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São Paulo, Brazil.
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Best Practice in National Support for Urban Transportation

Part 2: Growing Rapid Transit Infrastructure — Funding, Financing, and Capacity

Lead Authors: Walter Hook & Colin Hughes

Contributing Authors: Yoga Adiwinarto, Xiaomei Duan, Javier Garduno, Aimee Gauthier, Justin John, Chris Kost, Sofia Martin-Puerta, Jacob Mason, Luc Nadal, Ana Nassar, Jamie Osborne, Carlos Felipe Pardo, Pedro Torres, Xianyuan Zhu

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Glossary of Terms

Annual Rapid Transit Spending Per Urban Capita
This figure represents capital costs only and is estimated by multiplying the average per-kilometer cost of infrastructure by the number of kilometers of total rapid transit built in a given time period and dividing the product by the population in urban agglomerations over 500,000.

Average Level of Debt Finance for Rapid Transit
Averages the percent of total project cost covered by debt finance for projects within the study sample.

Average Per-Kilometer Cost of Infrastructure
This value was estimated by dividing the total cost of infrastructure by the total number of kilometers of infrastructure for the projects in within the study sample.

Financing
Project financing refers to any debt finance that is used to pay for up-front capital costs.

Funding
Project funding refers to the money that will be used to pay for a project's capital costs.

Government-Owned Enterprise (GOE)
A legal entity created by a government to conduct commercial activities on its own behalf. A GOE can be wholly or partially owned by a government. Also known as a State-Owned Enterprise (SOE).

Gross Domestic Product (GDP)
Gross Domestic Product (GDP) is a measure of the total size of an economy. For the purposes of the paper, GDP is measured in terms of Purchasing Power Parity (PPP), which accounts for the differences in exchange rates of currencies across countries.

Gross Domestic Product (GDP) per capita
GDP per capita is the measure of the total size of an economy of an area divided by the population of that area.

Multi-lateral Development Banks (MDBs)
Multi-lateral Development Banks are intergovernmental financial institutions that are generally capitalized to some degree by developed member countries and whose purpose is to lend money to developing member countries.

National Development Bank (NDBs)
National Development Banks are financial institutions created by national governments for the purpose of financing economic development within the country.

Public Private Partnership (PPP)
A business venture funded and operated by a partnership between a government entity and a private sector company. Typically a mid-to-long term agreement in which service obligations normally conducted by the public sector are operated by the private sector.

Public Transit
Refers to any mode of public transit including mixed-traffic buses, not just rapid transit.

Public Transportation Federal Support Program (PROTRAM)
A Mexican federal program designed to support rapid transit by offering grants to subnational governments for up to 50% of the infrastructure cost of public transportation projects. PROTRAM is funded by national toll road revenues and financed in part by loans from MDBs.

Rapid Transit
Rapid Transit is defined as any of the following:

- Bus Rapid Transit (BRT) - a BRT corridor that meets the BRT Basics (BRT Standard)
- Light Rail Transit (LRT) - an LRT corridor that meets the BRT Basics (BRT Standard)
- Metro - a rail-based transit mode that meets the following qualifications:
  - Completely grade separated
  - Off-board fare purchase
  - Operates entirely within a single built-up urban area with regular station spacing (<5km, excluding bodies of water)
  - Headways of less than 20 minutes in both directions from at least 6am to 10pm
  - Coaches are designed to prioritize capacity over provision of seating

RTR Ratio
The Rapid Transit to urban Resident ratio (RTR ratio) is the ratio of rapid transit to urban population in metropolitan agglomerations with populations over 500,000. RTR is measured as kilometers of rapid transit per million urban residents. This metric can be applied at the country-level.

Urban Transport Transformation Program (UTTP)
A World Bank program that aims to contribute to the transformation of urban transport in Mexican cities toward a lower carbon growth path.

Value Added Tax (VAT)
A type of consumption tax, in which the value of the tax is increased at each stage of production.

Executive Summary

Large cities of the world require strong coverage of rapid transit networks to ensure they remain competitive, and that local communities have a healthy environment, vibrant urban economy, and an equitable, high quality of life for all residents. Many cities—especially those with growing populations, incomes, and/or large infrastructure deficits—have not, however, built rapid transit at the scale and rate needed to meet mobility needs. This paper is Part 2 in a series of research papers that explores how countries can grow their rapid transit infrastructure. This part focuses on the role that funding, financing, and capacity have played in delivering rapid transit infrastructure in nine countries.

