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An report by the Economist Intelligence Unit

Smart Mobility PPPs in Latin America and the Caribbean



Commissioned by



About this report

This Economist Intelligence Unit/Multilateral Investment Fund report is an introduction to the 2014 Infrascopes study that analyzes public-private partnerships (PPPs) in Latin America and the Caribbean. Smart mobility PPPs in Latin America looks at how smart solutions to mobility challenges in the region lend themselves to a PPP framework. The report examines the mobility challenges the region faces, to what extent smart mobility solutions are used by governments, and the role the private sector plays in coming up with innovative mobility solutions. More importantly, the report analyzes mobility solutions that are most likely to lend themselves to PPP investment.

The complete index, as well as detailed country analyses, can be viewed on these websites:
www.eiu.com/lacinfrascopes2014
<http://infrascopes.fomin.org>

Please use the following when citing this report:

EIU (Economist Intelligence Unit). 2014.
Evaluating the environment for public-private partnerships in Latin America and the Caribbean: The 2014 Infrascopes. EIU, New York, NY.

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About The Economist Intelligence Unit

The Economist Intelligence Unit (EIU) is the research arm of The Economist Group, publisher of *The Economist*. As the world's leading provider of country intelligence, it helps governments, institutions and businesses by providing timely, reliable and impartial analysis of economic and development strategies. Through its public policy practice, the EIU provides evidence-based research for policymakers and stakeholders seeking measurable outcomes, in fields ranging from gender and finance to energy and technology. It conducts research through interviews, regulatory analysis, quantitative modelling and forecasting, and displays the results via interactive data visualisation tools. Through a global network of more than 350 analysts and contributors, the EIU continuously assesses and forecasts political, economic and business conditions in more than 200 countries. For more information, visit www.eiu.com.

About the Multilateral Investment Fund

The Multilateral Investment Fund (MIF), a member of the Inter-American Development Bank (IDB) Group, supports economic growth and poverty reduction in Latin America and the Caribbean through encouraging increased private investment and advancing private-sector development. It works with the private sector to develop, finance and execute innovative business models that benefit entrepreneurs and poor and low-income households; partners with a wide variety of institutions from the private, public and non-profit sectors; evaluates results; and shares lessons learned. The MIF is a laboratory for testing pioneering, market-based approaches to development, and an agent of change that seeks to broaden the reach and deepen the impact of its most successful interventions. For more information, visit www.fomin.org.



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Executive summary

The key findings in this report include:

- **Economic and population growth over the past 15 years has prompted rising urbanization, and with it higher levels of traffic congestion in the region's urban centers.**

Between 2000 and 2010 Latin America's population grew by more than 13% to exceed 596m, and it is set to surpass 624m by the end of 2015. Average GDP per person has increased by 32% in the ten years to 2013. In Brazil, the region's largest economy, this has resulted in growing car demand, which contributes to residents of São Paulo spending 63 minutes a day commuting to work, far above the world average of 46 minutes. Similarly, vehicle congestion in Mexico City has been deemed the worst in the world.

- **Governments across Latin America have expanded road infrastructure and used road-space rationing schemes to handle traffic that do not always lend themselves to smart mobility solutions or PPP financing.**

Cities such as São Paulo, Mexico City and Bogotá have implemented road-space rationing schemes that prohibit the circulation of cars with certain registration numbers throughout the day or during rush hours. But all of them have shied away from imposing punitive congestion charges that demand a fee from drivers for entering specific areas of the city. Punitive mobility solutions that generate income may be politically controversial, but they

lend themselves to being designed and managed jointly by the public and private sectors.

- **Most PPP mobility infrastructure ventures in the region involve toll roads or train, subway and rapid bus transit lines. However, public servants in the region tend to lack the necessary training and expertise to implement PPP schemes and their financing.**

PPPs in mobility infrastructure are still seldom used in the region by local, regional and federal governments. In many cases the infrastructure planning staff are ill prepared to implement PPPs for various projects. They also lack the necessary knowledge of capital markets to implement financial arrangements.

- **The most successful PPP ventures in mobility infrastructure carry low levels of political and operational risk and are economically sustainable.**

Engaging the private sector in PPP ventures can become controversial. As such, the most successful PPP ventures are those that can fund themselves through road user charges, while also employing unique private-sector technology that the government would be unable to offer, such as the Ecoparq parking meter system in Mexico City, the car-sharing system in Brazil's Recife or the bike-sharing systems that have gained popularity in various Latin American cities. ■

Introduction

Latin America has seen a strong population increase during the last 15 years, coupled with robust economic growth driven by a decade-long commodities boom. Between 2000 and 2010 the region's population grew by more than 13% to surpass 596m people, according to the Economic Commission for Latin America and the Caribbean (ECLAC). By the end of 2015 it is expected to exceed 624m.

The economic wellbeing of Latin Americans has also improved, with average GDP per person rising by 32% in the ten years to 2013. Such trends have resulted in increased urbanization and higher rates of vehicle ownership, which have begun to test the public services and transport infrastructure not only in the region's most important capitals, but across emerging mid-tier and smaller cities as well.

The resulting increase in congestion and higher levels of pollution have become part of everyday life throughout Latin America's cities. Poor and lower-middle-income families struggle with mass transport systems that are often overwhelmed by increasing demand and a lack of infrastructure for pedestrians or cyclists. At the same time, higher-income Latin Americans benefit from fuel subsidies,¹ while more open trade has resulted in cheaper prices for commercial and passenger vehicles. These trends and incentives threaten to make mobility a growing problem in a region

where, according to ECLAC, the population is set to increase by almost one-quarter by 2040.

This report by The Economist Intelligence Unit (EIU) and the Multilateral Investment Fund (MIF) looks at the state of smart mobility in Latin America, defined as solutions that cities in the region are adopting to (1) offer resources and infrastructure, such as better city planning, that reduce the need for transport; (2) manage existing mobility problems through the use of congestion charges and other mobility restrictions; and (3) promote alternative means of transport, such as rapid transit buses, electric cars, carpooling or bicycle usage. The report focuses on two of these areas, namely new methods to manage mobility and innovative means of transport, and will examine the viability of using public-private partnerships (PPPs) to advance smart mobility solutions in the region.²

Smart mobility solutions offer the promise of more efficient commuting, which can have important knock-on effects on the cost of freight, which is of vital importance for trade. Reduced car use can also help to cut carbon dioxide (CO₂) emissions and in doing so decrease the negative health effects of pollution, thereby helping to improve the overall quality of life. Reducing time lost to traffic congestion and the damaging health effects of pollution can also improve worker

1 International Monetary Fund, "The Unequal Subsidies of Fuel Subsidies: A Review of Evidence for Developing Countries" (September 2010). Retrieved from: <http://www.imf.org/external/pubs/ft/wp/2010/wp10202.pdf>

2 This interim report is part of a larger IDB-EIU research program and benchmarking study evaluating the legal, regulatory and institutional environment for public-private partnerships in Latin America and the Caribbean, called the *InfraScope*.

productivity.

