 - Providing pick-up and drop-off locations for micromobility, personal mobility devices, and mobility on-demand.

⁸ Areas with the same services and commercial activities as a city's core, but on a smaller scale, and with a lower incidence of specialized activities, targeted for a more restricted audience. (Sposito 1991)

⁹ Personal mobility devices include electric scooters, hoverboards, electric unicycles, Segways and other variations. There are also non-self-propelled vehicles, such as bicycles with delivery drawers or "bicycle-taxis". (Moncho 2020) - Available at: <https://www.denia.com/en/normativa-vmp-patinetes-electricos-hoverboards-segways-requisitos-y-vias-para-circular/> [Access on 9/23/2020]

BIKE PARKING AT SAO PAULO METRO STATIONS

Parking spaces for bicycles (bike racks) at stations or terminals should be designed to ease transfers between the two modes. It is important that bike racks are well-connected with the stations themselves and that they have some form of integrated fare (the bike rack or bicycle rental could be included as part of the transit fare, for example). The São Paulo Metro provides about 600 parking spaces at the Sé, Carrão, Guilhermina-Esperança, and Corinthians-Itaquera stations. 21 additional stations have bike stands¹⁰. The Companhia Paulista de Trens Metropolitanos (Paulista Company of Metropolitan Trains—CPTM), meanwhile, has 6,261 bike rack parking spaces, spread across several stations in the system.



Source: https://sao-paulo.estadao.com.br/blogs/sao-paulo-na-bike/wp-content/uploads/sites/305/2017/09/2014_09_24_bicicletario15-copy.jpg

¹⁰ "While bike racks are enclosed spaces, usually with some kind of surveillance and additional infrastructure, bike racks are the structures that allow you to safely support and lock the bike. They can be integrated into a city's urban furniture, along with benches, signs, lamps, and information poles." (Souza, 2019) - Available at: <https://www.archdaily.com.br/910581/guia-de-projeto-para-paraciclos-e-bicicletarios>

- **Implement Park & Ride systems at peripheral stations:** Park & Rides are parking lots with direct connections to public transit, allowing passengers living in other municipalities or peripheral neighborhoods to park their vehicles and access the center of large cities as facilitated by public transit. It is thus important to build Park & Ride systems as close to the station as possible in order to better integrate them with the system.

Park & Ride systems work because they serve low-density urban areas that nonetheless need to be connected with the urban core. TOD projects in these parking lots, in turn, help to create

urban centers in sparsely populated areas, in addition to promoting the connections with the city center itself.

In Brazil, several urban areas on the outskirts of major cities and metropolitan regions do not have adequate parking management. Park & Ride could be a good solution to reduce the use of single-occupancy vehicles, increasing public transit use and improving air quality. Trensurb in the Metropolitan Region of Porto Alegre serves as a good example of a transit corridor with a Park & Ride systems near its peripheral stations in order to meet the demand of users who travel to Porto Alegre's city center on a daily basis.

↓ **FIGURE - FENAC STATION (TREN SURB), NOVO HAMBURGO.**



Source: Emilene Lopes -- Urban Railway Company of Porto Alegre (Trensurb)

B Single-occupancy vehicle use

Intensive single-occupancy vehicle use has induced cities to expand car-centric infrastructure both for vehicle circulation and parking—to the detriment of the quality of public spaces. This model has shown itself to be obsolete, however, resulting in major congestion, a loss in productivity due to time spent in traffic, and a number of other nuisances, ranging from accidents to noise pollution to, above all, greenhouse gas emissions and local pollutants.

A reduction in the use of single-occupancy vehicles requires the creation of policies to encourage more sustainable and more energy-efficient modes of transportation, such as public transit, walking, or cycling. TOD projects are part of a set of actions aimed at making the public transit network more attractive. Yet the incentive alone is not enough: it is important that cities also adopt measures to restrict car use; and this guideline offers some actions that can be taken in that pursuit.

B.1 Implement parking policies that benefit sustainable mobility

The ease with which a private motor vehicle can be parked plays a key role in an individual's choice to use it. Public policies should act on the availability and cost of parking in public places, as well as in privately-owned areas.

MAIN RECOMMENDATIONS

- Reduce space allocated to surface parking:** this simple action is linked to an urban design that facilitates active modes of transportation. Urban land is ever limited, meaning that building surface parking is invariably expensive¹¹. Cities should thus restrict parking along key transportation axes and in TOD areas with good public transit coverage. Space intended for parking lots should instead be used to expand public space, including sidewalks, parks, squares, and bike lanes.
- Charge for parking along public roads:** it is fair for a driver to pay for the use of a parking space in the same way that the public transit user pays the fare to access the associated services. Municipalities can adopt different rates for residents (lower) and non-residents (higher). For non-residents, the charge should be greater than the cost of parking in a private garage. Rotating parking (zona azul), on the other hand, should be limited only to neighborhoods with the highest demand for services and commercial uses. The resources obtained from parking fees, in turn, should be used to finance actions aimed at supporting active mobility or public transit. Cities like Barcelona, Copenhagen, Stockholm, London, and Madrid all charge for surface parking.
- Limit the number of parking spaces in buildings:** TOD projects should allocate only the minimum area necessary to private vehicle parking in proximity to transit stations (Veloz 2015). Similarly, municipalities could modify minimum parking requirements traditionally associated with land use or construction codes, instead setting maximum parking requirements in the central areas of the city or along the transport corridors.