Part 1, *Evaluating Country Performance in Meeting the Transit Needs of Urban Populations*, released in May 2014, drew upon a comprehensive global data set developed by the Institute for Transportation and Development Policy (ITDP) of the rapid transit infrastructure to create a comparative analysis of rapid transit infrastructure in nine countries that are major contributors to greenhouse gas emissions. A key metric of this analysis was the ratio of rapid transit per resident (referred to as the "RTR ratio," meaning kilometers of rapid transit per million urban residents) that allowed comparisons of rapid transit infrastructure between countries of very different sizes over time. The results showed that rapid transit infrastructure stocks vary widely around the world from an RTR of seventy kilometers of rapid transit per million urban residents in France to an RTR of three in India. The RTR of a country thus became the baseline indicator of how adequately a country is expanding its rapid transit systems to meet the needs of its urban populations.

Part 2, *Growing Rapid Transit Infrastructure: Funding, Financing, and Capacity*, analyzes how the funding practices, financing practices, and institutional capacity impact a country's ability to deliver rapid transit effectively. While the paper draws on the rapid transit database used in Part 1, it also uses an additional database compiled by ITDP with complete funding and financing details for 123 urban rapid transport projects, as well as data on urban transport capacity. To understand which countries are the most successful at growing their rapid

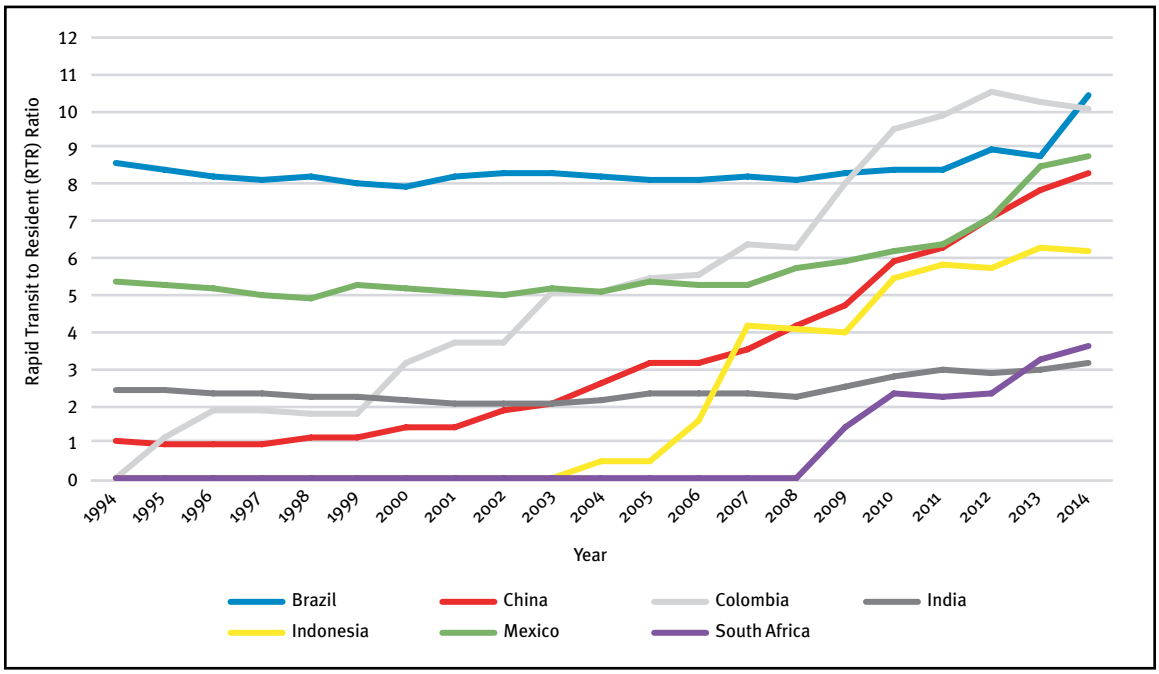


Figure A: Change in RTR Ratio in Seven Countries 1994-2014

	RTR Growth: Annual Kilometer of Mass Transit Added per 1 Million Residents, 2000-2014	Funding: Annual Rapid Transit Spending per Urban Capita (USD, 2014)	Average Cost of Infrastructure: Million USD per Kilometer of Transit (USD, 2014)	Financing: Average Level of Debt Finance on Rapid Transit	Capacity: Planning, Governance, and Implementation
France	0.80	$62	$50	43%	High
Colombia	0.49	$18	$26	69%	Medium
China	0.49	$46	$64	56%	High
Indonesia	0.44	$2	$4	43%	Low
South Africa	0.26	$2	$6	3%	Low
Mexico	0.26	$6	$15	42%	Medium
Brazil	0.18	$22	$66	50%	Medium
United States	0.16	$26	$82	44%	Medium
India	0.07	$7	$45	36%	Low

Table A: Annual RTR Growth and Key Factors for Growing Transit Infrastructure

transit relative to their urban populations, the paper focuses on the annual change in a country's RTR, looking specifically at the period from 2000 to 2014. Countries are then evaluated according to this metric.