The report is structured in three parts. Part 1 offers a survey of current smart mobility initiatives in Latin America; Part II looks at the role PPPs play or fail to play in smart mobility solutions; and Part III offers conclusions and recommendations. The report will focus on the types of smart mobility that

have been launched—or have the potential to be launched—as PPP initiatives. It seeks to offer city mayors and city planners a tool to evaluate what advantages and potential pitfalls they may encounter in formulating smart mobility solutions using a PPP financing approach. ■

1 The case for smart mobility

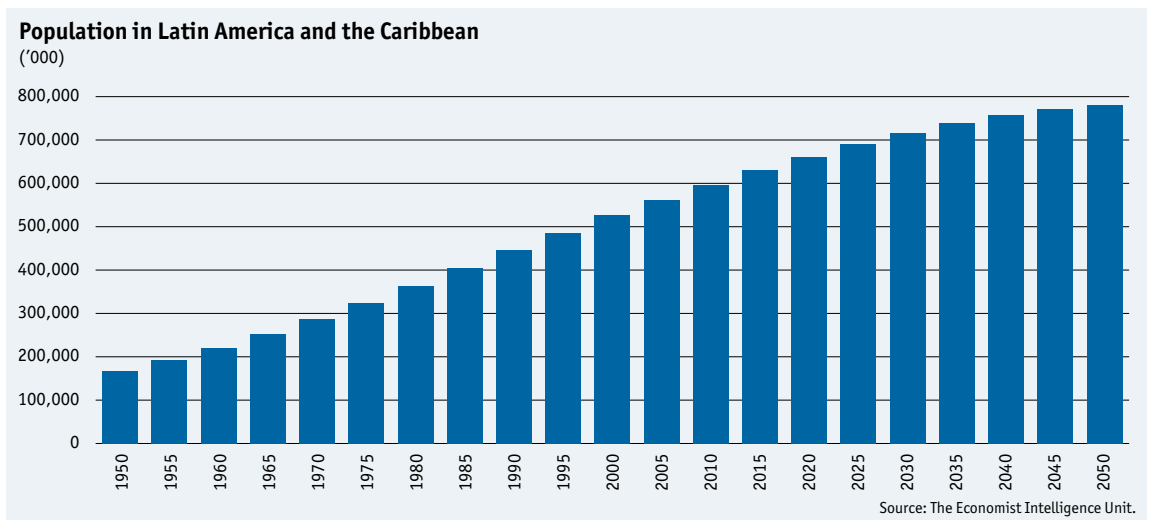
Latin America’s rate of urbanization is now the highest in the developing world, with nearly 81% of its population concentrated in urban areas by 2015, according to the United Nations Population Division. The economic growth of the past decade has led to increased demand for passenger vehicles, a trend that poses a growing challenge for mobility across the Americas.

The region’s two largest economies, Brazil and Mexico, have experienced robust economic growth and rising populations, which has resulted in higher demand for motorized vehicles. Brazil is now the world’s fourth-largest market for automobiles and the sixth-largest car manufacturer. The South American country recorded 2.76m new passenger car registrations in 2013, and The Economist Intelligence Unit (EIU)

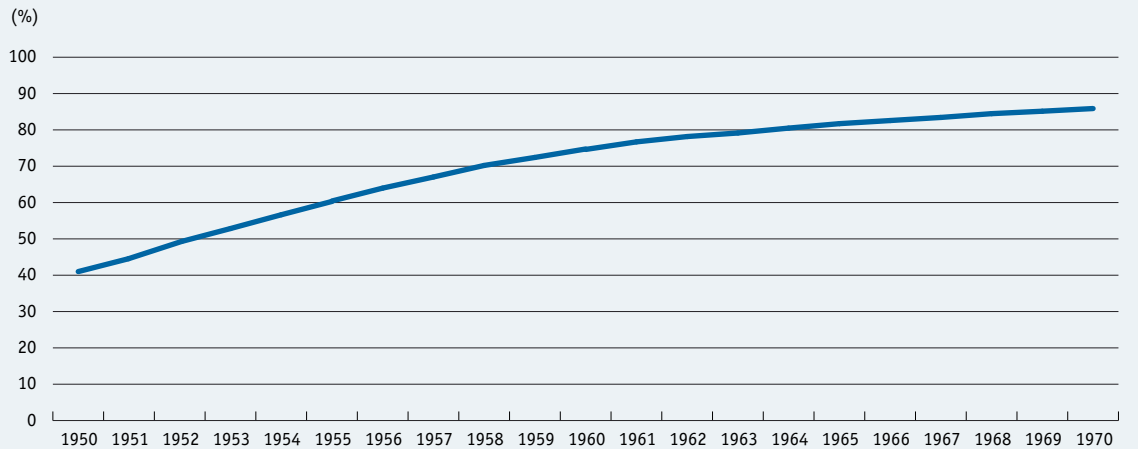
expects new vehicle registrations to exceed 2.9m by 2018. Higher incomes, inexpensive and accessible car loans as well as subsidized fuel prices have prompted Brazilians to demand more cars, resulting in higher energy consumption and more traffic congestion.¹ Growing traffic problems in São Paulo have left Paulistas spending an average of 63 minutes commuting to work every day, far above the world’s average of 46 minutes according to the *Smart Cities Survey 2014* conducted by Indra, a Spanish information technology company.

Mexico’s growing demand for cars over the past decade has also become a notable problem for its capital city. Vehicle ownership in Mexico reached

¹ Inter-American Development Bank, *Practical Guidebook: Parking and Travel Demand Management Policies in Latin America* (June 2013). Retrieved from: <http://publications.iadb.org/handle/11319/3577?locale-attribute=en>



Urbanisation in Latin America and the Caribbean



Source: The Economist Intelligence Unit.

209 per 1,000 people in 2013, even surpassing Brazil's 195-vehicle average. The EIU estimates that annual car registrations will grow by 50% and that by 2018 Mexican car ownership will exceed 244 vehicles per 1,000 people. But the growth of car ownership also goes beyond population growth. The *2014 IBM Commuter Pain Survey* found that in Mexico City every year twice as many car registrations are recorded as births.² Congestion in Mexico City was deemed the worst in the world by the *2011 IBM Commuter Pain Survey*. Congestion in that city even threatens to undermine the country's plans for reducing greenhouse gas emissions. Indra's *Smart Cities Survey 2014* found that Mexico City residents spend an average of 65 minutes commuting to work, higher than São Paulo's average commuting times. And while Mexico adopted climate change laws in 2012 that aimed for reductions in greenhouse gas emissions of 30% and 50% by 2020 and 2050 respectively, the EIU estimates that Mexico's targets may be far too optimistic, reflecting in part rising car ownership, the increased use of less fuel-efficient cars and rising fuel consumption.