¹¹ For an updated overview of the topic, see: Shoup, Donald. *High Cost of Free Parking: Updated Edition*. Routledge, 2019.

PARKING MANAGEMENT IN NATIONAL AND INTERNATIONAL CASES

Municipalities such as São Paulo and Mexico City have adapted their legislation to limit the number of parking spaces in new buildings. In doing so, they signaled that space dedicated to parking comes with a high cost and could instead be used to generate activities with greater added value. These cities adopted maximum parking requirements for buildings as opposed to minimum parking requirements—a subtle change that can have a huge impact on planning. The laws also restrict the placement of parking lots along a building's main façade to make the ground floor more pedestrian friendly (active façades and commercial activity). They also prohibit buildings dedicated exclusively to the use of parking in the central areas of the city.

Ottawa (Canada) is another successful case of parking management policy. In 1993, after the implementation of the city's Transitway (an elevated and underground BRT system covering most of the city), the federal government eliminated free parking for employees in all public facilities located near the stations. The measure meant that the urban center had 300 parking spaces for every 1,000 jobs, while in most North American cities the proportion was 500 to 600 per 1,000¹².

Another important example was the construction of London's The Shard building, the largest building in the United Kingdom (310 meters and 95 floors) boasting residential apartments, offices, a hotel, restaurants, shops—and only 48 parking spaces. The excellent accessibility of the building to London's public transit network proved decisive and ensured that the built area had a better use with greater added value.

Barcelona (Spain) has fees for nearly 100% of its surface parking. It is a city with a high population density and public policy efforts strive towards improvements to the quality of the city's urban space.

In 1984, the City of Barcelona carried out the first study to create a zona azul, with the objective of promoting a parking lot rotation system in the main commercial areas of the city. The process was first implemented for 648 parking spaces and 34 parking meters, including fees and maximum parking times, followed by improvements to public space. These measures helped to increase the attractiveness of the commercial areas and reduced irregular parking habits (on sidewalks, for example).

By 2005, there were an impressive 7,000 spaces as part of the zona azul program. The city was also regulating tourist bus spaces (1997), loading and unloading zones (2001), and motorcycle parking at that time.

Between 2000 and 2004, an urban mobility study indicated that the city's transportation model was not sustainable and could collapse as soon as 2010. It was necessary to rethink Barcelona's mobility policy, and parking served as one of the core challenges. The zona azul generated vehicle rotation, but was not able to reduce overall private vehicle use. The solution was to implement a parking management system that could reduce

PROCEED ►

¹² Ottawa's BRT "Transitway": Modern Miracle or Mega-Mirage. https://www.lightrainow.org/myths/m_otw001.htm

B.2 Implement restrictions on individual motor vehicle movement in central areas

In order to discourage individual motor vehicle use, it is essential that public transit be more attractive to the user, in terms of both cost and time savings. To this end, cities can adopt restrictive measures for individual motor vehicles in two ways:

- **Increase the cost of commuting:** this can be done through the implementation of an urban toll, charging a fee for cars to access certain parts of the city (usually the central area). The main advantage is that the revenue obtained can finance improvements to the public transit system or can promote active mobility.
- **Increase the travel time for individual motor vehicles:** this depends on the urban design of the roads, or on the prioritization of public transit operations, in the form of either exclusive lanes or traffic lights.

These are dubbed push and pull measures, combining demand management and mobility strategies. On the one hand, they promote (push) actions to discourage the use of an individual private vehicle by increasing travel time and

charging fees for circulation or parking. On the other hand, revenue from fee collections can finance improvements (pull) to more sustainable modes. Combined, they can work to attract more users to public transit or active modes, resulting in a virtuous circle.

MAIN RECOMMENDATIONS

- **Implement “traffic calming” areas:** “traffic calming” or “traffic moderation” involve a set of measures designed to reduce the speed of motor vehicle movement on a street, court, or neighborhood. It is done through signaling, traffic flow ordering, pavement differentiation, and other physical changes in the design and layout of a road. Such interventions not only allow streets to be shared between motorized and non-motorized modes in a safe manner, but they also divert through-traffic passing and reduce accidents.