In the table above, countries are ordered by their success in their annualized growth rate of RTR in the new millennium (2000–2014). Then, each country is analyzed through indicators measuring key factors for a country's ability to grow transit: the amount of funding per capita, the cost of a kilometer of infrastructure, the level of debt financing, and institutional capacity. Though there was too small of a sample to use regression analysis to find statistical correlations, the results confirm what would be expected: that the countries with the best overall combinations of higher funding, lower infrastructure costs, high financing rates, and high capacity tend to have grown their rapid transit networks more quickly. Below is a review of more detailed findings about what contributes to successful funding, financing, and capacity.

Funding Rapid Transit

Many factors determine a country's ability to grow its rapid transit infrastructure, but none are as critical as the nature of its funding. Project funding refers to the money that will be used to pay for a project's capital (construction and procurement) costs or to pay off the loans that financed the construction over time. Project funders pay the ultimate cost of the project, either up front or over time. Just as the growth of rapid transit (RTR) varies greatly country by country, so do the critical aspects of funding: the amount of funding per capita, the costs of infrastructure, the sources of funding, and its reliability. Our analysis finds that:

- **Funding levels and costs per kilometer of rapid transit must be aligned for RTR growth.** RTR is a direct outcome of the amount of funding per capita and the cost of infrastructure per kilometer. The higher the funding and the lower the costs per kilometer, the higher a country's RTR. Countries can achieve high RTR goals with relatively low investment only if the cost per kilometer of rapid transit is low. This does not mean building low-quality transit, but instead ensuring cost-effectiveness of quality transit.

- **Cities should be empowered with the financial and institutional capacity to make urban transit investments.** City or metropolitan governments are the most directly politically accountable to users for quality mobility and accessibility. When cities have been in control of the funds, our analysis shows higher RTR growth (more rapid transit), built at a lower cost per kilometer.

- **Funding for urban transit infrastructure must be reliable—characterized by predictable long-term revenue flows from dedicated sources.** Without reliable funding, transport authorities cannot make highly effective long-range infrastructure plans because budgets and spending capacity are not known in advance.

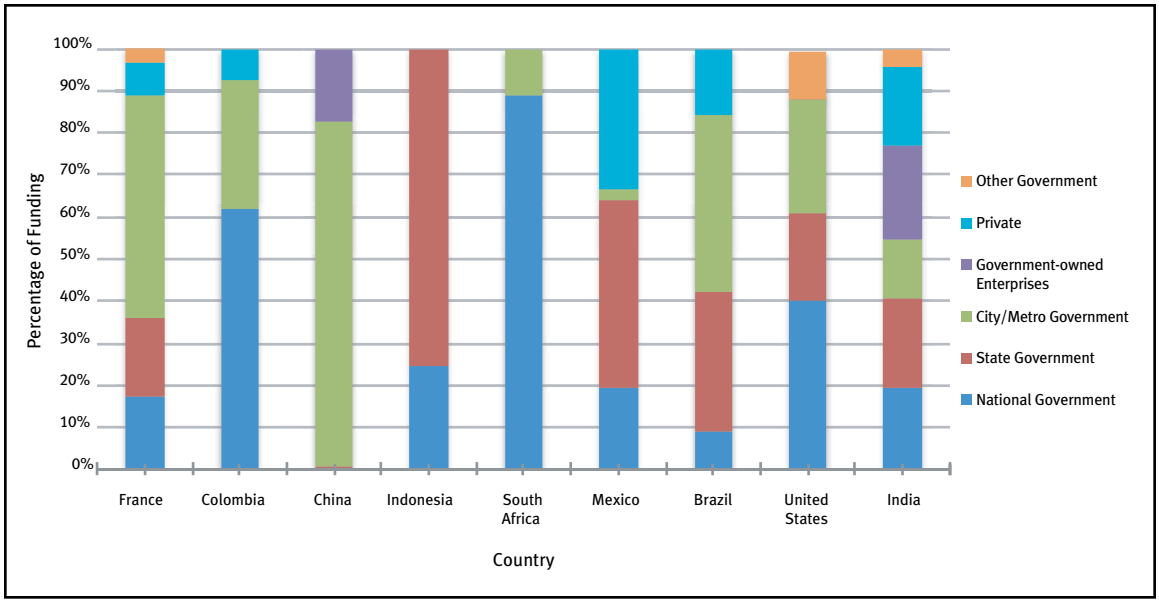


Figure B: Sources of Mass Rapid Transit Funding (as an average percent of total project cost)