While owning a car is perceived as a middle-class status symbol in Latin America, a cheaper transport alternative, the motorcycle, has also gained in popularity. Indeed, motorcycles have become an

important source of business in the form of low-cost and mostly unregulated transport services known as "moto-taxis".³ In Brazil, the total fleet of motorized two-wheel vehicles rose by roughly 213% to 81.6m in the 14-year period to 2013,⁴ according to data by Abraciclo, the Brazilian association of motorcycle and bicycle producers. During that same period the number of motorcycles on the streets of Rio de Janeiro grew by 851%. In Colombia, motorcycle sales quadrupled in the last decade to reach 660,000 in 2013,⁵ with one out of seven Colombians using a motorcycle as a means of daily transport.⁶ In the capital, Bogotá, more than one-third of riders use a motorcycle to make a living as deliverymen or moto-taxis. But this also results in more road accidents: Colombia's forensics institute, Instituto de Medicina Legal y Ciencias Forenses, estimates that in 2013 some 44% of traffic accident deaths and 51% of traffic-related injuries involved a motorcycle.⁷

The government approach to traffic management

2 Audi Urban Future Initiative, "Slowed down to 6km/h" (July 2014). Retrieved from: <http://audi-urban-future-initiative.com/blog/mexico-city-traffic-situation-slowed-down>

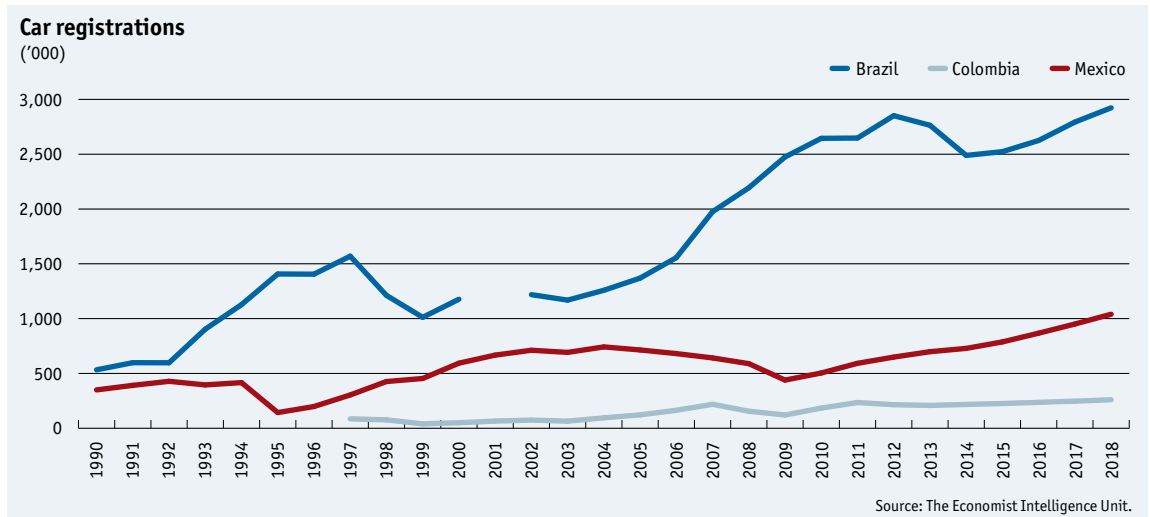
3 Mototaxi Video CAF Latin American Development Bank. Retrieved from: <http://www.caf.com/en/currently/news/2014/04/use-of-motorcycles-in-latin-america/?parent=15906>

4 Abraciclo.com.br. Retrieved from: http://www.abraciclo.com.br/images/pdfs/Motocicleta/Frota/2014_8_frota.pdf

5 Thomson Reuters, "Entrevista: Fabricante de motos Hero busca expansion en America Latina desde Colombia" (July 6, 2014). Retrieved from: <http://lta.reuters.com/article/domesticNews/idLTAKN0FB0ZT20140707?pageNumber=2&virtualBrandChannel=0>

6 Comité de Ensambladoras de Motos Japonesas, "VIII Estudio Sociodemográfico del Usuario de Moto en Colombia" (2013). Retrieved from: <http://www.comitedemotosjaponesas.com/upload/noti/Octavo%20Estudio%20Sociodemografico%20-%202013.pdf>

7 "Mototaxismo, una aproximación a la problemática", *La Republica*, December 2, 2014: http://www.larepublica.co/mototaxismo-una-aproximacion-la-problematica_197831



in the region has focused on road-space rationing schemes that limit the use of cars with certain registration numbers for the entire day or during rush hours in São Paulo, Mexico City and Bogotá, and in smaller cities such as San Jose in Costa Rica and La Paz in Bolivia. Mexico City began the “Hoy No Circula” (no-drive day) campaign in 1989 to improve the city’s air quality. The “Pico y Placa” (peak and license plate) plan in Bogotá, created a decade later, also limits vehicle use on certain days. In May 2014 Bogotá began eliminating fines for vehicles driving on off-days if they transported three or more passengers.⁸ However, studies have found that the impact of such restrictions is limited, in part because they have prompted higher-earning citizens to buy a second car to use on off-days.⁹ The problem with this second car is that it is often much more polluting than the first, making the problem even worse.

Road-user fees—charges imposed on drivers using their vehicles at certain times in specific areas of a city—have been studied and considered by São Paulo, Santiago and Bogotá, but local authorities have so far failed to implement the programs in the face of popular opposition.¹⁰ In

some cases congestion charges have been used for traffic on sections of major highways, such as the Anillo Periférico in Mexico, but they have not yet been implemented in urban areas. The São Paulo city council has approved a bill to add congestion charges to the city’s road-space rationing, but so far the plan has not been put into effect. A 2012 survey by Datafolha, a polling institute, found that barely 1% of Paulistas supported the measure.¹¹ In October 2014 the Bogotá city council began once again to consider a plan to introduce congestion charges for cars and motorcycles.

The private sector has tried to tackle traffic challenges with smart mobility solutions through the use of technology to secure parking, hail cabs and offer the short-term use of cars and bicycles. Brazil’s e-mobile taxi-hailing app Easy Taxi, launched in April 2012 in Rio de Janeiro, is now available in 27 countries worldwide, including in 13 countries in the region. Colombia’s Tappsi, a similar app created that same year, now serves nine Colombian cities.¹² Uber now serves 14 cities in Latin America, including Mexico City, Rio de Janeiro, Panama, Belo Horizonte, Lima and Cali in Colombia.