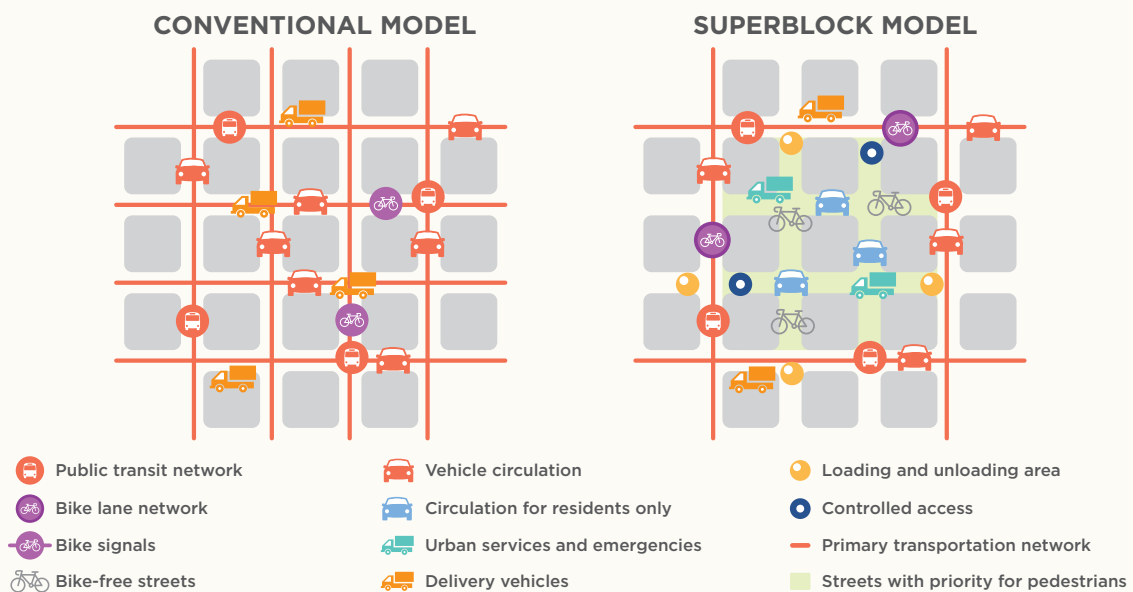
Usually applied in areas with high housing densities, flows of pedestrians, and cyclist trips, the neighborhoods or group of blocks instituting traffic calming are commonly called “zones 30”¹³, as motor vehicle speeds are limited to 30 km/h.

¹³ Zones 30 are extremely common in Europe and are used as road safety policies. Graz, Austria, was the first European city to implement a 30 km/h limit along its entire length, with the exception of its main road. In Brazil, Zones 30 have been implemented in a few capitals, such as Rio de Janeiro, São Paulo, Vitória, Porto Alegre and Curitiba. (Cruz 2018) - Available at: <http://vadebike.org/2016/04/zonas-30-areas-30-no-brasil-e-na-europa/> [Accessed on 9/23/2020]

BARCELONA'S ZONE 30

Zones with speed limits allow cyclists and pedestrians to safely share the street and help to reduce through-traffic in areas that are primarily residential. Northern Europe was the strategy's pioneer, first implementing the zones in the 1970s, but today such zones can be found in cities across the globe.

The city of Barcelona modernized the concept in its creation of superblocks. The Zones 30 operate in a 3x3 format, helping to prioritize the internal public space for people. The internal areas can only be accessed by resident-owned vehicles (for garage access), bicycles, pedestrians and some urban services. Public transit and urban freight distribution are organized along the perimeter streets. Zone 30 is a concept that fits perfectly into the conceptualization of TOD projects. Entrances are optimized for public transit access and the surrounding streets are oriented around sustainable modes of transportation—primarily walking.



Source: <https://barcelonarchitecturewalks.com/superblocks/>

- Introduce congestion charges¹⁴: congestion charges are urban tolls with the purpose of reducing traffic and, as a result, the costs generated by congestion in large urban centers;

thus improving air quality by reducing GHG emissions and local pollutants; and generating revenue to invest in improvements to public transit or other more sustainable modes.

¹⁴ Congestion charging—also known as congestion pricing or value pricing—is a form of charging to relieve traffic. The goal is to shift discretionary rush hour highway trips to other modes or to off-peak periods. Removing a fraction (even as small as 5%) of vehicles on a congested highway helps the system to flow much more efficiently. Similar charges have been used successfully in other sectors, such as for airline tickets, cell phones, or electricity. (Federal Highway Administration, 2019) - Available at: <https://ops.fhwa.dot.gov/publications/congestionpricing/sec2.htm> [Accessed on 0/22/2020]