Given the increase in trade in the region, road

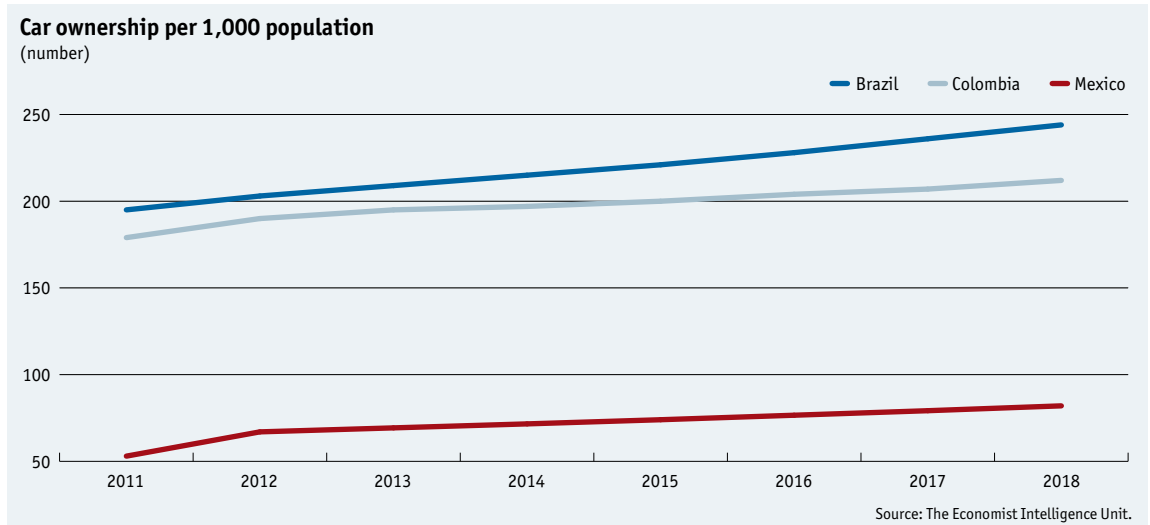
8 “La flexibilización del pico y placa, en análisis”, *El Comercio* (September 13, 2014). Retrieved from: <http://www.elcomercio.com/actualidad/picoplaca-ordenanza-autocompartido-sumavive-mauriciorodas.html>

9 Luis de Grange and Rodrigo Troncoso, “Impacts of vehicle restrictions on urban transport flows: The Case of Santiago, Chile” (2011). Retrieved from: <http://www.sochitrans.cl/wp-content/uploads/Acta-2011-01-40.pdf>

10 Inter-American Development Bank, *Practical Guidebook: Parking and Travel Demand Management Policies in Latin America* (June 2013). Retrieved from: <http://publications.iadb.org/handle/11319/3577?locale-attribute=en>

11 Folha de S Paulo, “Apenas 1% dos paulistanos quer pedágio urbano, aponta Datafolha” (November 6, 2012). Retrieved from: <http://www1.folha.uol.com.br/cotidiano/2012/11/1180886- apenas-1-dos-paulistanos-quer-pedagio-urbano-aponta-datafolha.shtml>

12 “Bucaramanga es la segunda ciudad que mas usa Tappsi”, ADN (November 21, 2014). Retrieved from: <http://diarioadn.co/actualidad/colombia/bucaramanga-es-la-segunda-ciudad-que-mas-usa-tappsi-1.133916>



freight transport is also an important mobility factor. Nearly 38% of all food imports in terms of value come into South America via roads, according to 2009 World Bank data.¹³ The logistics business in the region suffers from poor road infrastructure and quality. In Brazil, for instance, a 2009 World Bank study¹⁴ found that barely 12% of the road network is paved owing to poor maintenance. Meanwhile, railroad infrastructure in countries like Brazil and Argentina has proved insufficient to adequately serve the logistics business.¹⁵ Logistics costs in Latin America range anywhere between 18% and 35% of GDP.¹⁶ In Peru, logistics accounted for as much as 32% of GDP, compared with 9% in OECD countries, according to a 2011 Inter-American Development Bank (IDB) report.¹⁷ The region's logistics business is dominated by trucking, which gives added importance to highway infrastructure. In Brazil, trucks account for 60% of freight transport volume. In Argentina, that figure is 66%, while in Mexico it is 70%, and in Colombia

it is 81%.¹⁸

Despite the growing use of cars and motorcycles, the region has the most extensive bus rapid transit (BRT) network in the world in terms of length (kilometers) and passengers per day, with the largest systems found in São Paulo, Santiago, Buenos Aires and Bogotá.¹⁹ In 2013 Latin America accounted for more than one-third (34.6%) of global BRT kilometers traveled, and nearly two-thirds (62.4%) of total BRT passengers, according to BRTdata.org.²⁰ Brazil is considered the global leader in BRT systems, the most successful of which, the Rede Integrada de Transporte, was created in 1974 in the city of Curitiba. The system now serves 508,000 passengers a day in a city with 1.84m inhabitants.²¹ Curitiba's BRT system has been partly credited with giving the city the cleanest air among Brazilian urban areas.²² Bogotá and Guayaquil in Ecuador have followed Curitiba's BRT model. Bogotá's TransMilenio BRT system, created in 2000 with dedicated bus lanes, is now the largest in the world. The system serves 2.6m

13 World Bank, *Logistics, Transport and Food Prices in LAC: Policy Guidance for Improving Efficiency and Reducing Costs* (August 2009). Retrieved from: http://siteresources.worldbank.org/LACEXT/Resources/258553-1252607325125/LCSDS_OccasionalPapers_August.pdf

14 Ibid.

15 Ibid.

16 Inter-American Development Bank, *Logistics as a Driver for Competitiveness in Latin America and the Caribbean* (October 2011). Retrieved from: http://www.competecaribbean.org/wp-content/uploads/2013/06/JL_Guasch_final_Logistics-as-a-Driver-for-Competitiveness-english.pdf

17 Ibid.

18 Inter-American Development Bank, *Freight Logistics in Latin America and the Caribbean: An Agenda to Improve Performance* (2010). Retrieved from: <http://publications.iadb.org/bitstream/handle/11319/6312/Freight%20Logistics%20in%20Latin%20America%20and%20the%20Caribbean%3a%20An%20Agenda%20to%20Improve%20Performance.pdf?sequence=1>

19 BRTdata.org website: <http://www.brtdata.org/>

20 Robert Cervero, "Transport Infrastructure and the Environment: Sustainable Mobility and Urbanism", Institute of Urban and Regional Development (October 2013). Retrieved from: <http://iurd.berkeley.edu/wp/2013-03.pdf> and BRTdata.org

21 BRTdata.org, *Latin America Curitiba*. Retrieved from: http://brtdata.org/#/location/latin_america/brazil/curitiba

22 Robert Cervero, "Transport Infrastructure and the Environment: Sustainable Mobility and Urbanism", Institute of Urban and Regional Development (October 2013). Retrieved from: <http://iurd.berkeley.edu/wp/2013-03.pdf>

passengers a day, but increasing demand is straining the current capacity of its stations and buses.²³

Bicycle use has grown rapidly as an alternative means of mobility in Latin America, but it remains marginal, partly because there is no particular bicycle culture and very little dedicated infrastructure.²⁴ In the region, daily bicycle trips rose from 433,000 in 2007 to 1m in 2012, according to IDB data. Mexico City launched its first bike-sharing system, ECOBICI, in February 2010 and recorded 120,000 users in its first four years.²⁵ It now has 275 docking stations, run and maintained by the city government.²⁶ A study by Mexico City's environment agency estimates that the system saved the city 232 tons of carbon dioxide emissions in its first three years of operation.²⁷ Bike-sharing systems are now operational in seven countries in the region: Argentina, Brazil, Chile, Colombia, Ecuador, Mexico and Uruguay.²⁸ In Chile, bicycle use has grown by 20% a year since 2005.²⁹ Bogotá now offers the most extensive network (392 km) of permanent and shared bike lanes in the region, according to a 2015 IDB study on bicycle use in 56 cities in Latin America.³⁰ As of 2014, however, only 5% of daily trips in Bogotá were completed using bicycles. Bogotá has the highest percentage of bicycle users in the Americas with a share of 5% of total trips, surpassing cities such as Mexico City or Santiago de Chile with 1.5% and 3%, respectively.

Any increase in vehicle use and energy consumption by the passenger and freight

transport sectors carries inherent climate risks. As such, the adoption of smart mobility solutions can help mitigate such negative effects on a city's quality of life. Climate change is of particular concern for the region since weather events destroy infrastructure and affect crops, food security and ultimately levels of poverty. A 2014 World Bank study, *Turn Down the Heat*, points out that an average 6% reduction in agriculture as a result of climate change would by 2025 lead to a 22.6% reduction in the number of people surpassing the US\$1.25 per day poverty level because of loss of work.³¹ If global climate levels were to become 4°C warmer, the World Bank estimates that more frequent droughts and tropical storms would hurt coastal infrastructure, including the quality and maintenance costs of transport infrastructure.³²

Air quality has suffered in a number of Latin American cities owing largely to fossil-fuel use by the transport sector. The increase in pollutant emissions in the region results partly from uncontrolled land use and transport planning as well as inefficient fuel use, according to a 2012 study by the Air Quality Institute.³³ The institute reckons that Bogotá's TransMilenio, Mexico City's Metrobus and Santiago's Transantiago have done much to improve air quality in these cities, but worsening air pollution trends suggest that more such measures are needed.³⁴ More importantly, adopting smart mobility solutions that contribute to the reduction of particulate concentrations in the air to global standard levels in cities that suffer the most from air pollution could help to prevent anywhere between 10,500 and 13,500 premature deaths, a series of illnesses and lost economic productivity, according to an IDB study.³⁵

Linking mobility ideas and transport

23 "Los 10 Lunares de TransMilenio", *Semana Magazine* (February 14, 2014). Retrieved from: <http://www.semana.com/nacion/articulo/los-10-lunares-de-transmilenio/377131-3>

24 Inter-American Development Bank, *Biciudades 2013*, page 22. http://www.vanguardia.com/sites/default/files/informe_uso_de_las_bicicletas.pdf

25 Grupo Milenio, Infographic March 2014: http://www.milenio.com/df/ECobici-aniversario-Distrito_Federal-Ciudad_de_Mexico_5_247825237.html

26 ECOBICI website: <https://www.ecobici.df.gob.mx/es/informacion-del-servicio/que-es-ecobici>

27 ECOBICI, "Estudio de la Reducción de Emisiones y los Co-Beneficios Generados por la Implementación del Programa (2010, 2011, 2013) May 2013. https://www.ecobici.df.gob.mx/sites/default/files/pdf/reduccion_gei_y_co-beneficios_generados_por_la_implementacion_del_programa_ecobici_201020112012.pdf Media coverage: <http://www.veoverde.com/2014/07/ecobici-rompe-nuevo-record-de-uso/>

28 Inter-American Development Bank, *Biciudades 2015*.

29 "Crece numero de ciclistas en Santiago. Resultados Campaña 'Nosotros contamos' de UYT y Ciudad Viva", *Bicicultura.cl* (November 16, 2012). Retrieved from: <http://www.bicicultura.cl/crece-numero-de-ciclistas-en-santiago-resultados-campana-nosotros-contamos-de-uyt-y-ciudad-viva>

30 Inter-American Development Bank, *Biciudades* (May 2013). Retrieved from: http://www.vanguardia.com/sites/default/files/informe_uso_de_las_bicicletas.pdf

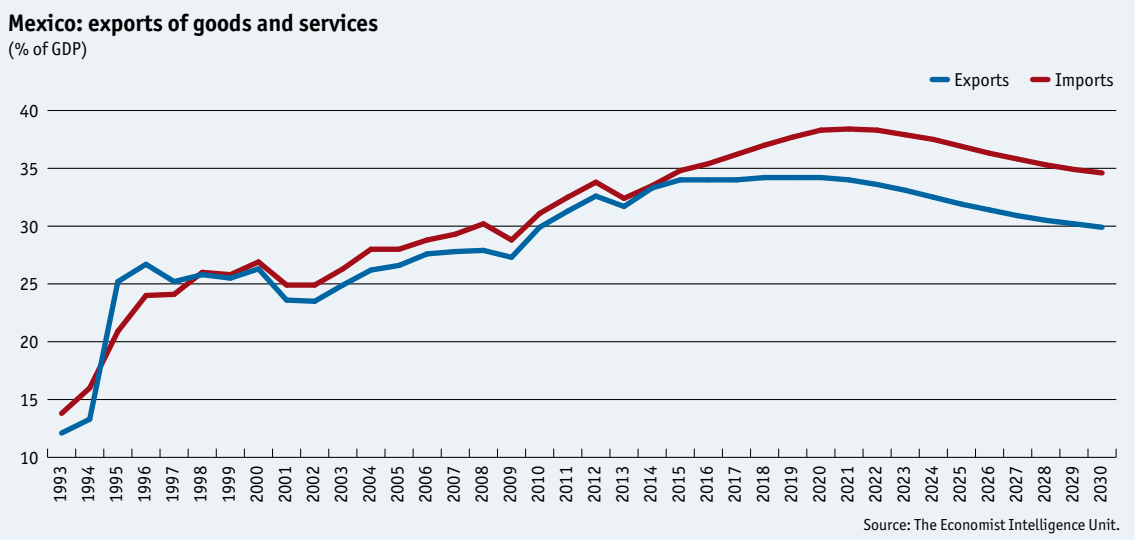
31 World Bank, "4o. Bajemos la temperatura" (2014). Retrieved from: http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/IB/2014/12/01/000456286_20141201140248/Rendered/PDF/927040WP0v30SP0t0B0x38537500PUBLIC0.pdf

32 Ibid.

33 Air Quality Institute, *Air Quality in Latin America: An Overview* (2012). Retrieved from: <http://www.cleairinstitute.org/calidaddelaireamericatlatina/cai-report-english.pdf>