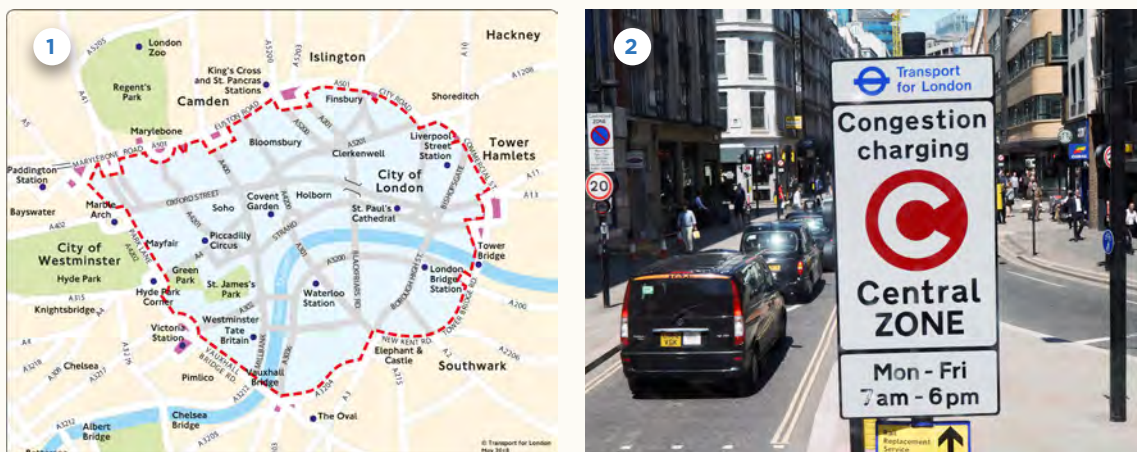
LONDON'S CONGESTION CHARGE

The City of London introduced its congestion charging system in 2003. Drivers in the target area are charged £15 (2020)¹⁵ between 7 am and 10 pm daily, except on 25 December. Starting in 2013, in addition to the fee, vehicle access to the area was limited, based on a vehicle's pollutant profile (Ultra Low Emission Discount - ULED¹⁶).

During the system's first 10 years (2003-2013), the revenue amassed from congestion charging amounted to £2.6 billion; during that time TfL invested £1.2 billion in improvements to public transit, pedestrian infrastructure, and cycle paths. From 2017 to 2018, congestion revenues were £156 million, approximately half of which was invested in improving the city's sustainable mobility system.

The implementation of the congestion charge combined with urban improvements and investment in the city's center reduced traffic by approximately 21% (70,000 fewer cars per day). Its implementation was also associated with other benefits, including a reduction in the emission of air pollutants and increased travel speeds. This is notably the result of several investments made into improving the urban landscape, placing a priority on public transit, improved safety and walking conditions, and bicycle infrastructure.

↓ **FIGURE - BOUNDARIES FOR LONDON'S "CONGESTION CHARGE" AREA**



Fontes: (1) TfL (2) Bikeworldtravel. Congestion Charge Zone Sign; introduced 2003 to reduce congestion in central London, UK. Agosto, 2015. Shutterstock, consultado em 2020. www.shutterstock.com

15 Source: Transport for London (TfL) – Available at: <https://tfl.gov.uk/modes/driving/congestion-charge> [Accessed on 9/23/2020]
 16 In ULEDs only cars that emit 75 g/km of CO2 emissions or less and are of type Euro 5 (based on the European regulatory standards for reducing pollutant emissions by diesel-powered vehicles) are eligible for a 100% discount. This approach has been successful in encouraging purchases of newer and cleaner vehicles by those who choose to drive in the area. (Mayor of London - London Assembly 2014; Chiptronic 2017) - Available at: <https://www.london.gov.uk/questions/2014/5137> and <https://chiptronic.com.br/blog/entenda-tudo-about-the-euro-5-system> [Accessed on 9/24/2020]

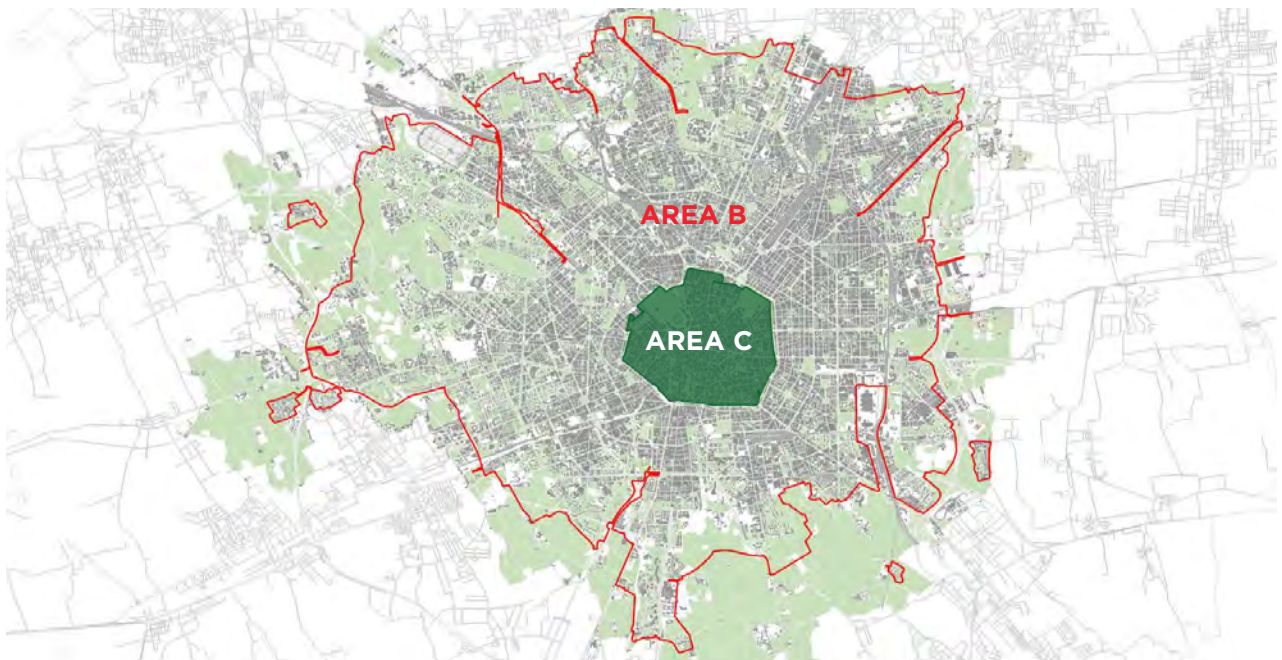
- **TOD in low-emission areas:** widely deployed in Europe's largest cities, low-emission areas aim to instigate vehicle fleet renewal. They involve access restrictions based on fuel type and vehicle efficiency (as defined by the European classification). The goal is to decrease pollution levels, improving air quality.