34 Ibid.

35 Inter-American Development Bank, *Urban Air Quality and Human Health in Latin America and the Caribbean* (October 2005). Retrieved from: <http://publications.iadb.org/handle/11319/2988?locale-attribute=en>



infrastructure to housing policies can also help reduce the need to travel long distances and thereby cut down on commuting times. A study by McKinsey & Company of Latin American cities in 2011 found that better city planning tied to transport solutions—in other words, sound urban governance—can create greater business efficiencies that have positive knock-on effects on economic growth.³⁶ Mobility ideas in Latin America should also be analyzed through the lens of accessibility, equity and affordability to fully measure their positive benefits for society. And smart mobility solutions can emerge from government demand as well. Mexico City’s Plan Verde managed to cut carbon dioxide emissions by approximately 10% between 2008 and 2011, when the city upgraded its fleet of taxis to more fuel-

efficient vehicles.³⁷

Addressing mobility challenges posed by increased car use can also save lives. A 2014 IDB infrastructure strategy report found that more than 100,000 people die each year in the region from traffic accidents, with associated costs that amount to anywhere between 1% and 3% of GDP.³⁸ As a consequence of road fatalities, 4.7m years of life are lost in Latin America and the Caribbean annually, according to the *Global Burden of Disease* report.³⁹ This is equivalent to the years of life lost as a result of HIV/AIDS, lung cancer, tuberculosis and malaria combined. Furthermore, more than half (50.6%) of these casualties in the region are vulnerable users, that is, pedestrians, cyclists and motorcyclists.⁴⁰ ■

36 McKinsey & Company, “Fulfilling the promise of Latin America’s cities” (August 2011). Retrieved from: http://www.mckinsey.com/insights/economic_studies/fulfilling_the_promise_of_latam_cities

37 Ibid.

38 Inter-American Development Bank, “Infraestructura Sostenible para la Competitividad y el Crecimiento Inclusivo” (2014). Retrieved from: <http://www10.iadb.org/intal/intalcdj/PE/2014/14088es.pdf>

39 Institute for Health Metrics and Evaluation website: <http://www.healthdata.org/data-visualization/gbd-heatmap>

40 http://publications.iadb.org/handle/11319/3685?scope=123456789/1&thumbnail=false&order=desc&rpp=5&sort_by=score&page=0&query=avances+en+seguridad+vial&group_by=none&etal=0

PPP mobility case studies

The vast majority of public-private partnerships in Latin America are large infrastructure projects such as toll roads, train and subway lines and the development of bus rapid transit systems. Bicycle use and car sharing as well as traffic management technology have also lent themselves to private-sector involvement. The following is a list of mobility PPPs in operation, execution or in the process of approval.

- In October 2013 B-cycle, a public bicycle-sharing company based in Madison, Wisconsin, partnered with Itaú Unibanco to launch BikeSantiago, a bicycle-sharing business in Santiago, Chile with a US\$15m investment. The system, financed by Itaú and operated by B-cycle, has 180 bicycles and 18 docking stations in the city and aims to expand to 600 bicycles and 40 stations in 2015.¹ Itaú has also struck a partnership with Serttel, a Brazilian company specializing in technological solutions for traffic management, and the government of Rio de Janeiro in BikeRio, another bike-sharing system with 60 stations and 600 bikes.² The partnership plans eventually to expand to 2,600 bicycles.³

- Serttel, in association with the Brazilian Ministerio da Ciencia, Tecnologia e Inovacao, the country's technology ministry, is launching a car-sharing system in Recife with an initial investment of US\$193,000 that allows users to reserve electric cars

through a smartphone app. The system launched with 20 registered users and three initial car stations in December 2014.⁴

- In late November 2014 the Colombian city of Armenia approved a controversial project that would give Sutech, a company specializing in traffic safety, a US\$61m, 20-year concession to finance, install and manage the city's traffic safety cameras. Council members are debating the legality of earmarking future traffic-fine revenue to pay for the management of the camera system.⁵

- Peru is putting together a PPP approach to finance the US\$5.8bn Lima Metro Line 2. The Lima Metro is considered to be Latin America's largest infrastructure project, second only to Nicaragua's US\$50bn transoceanic canal plan.⁶ In March 2014 a private consortium of Spanish, Peruvian and Italian companies won the 35-year concession to build and operate the metro line, which will be partly financed with Inter-American Development Bank loans.⁷

- The city of Sorocaba in the state of São Paulo is launching a US\$208m, 20-year concession to build and operate

a bus rapid transit system. The system, which will be partly financed by the federal government, is expected to serve 150,000–180,000 commuters and shorten average travel time by 20%.⁸

- The city of Cuenca in Ecuador, whose car fleet is growing at an annual rate of 8%, is in the process of building a 10.5-km tram line with 27 stops, which is expected to carry 120,000 passengers a day.⁹ The US\$232m project, including construction and equipment supply, has been contracted out to several private companies that include French multinational company, Alstom.¹⁰

- The Colombian city of Barranquilla has had a bus rapid transit system—the Transmetro—since 2010; the fleet is run by two privately owned consortiums, Union Temporal Sistrurbanos (which runs 60% of the bus fleet) and Grupo Empresarial Metrocaribe (responsible for the remaining 40% of the buses).¹¹ In 2013 Transmetro users reached 30.95m, slightly higher than in the previous year. But as usage has increased, so have demands by customers to improve the quality of the service.¹² ■

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2

The role of PPPs in smart mobility

Public-private partnerships are becoming more prominent in large infrastructure projects in the region, especially those that are meant to ease mobility. According to the Partnership Financing report by the Eno Center for Transportation, a non-profit think-tank based in Washington, DC,¹ Latin America accounted for 11% of global PPP investment between 1985 and 2014, while the region's population accounted for 8.5% of the total global population.² A high percentage of the PPP projects implemented in the region have so far involved large infrastructure projects such as major highways in Colombia and Mexico and train and bus rapid transit systems in Brazil, in various cases run by both the national and the regional governments. Yet these are not without problems. Often large ventures of this nature face political risks and operational difficulties, such as obtaining environmental impact permits in the face of community opposition, operational difficulties owing to geography, or securing right of way if the ownership of land or buildings stands in the way of a major infrastructure development.³

When work started on Bogotá's TransMilenio bus rapid transit system in 2000, the central and city governments took on the financing and operational risk. It now works as a public-private partnership,

with a state company running the system, but with private bus operators, which manage to turn a profit, charged with running and maintaining the bus units.⁴ By taking on the building of the TransMilenio infrastructure and then allowing the private sector to manage the buses, the government took on the risks associated with securing rights of way and addressing other political risks—difficulties that the private sector would have been hard pressed to solve on its own.⁵

A November 2014 study conducted by Colombia's Asociación Nacional de Instituciones Financieras (ANIF), a financial-sector trade group, concluded that of the country's 25 transport infrastructure projects planned for the 2014-22 period—known as fourth-generation or 4G projects—only 12 can be developed by the private sector or under a PPP scheme.⁶ More than half of the 4G highway projects suffer from major geological risks, high construction costs and uncertain levels of traffic demand. This suggests that the PPP mechanism can be most effective in projects with enough anticipated traffic demand and sufficiently low costs to be self-sustaining

1 Eno Center for Transport, *Partnership Financing: Improving Transport Infrastructure Through Public Private Partnerships* (2014). Retrieved from: <https://www.enotrans.org/wp-content/uploads/wpsc/downloadables/P3-paper-04-14.pdf>

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4 Global Mass Transit Report, *Transmilenio in Bogotá: Case-study of PPP in BRT* (August 1, 2011). Retrieved from: <http://www.globalmasstransit.net/archive.php?id=7392>

5 This type of project, because of the heavy state involvement early in the project, falls outside the definition of PPPs as contemplated in the Infrascopes studies, whereby the private sector takes on financial, operation and demand risk and the public sector remains responsible for policy oversight and regulation; and the infrastructure generally reverts to public sector control at the end of the contract term.

6 Asociación Nacional de Instituciones Financieras (ANIF), "Concesiones de Infraestructura de Cuarta Generación (4G): Requerimientos de Inversión y Financiamiento Público-Privado" (November 2014). Retrieved from: http://anif.co/sites/default/files/uploads/Anif-CCI-4Gfinan1114_1.pdf

through toll charges without the need for public-sector financing.⁷

Although punitive traffic management techniques such as congestion charges and fines for traffic violations captured by cameras may help to address congestion issues, using PPPs to implement these can be controversial. Citizens accustomed to a lax traffic culture may strongly oppose measures such as congestion charges. Bogotá, Santiago and São Paulo have failed to implement congestion charge policies, in large part owing to popular opposition. In certain cases, there is a general distrust whether private companies can manage revenue from tolls and traffic fines responsibly and whether governments can serve as careful regulators. In Colombia, the city of Armenia's 2014 attempt to allow a private company to run its traffic cameras in exchange for a share of the revenue from traffic fines has faced opposition. Some city council members and citizen critics oppose the idea that a private company should receive the bulk of such revenue, even if it takes on the full financial and operational risk of installing and running the system in the first place. Such a case suggests that PPP projects that can have a meaningful impact on traffic and can save local governments hefty building expenses do not always enjoy enough public support. In Mexico City, the Ecoparq parking meter system has sought to avoid community opposition by including neighbors in planning committees and reinvesting part of the profits in sidewalk and park improvements.⁸ In these cases, a PPP model would be of use only if there was enough political will to advance these measures despite popular opposition.

Harvard economist Ricardo Hausmann has suggested that projects that require complex permit approval processes tend to mire PPPs in delays and in doing so eliminate the increased project efficiency and lower costs that PPP projects

are expected to deliver.⁹ In such instances, allowing the government to develop these infrastructure projects may turn out to be more effective and less financially costly.

Transport-related PPPs that involve using private-sector technology that could not otherwise be offered by the state appear to receive the most support from the public and seem the easiest to implement. Itaú Unibanco's initiative to finance bicycle-sharing systems with sophisticated bike-docking stations in São Paulo and Santiago in association with privately owned bicycle system companies and local city governments have so far met with operational and public relations success.

Although bicycle use remains a marginal means of urban transport in the region, such low-cost transport alternatives are increasing in popularity. Latin America's bike-sharing fleet has increased from 490 bicycles in 2007 to 9,034 units in 2013.¹⁰ Other smart mobility solutions, such as traffic analysis software, smartphone apps that track parking space availability and electric car-sharing systems as offered by Porto Leve in Brazil's Recife, have the potential to become profitable and politically popular for the companies and local governments that launch them.

Successful transport PPP ventures can also go a long way towards promoting green technologies and, by reducing car use, bringing about long-term climate and environmental improvements as well. Recife's new electric car-sharing venture, although still in its early stages, is one example of green technology promotion. The same can be said of the increased adoption of bicycle use in various cities, which can bring about important CO₂ emission reductions. As an example, ECOBICI is estimated to have cut CO₂ emissions by 127 tons in 2012.¹¹ The early bicycle- and car-sharing experiences in Latin America also open the door to the promotion of

7 Interview with Ana Carolina Ramirez, Director of Economic Affairs, Camara Colombiana de la Infraestructura, Colombia's infrastructure chamber (November 26, 2014).

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11 ECOBICI, "Estudio de la Reducción de Emisiones y los Co-Beneficios Generados por la Implementación del Programa ECOBICI" (2010, 2011, 2012)" (May 2013). Retrieved from: https://www.ecobici.df.gob.mx/sites/default/files/pdf/reduccion_gei_y_co-beneficios_generados_por_la_implementation_del_programa_ecobici_201020112012.pdf

new business models, in which private-sector companies can structure their future business plans based on shared risk and reward contracts with local and national governments, in which revenue and pricing depend on usage and infrastructure demand.

The financing mechanisms are of particular importance in expanding PPP schemes in mobility projects. The IDB's *2014 Infrastructure Strategy* report¹² points to the need for Latin American countries to develop new capital market instruments to help finance the region's infrastructure. The bank has also pointed out the important role that development-related multilateral institutions can play in granting financial guarantees to PPP schemes, especially in cases where those guarantees can help finance public-sector fund disbursements.¹³ As mobility infrastructure PPP projects extend over 20 years or more, financing from private financial institutions becomes harder to obtain. As such, many governments and companies in Latin America are beginning to look into project bonds, or financial instruments at the national level that can be sold to pension funds or other institutional investors interested in financing PPP infrastructure ventures. So far, infrastructure-related bond issuance in Latin America has mostly focused on refinancing debt or expanding the services of established PPP ventures that are already generating revenue.¹⁴

In July 2014 Rutas de Lima, a public-private partnership concessionaire charged with operating and maintaining an 85.6-km stretch of the Panamerican Highway,¹⁵ sold US\$520m in local bonds with 22-year and 25-year maturities to

pension funds and obtained a further US\$200m through a 15-year loan from several banks. The funds are meant to finance the project and will be paid back with future toll revenue.¹⁶ The Raposo Tavares road concession in Brazil issued US\$370m in a 12-year local bond to refinance existing debt in 2013, and Peru's Via Parque Rimac issued US\$445m in 25-year local bonds to finance the overhaul of an existing toll road.¹⁷ Issuing debt to help finance so-called "greenfield" infrastructure ventures remains difficult, primarily because pension funds and other institutional investors, which seek stable cash flows from their investments, are loath to lend to operationally risky projects. For this reason, several governments in the region are exploring risk-mitigation options to enhance the attractiveness of these instruments, such as financial guarantees in case the project fails, and tax exemptions for bond holders.¹⁸

The prospect of PPP financing for smart mobility projects offers project planners two main benefits: 1) the full integration of a project with one single party responsible for its design, construction, operation and maintenance, so that costs are minimized over its lifetime; 2) it transfers the risk of ownership and operation to a private party. As outlined by the *Public-Private Partnership Reference Guide*,¹⁹ by focusing on specific service results, PPP schemes allow participants the flexibility to choose inputs, construction design and technology in innovative ways. They also offer public-sector agencies with limited budgets a way to finance mobility infrastructure projects. ■

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3

Conclusions and recommendations

As outlined in this report, the commodities-driven economic growth that Latin America has experienced over the past 15 years has led to increased urbanization and more challenges to everyday mobility in the region's cities. Increasing traffic congestion and issues with greenhouse gas emissions and air pollution have led cities in the region to invest heavily in revamping and expanding mobility-related infrastructure. Infrastructure investment has centered on highways and public transport, such as subways and bus rapid transit systems, and the adoption of road-space rationing schemes meant to improve the quality of life in urban areas. The Latin America experience shows that PPP schemes have the greatest impact when they are used for projects with low operational and political risks, and where infrastructure demand makes the project self-sustainable through toll fees. PPPs also receive the widest acceptance when they involve new technologies and traffic solutions provided by the private sector that national or local governments would otherwise not be able to provide.