London's Ultra Low Emission Zone (ULEZ) was introduced in 2019, for example. It requires that most vehicles, including cars and vans, either meet GHG emission standards or pay a daily fee for driving within the ULEZ¹⁷: £12.5 for vehicles up to 3.5 tons; and £100 for those over 3.5 tons (trucks and buses, for example)¹⁸. The system relies on the electronic reading of license plates (ANPR¹⁹).

The city of Milan, Italy, in turn, has two low-emission areas: area B, established in 2018, encompasses the entire city of Milan; and zone C, established in 2012, comprises solely of the city's historic center. The characteristics of each are as follows:

- **Area B:** a fee is charged from Monday to Friday between 7:30 am and 7:30 pm. Highly polluting vehicles (as defined by the European directive) and trucks over 12 meters in length are not permitted to travel in the zone.
- **Area C:** a fee is charged from Monday to Friday between 7:30 am and 7:30 pm. Access is free for M1 class electric and hybrid vehicles. Others must pay a fee of 5 euros a day. The most polluting vehicles and trucks over 7.5 meters in length are not permitted to access the perimeter of Area C.

↓ **FIGURE - AREAS B AND C: MILAN.**



Source: Milan Comune - www.comune.milano.it/wps/portal/ist/it/servizi/mobilita/area_b

¹⁷ ULEZs operate daily, uninterrupted, except on December 25th—Available at: <https://tfl.gov.uk/modes/driving/ultra-low-emission-zone/ulez-where-and-when> [Accessed on 9/24/2020]
¹⁸ Source: Transport for London (TfL) – Available at: <https://tfl.gov.uk/modes/driving/ultra-low-emission-zone> [Accessed on 9/24/2020]
¹⁹ Automatic Number Plate Recognition.

C c) Quality of service and viability of public transit in TOD projects

Public transit is an essential catalyst for urban dynamics. It supports medium- and long-distance trips, facilitates flows of people and is a less polluting alternative (especially as measured by the number of users transported) to individual motor vehicles, particularly in the densest urban centers.

Despite its benefits, public transit has, over time, lost users to other modes of transportation as a result of: poor service quality, low reliability, a lack of comfort, and unattractive fares. In order to reverse this trend, improvements should include:

- **Improved quality of service:** users must have confidence in the service provided, which should be high-quality (in terms of efficiency and comfort).
- **Unified network:** users should perceive a city's or metropolitan region's transportation network to be integrated and unified, including micromobility and mobility on-demand.
- **Easy to understand:** any integration should be easily understood by the user, including both the network itself and its fare system.
- **Moderate fares:** fares should be competitive and accessible for users.

Such efforts should result in increased demand and an improved public transit system. Yet any such effort will have little effect if not paired with policy and regulatory changes.

C.1 Ensure coordination across the public transit network

According to an annual survey carried out 25 years ago by the Associação Nacional das Empresas de Transportes Urbano (National Association of Urban Transportation Companies—NTU), public transit finds itself in a consistent decline in Brazil. Data from 2017 reveals that the country's average public transit demand was down by 9.5% (the third largest measured decline) as compared to the year prior, equivalent to a daily loss of 3.6 million passengers. According to the NTU study, public bus transit lost 35.6% of its paying passengers in just over 20 years. The decrease in demand has been exacerbated in the last five years in particular (from 2014), culminating in an accumulated average loss of 25.9% of paying users (NTU 2018)²⁰.

A survey carried out in 2017 by the Instituto Clima e Sociedade (Institute for Climate and Society—ICS) examining users' perceptions of various aspects of transportation found that the public bus system was considered most in need of improvement and that individual vehicle mode choice was the direct result of commute time, cost, and comfort comparisons²¹. Other attributes, such as a lack of punctuality, regularity, reliability, and quality of service were among the main complaints with regards to public transit, and strongly influenced mode choice. Half of the respondents indicated their intent buy a car in the next three years and the other half blamed a lack of money for not doing so.

²⁰ Nine capitals were studied over time - Belo Horizonte, Curitiba, Fortaleza, Goiânia, Porto Alegre, Recife, Rio de Janeiro, Salvador and São Paulo – comparing the transportation sector's performance in April and October of each year. Source: <https://www.ntu.org.br/novo/NoticiaCompleta.aspx?idNoticia=1005&idArea=10&idSegund>

²¹ 3,000 respondents were asked: "If you could choose, what would be the ideal means of transportation to travel to work, school or anywhere else in the city every day?" About 30% pointed to individual vehicle travel, followed by bus (about 20%), bicycle (about 15%), metro (about 10%), etc.

High fares also play a role in mode choice (NTU 2009)—the financial burden of cross-subsidies, lower demand and a lower competitiveness vis-à-vis individual transportation, increased operating costs resulting from increased congestion (without exclusive lanes), and an increase in input prices (vehicles, tires, diesel, etc) are all directly reflected in public transit fares and the quality of service provided. The resultant harm is mainly suffered by lower income users. According to the IPEA²² (2017), the most vulnerable classes depend much more on public transit: 53.8% in class C and 60.8% in class D/E.

To reverse this situation, public policy should help make public transit more competitive as compared to car use by improving both the quality and the cost of the system. In capitals like São Paulo, for example, the problem of overcrowding was solved by limiting transfer times—users can change buses anywhere in the city within three hours, paying only for one ticket. The municipality of Aracaju's Integrated Transit System (SIT), meanwhile, was designed with a view towards linking supply with demand in order to make public transit cheaper for its population. SIT riders can pay a single fare and use virtually any of the city's bus lines, increasing both mobility and accessibility. The broader system that serves municipalities part of the Greater Aracaju region (specifically São Cristóvão, Nossa Senhora do Socorro and Barra dos Coqueiros), dubbed SIM, aims to integrate peripheral residential areas with the capital, increasing accessibility to central destinations at affordable prices²³.

MAIN RECOMMENDATIONS

- **Provide a high-quality transit system in central urban areas**—the areas with the greatest potential for high demand.
- **Improve the system's quality:** networks should improve their overall quality, including capacity, frequency, and reliability.
- **Improve the quality of vehicles:** buses should provide a comfortable, low-noise environment, and be energy-efficient and clean.
- **Connect service hubs and subcenters:** the network should offer good connection with subcenters, facilitating access, catalyzing urban synergies, and attracting users. It is important to create a network where it is possible to go from one place to another without necessarily going through the city center.
- **Improve the quality of transfer terminals:** improve the design of transfer points, in pursuit of a more efficient system that facilitates transfers between lines.

C.2 Integrate fares across the transit system

System integration is essential to encourage public transit use and to discourage individual motor vehicle use. This includes the metro network, the bus system, shared bicycles, parking lots, and bike racks as components of the system as a whole, which should be integrated in an area's infrastructure and planning.

²² <https://www.ntu.org.br/novo/upload/Publicacao/Pub636397002002520031.pdf>

²³ Source: Araújo, Marley Rosana Melo de, Jonathan Melo de Oliveira, Maísa Santos de Jesus, Nelma Rezende de Sá, Párbata Araújo Côrtes dos Santos, e Thiago Cavalcante Lima. Transporte público coletivo: discutindo acessibilidade, mobilidade e qualidade de vida. Vol. 23. 3 vols. Florianópolis: Psicologia & Sociedade, 2011. <http://dx.doi.org/10.1590/S0102-71822011000300015> [Accessed on 10/19/2020]

Transit Oriented Development

One of the PNMU's guidelines is in fact to promote physical, fare, and operational integration—and government participation is necessary, in order to achieve this. The benefits of fare integration, for example, include:

- Increased demand for public transit.
- Decreased travel costs from origin to destination.
- Time savings for the user.
- Increased accessibility to all areas of the city served by public transit
- Promotion of multimodality
- Transportation system optimization, including routes chosen by users.

Source: Sergey Ryzhov. Modern touch payment terminal in bus. Data desconhecida. Shutterstock, consultado em 2020. www.shutterstock.com



FARE INTEGRATION IN THE ABURRA VALLEY (COLOMBIA)

Colombia's Aburrá Valley metropolitan region has an integrated transportation system²⁴ that benefits 10 municipalities: Caldas, La Estrella, Sabaneta, Envigado, Barbosa, Copacabana, Itagüí, Medellín, Girardota and Bello.

Fare integration is managed through a unified collection system and a single payment method for users: the Cívica, a smart card allows users to store money to pay for trips as part of the Integrated Transit System of the Aburrá Valley (SITVA), which consists of an array of transport modes. The metro serves as the central axis, but other modes are also integrated in the Cívica, including light rail, Metroplus (BRT), cable cars, the public bike-sharing system, EnCicla, and the bus system. The fleet, meanwhile consists of vehicles running on clean fuels, as enforced by local regulations.

Nonetheless, the fare collection method is still in need of improvement as there is no fare for specific zones or kilometers traveled. Each mode charges an amount; it is the passenger's responsibility to know a trip's cost and to load his card accordingly.

↓ **FIGURE** – METROPLUS STATION, THE BRT SYSTEM THAT SERVICES THE CITY OF MEDELLIN AND THE ABURRA VALLEY.