It is difficult to accurately assess the amount of savings that can be had from developing and running smart mobility projects using a PPP approach. Indeed, a 2013 study by the International Transport Forum found that in the case of the UK, procuring transport infrastructure through PPPs can be more costly than doing so through the usual government contracts that are

prone to delays and cost overruns.¹

Following decades of inefficient and costly infrastructure projects, governments and the private sector are working together to devise innovative approaches to managing growing mobility challenges. Countries like Brazil and Colombia have used such schemes effectively to help run bus rapid transit systems and subway lines. These countries, along with Mexico, Peru and Uruguay, for instance, have also embraced PPPs to develop, run and maintain major toll-road projects, in which revenue is earmarked to pay for part—or the totality of—the private sector's maintenance services. As a result of increased PPP use, Latin America accounted for 11% of global PPP investment between 1985 and 2014.

Increasing the use of PPP schemes to develop smart mobility solutions, however, requires a series of changes in the region's mobility culture. Local and national governments still lack sophisticated finance and public works policy teams that understand PPPs and the benefits of using these to finance key public works projects, and they also sometimes lack adequate national- and subnational-level regulatory frameworks that make PPP schemes politically and economically viable. This lack of understanding of the PPP concept also extends to voters and citizens, who often distrust the idea of the public sector surrendering the

¹ International Transport Forum, *The Fantasy World of Private Finance for Transport via Public Private Partnerships* (2013). Retrieved from: <http://www.internationaltransportforum.org/jtrc/DiscussionPapers/DP201206.pdf>

construction and management of important infrastructure projects to the private sector. In many countries, voters mistakenly equate private-sector involvement in the form of long-term concessions—where the financing and operational risk is borne by privately owned companies—to the privatization of public-sector assets. Governments intent on taking on mobility PPPs should also devote resources and time to adequately educate and consult citizens on the structure, viability and convenience of a PPP venture before launching such a scheme. Moreover, governments must seek to strengthen their capacity to manage PPPs as well.

Some public-private partnership ventures have suffered from inadequate planning and execution in the region, something that has given potential private-sector investors pause to reflect and led them to demand additional guarantees from local and national governments. In November 2014, for instance, the government of São Paulo reached an agreement to pay US\$167m to Via Quatro, the private operator of São Paulo's Metro Line 4, as compensation for the costs incurred as a result of the government's delays in finalizing the construction of the line.² And in Colombia, the financial trade group ANIF has concluded that of the country's 25 fourth-generation transport infrastructure ventures less than half would function under PPP schemes owing to higher than expected geological risks and construction costs as well as lower than anticipated user demand. This suggests that adequate planning and modeling of financial costs as well as future demand is key for PPPs to become a more common infrastructure development tool in the region.

The most recent PPP experience in Latin America indicates that PPP mechanisms work best for large infrastructure ventures when geological or other construction risks are low, and when the projected traffic demand is high enough to make the project self-sustaining during the life of a concession without the need for public-sector financing. Indeed, a 2013 OECD/International Transport

Forum report concludes that PPPs deliver best value for money when they are toll-financed and when the private sector holds all demand risk along with sizeable project equity.³ The most successful PPP projects are those where private partners have the freedom to adjust the design and construction techniques. This suggests that those projects that remain independent of the rest of the transport network do best under the PPP framework.⁴

In instances when a self-sustaining PPP project is not an option because of its large size and the resulting higher costs, local and national governments would benefit from developing new strategies to ameliorate the financing and operating risks for the private sector. It is important to accurately assess, as suggested by Harvard economist Ricardo Hausmann, whether the operational and political risks involved in the construction of a particular project mean that it is best left to the public sector to execute it on its own, instead of using a shared cost-benefit scheme such as a PPP.

Mitigating the risks of financing can also make PPPs a more attractive scheme for mobility infrastructure and infrastructure services development. Governments, through their development financing banks and multilateral institutions, can play a role in offering financing guarantees that pay private-sector participants when a project fails to cover its costs. More importantly, local and national governments would go a long way towards enhancing PPP schemes through the development of properly structured financial instruments (such as project bonds) designed for institutional investors, which pay investors from the revenue generated by the use of a particular mobility infrastructure, such as toll fees, fines for traffic violations and similar sources of revenue.

The most successful smart mobility PPP solutions in the region that happen to enjoy wide public support are bicycle-sharing ventures such as

2 "São Paulo indemnizará a operador de metro", *Business News Americas* (November 13, 2014). Retrieved from: <http://www.bnamericas.com/news/infraestructura/sao-paulo-indemnizara-a-operador-de-metro>

3 OECD/International Transport Forum, *Better Regulation of Public-Private Partnerships for Transport Infrastructure* (2013). Retrieved from: http://www.keepeek.com/Digital-Asset-Management/oecd/transport/better-regulation-of-public-private-partnerships-for-transport-infrastructure_9789282103951-en#page3

4 *Ibid.*

BikeRio in Rio de Janeiro and BikeSantiago in Chile's capital. These ventures—financed, set up and run by private companies—offer entrepreneurs the chance to advance innovative and creative usage schemes in the mobility sector. Mobile technology that helps users carpool, track hard-to-find parking spaces, check on traffic flow and enable electric car-sharing systems enjoy wide support, partly because they are seen as new, innovative solutions that can be self-sustaining and do not benefit directly from state resources. More importantly, the perception is that without private-sector involvement such ventures would not exist. However, PPP ventures that rely on innovation must enjoy the freedom to adjust their

procurement methods and design techniques, which are often rigorously monitored and inflexible in the case of publicly led contracts.

Getting PPP schemes for smart mobility solutions to gain wider acceptance in Latin American cities would go a long way towards benefitting small and medium-sized enterprises involved in construction as well as those in the technology and software development space that can help create mobility solutions. A more mature mobility PPP market would also present rich opportunities for investors, not only those that are interested in project bonds, but also those that are seeking to invest in start-up ventures in the transport and mobility solutions business. ■

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