Source: Alexander Canas Arango. Metroplús is a medium capacity rapid transit bus system that serves the city of Medellín and the Aburrá Valley in Antioquia, Colombia. Fevereiro, 2020. Shutterstock, consultado em 2020. www.shutterstock.com

MAIN RECOMMENDATIONS

- **Ensure integration across modes and operators:** it is necessary to establish a single payment system.
- **Conduct fare studies for different scenarios:** it is necessary to assess a fare's impacts. On mobility, revenues, and equity, including assessing the possibility of cross-subsidization, such as, for example, shorter trips in central areas subsidizing longer trips that connect peripheral areas to the city center.
- **Communicate regarding fare integration.** Advertising campaigns are helpful as well as poles and information panels at stations to ensure access to information.

C.3 Progressively incorporate novel shared transport services into urban mobility

Shared mobility presents a unique opportunity for cities and public transit systems, but the integration should be well-planned. All actors and stakeholders should be involved in addressing fundamental issues such as where to place rental points, how to limit access to dockless systems, where to deploy electric car sharing²⁵ spaces, and what fees companies should pay for using streets.

Sharing systems notably allow users to consider the value of owning a car. For those who travel less than 10,000km a year, for example, it is arguably to their benefit to rent a car. In addition to economic considerations, shared electric vehicles

offer users access to technologically-advanced, sustainable vehicles, without the cost of maintenance (insurance, cleaning, and taxes). In 2019, for example, São Paulo saw its first electric car sharing startup—"beepbeep"—offering electric vehicles (Renault ZOE) for rent by the minute or by the hour.

In addition to shared vehicles, new urban mobility technologies, including new forms of micromobility, serve as fundamental tools to improve travel, and should be integrated into mobility systems in a planned and coordinated way.

C.4 Promote "Mobility as a Service"

Mobility as a Service (MAAS) is a concept for the future of mobility. If the integration of transit systems aims to create a single network and an understandable fare scheme, MaaS seeks to meet the needs of each individual user, incorporating a city's or metropolitan region's full existing transportation system. It also breaks with the concept of mobility as linked to ownership of an individual motor vehicle, introducing a new perspective on the provision of services.

In a MaaS system, the user pays a monthly or annual fee to have access to mobility services that cover their daily demands, such as public transit (integrated), shared bicycles or scooters, taxi services, on-demand mobility, and car rentals (limited by hours per month). MaaS services can be offered by public or private operators, who provide service packages as organized through partnerships with different local mobility operators.

²⁵ Car-sharing emerged as an alternative for personal vehicle use based on the concept that people need mobility, not cars. (Meijkamp 1998).

Conclusion

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The Latin America and Caribbean (LAC) region boasts a great deal of experience in developing urban and regional planning policies and processes—albeit coupled with rapid, and poorly-coordinated growth. A lack of integration between economic, spatial, and infrastructure development strategies combined with land market failures have resulted in cities that are socio-spatially segregated, of fragile sustainability, and with insufficient financial resources.

Transit Oriented Development (TOD), at its core, offers new policy and investment instruments that support the development of cities that are dense and mixed-use, with well-allocated resources and, if properly implemented, more just and equitable. TOD also emphasizes the importance of transportation planning in increasingly crowded cities, where congestion costs considerably outweigh the economic benefits of agglomeration. TOD's advantages include a reduction in the time dedicated to commuting as well as in greenhouse gases emissions and in the expansive growth of our cities.

Drawing on its strengths, TOD has been successfully implemented as part of urban regeneration and/or economic development projects in urban areas with opportunities for land value increases, where land readjustment invariably requires the participation of multiple actors. The cases of Bilbao and Washington, presented as part of this publication, are particularly notable, showing how TOD can serve in a greater capacity as a planning tool. The '3C' concept, meanwhile, unites the principles of compact, connected, and coordinated for urban development, allowing not only for the comprehensive organization of mobility models centered around public transit, but also enabling adequate zoning and supporting planning efforts to promote socially diverse housing opportunities and to provide public open space that fulfills international standards for well-being, alongside planning to support other economic and social activities.

As addressed in the five global cases presented above, the viability of TOD projects is subject to six important parameters: (i) governance mechanisms that allow for overcoming institutional barriers and facilitate coordination between the public and private sectors; (ii) appropriate legal and regulatory frameworks that ensure a project's feasibility; (iii) tools that allow for the integration of spatial planning and public transit networks with land management; (iv) economic and fiscal instruments to mobilize the necessary resources; (v) mechanisms that make it possible to integrate policies and urban development efforts in support of sustainable urban growth; and (vi) models of the environmental, social, and economic impacts that may result from an intervention. Many projects have proved complex in their implementation, yet transformative in their outcomes, rising above initial expectations as a result of effective frameworks and structures.

The Latin America and Caribbean region suffers from a major infrastructure deficit; yet a city's competitiveness and growth potential depend on timely infrastructure investment. TOD offers not only a suitable platform for both public and private investment, but also helps to structure projects in order to identify financial flows beyond those associated with transit fares or passenger growth. It thus enables land value capture and a greater financial sustainability.

In light of the urban development opportunities presented by TOD, it is important to consider the following elements in its application:

From Project to Development Strategy. TOD strategies are often incorporated at the project level, thus defining corporate and financial governance strategies that can be bounded and protected. In some cases, however, the implementation of new large-scale projects or initiatives (new transit lines, for example) has given way to a long-term vision for the city. A broader perspective is important to

incorporate not only in terms of TOD scalability, but also to support coherent long-term urban growth and development strategies that balance both densification and expansion objectives.

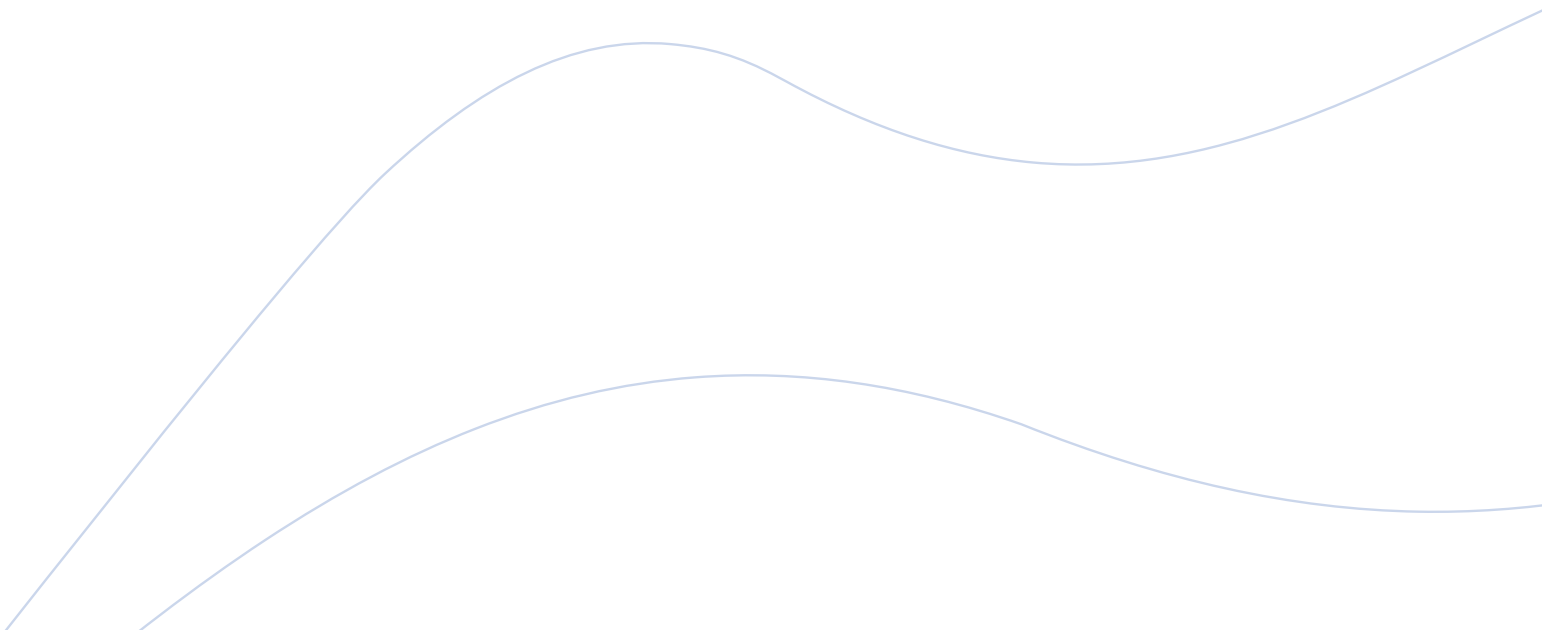
Governance. Governance frameworks are, of course, unique for each TOD project, as a result of the varied objectives of each stakeholder. Yet it is important to consider the institutional requirements for integrating both new services and urban development within the functions and responsibilities of the city beyond the implementation period itself. This is especially relevant in the case of metropolitan areas, where decisions related to both mobility and land use invariably have implications for neighboring administrations.

Gentrification and Neighborhoods Demographic Changes. Counter to inclusionary efforts, TOD-led transformations of deteriorated urban areas can give rise to the displacement of vulnerable groups, as a result of higher demand, increased rent, etc. It is important to develop safeguards

that ensure inclusive and equitable urban development and access to transportation.

Competition with other Urban Development Models. The recent pandemic has led several cities around the world to promote non-motorized mobility and to reorient urban development models around teleworking. The '15-minute city'—with multiple subcenters and neighborhood units—is a prime example. While the permanence of all related changes is unlikely, hybrid models may need to be considered in the future.

TOD presents opportunities for improvements to city planning and management. Regardless of size and profile, mobility solutions can be tailored to meet the citizens' needs, accompanied by land use solutions geared towards creating compact cities with smart densities. This book presents extensive information on TOD principles, inspiring cases and, significantly, key considerations for Brazilian cities—for which TOD offers significant opportunities.





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