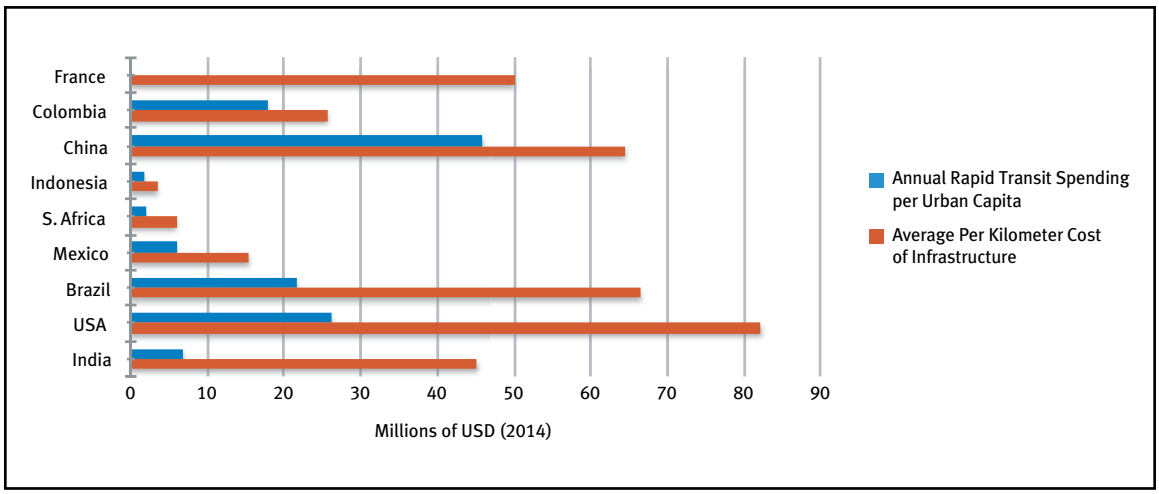


Figure C: Comparison of Spending per Urban Capita and Infrastructure Costs per Kilometer (2000-2014)

- **Cities should build high-quality, cost-effective rapid transit.** Cities that built more bus rapid transit (BRT) than urban rail paid less per kilometer of rapid transit, and their BRT systems had higher quality ratings on *The BRT Standard*. This could be because a city's capacity to implement high-quality BRT improves as it builds more of it and/or because low-quality designs have less impact and are less likely to be replicated.

- **When cities do not have the financial and institutional capacity necessary to implement rapid transit, the state or national government should step in.** Higher government authorities and the private sector are often needed to intervene to support rapid transit in the short term. RTR improves the most, however, over the long term when national and state governments build the capacity of local governments to plan, fund, and finance rapid transit.

- **Public funds should be used for rapid transit infrastructure; urban highway funding should come from user fees.** Within this sample, national government funding of urban highways correlated with low RTR growth. User-funded highways have proved viable in developed and developing countries alike and ensure that only private vehicle owners, who tend to be wealthier, pay for the urban highways that benefit them. This ensures that scarce public investments are not diverted from public rapid transit.

Debt Financing for Rapid Transit

Rapid transit infrastructure requires a great deal of capital investment at the outset and has the potential to deliver significant returns—both in terms of revenue and/or social, environmental, and wider economic benefits—over the long term, making it well-suited for the use of debt to finance its construction. Easy credit for bad projects, however, can drive a country into an unsustainable debt trap. For countries not already over-leveraged, with controls in place to ensure the cost-effectiveness of transit investments, expanding access to low-cost financing for high-cost-benefit projects can help accelerate growth in rapid transit infrastructure and improve the quality of those projects.

- **Cities should improve access to low-cost debt finance for rapid transit.** There are five main sources of debt for transit infrastructure projects, which are listed in general order of desirability (or cost and conditions of loans) for government borrowing:

  1. Bonds
  2. National development bank loans
  3. Multilateral development bank (MDB) loans
  4. Commercial loans
  5. Bilateral loans or loans from export credit agencies

- **Levels of debt finance for rapid transit projects should approach or exceed 70:30.** The higher the level of debt finance, the higher overall funding and ultimately RTR growth is likely to be for rapid transit in a country.

- **Cities should improve their credit ratings.** Better credit ratings mean lower interest rates with lenders, improved accountability and transparency, and wider access to lenders and bond markets.

Institutional Capacity for Rapid Transit

Implementing rapid transit is a complicated process. It requires more than just money for countries and cities to plan, finance, design, build, and operate a network of rapid transit that meets growing mobility demands. A country must have the institutional capacity for all of these tasks. While institutional capacity is a very broad topic, we have selected three discrete and important indicators of a country's competence in implementing rapid transit to shed some light on differences in capacity among countries. The top three countries for RTR growth were found to all have high to medium levels of institutional capacity.

In our research, we found examples of countries that had the requisite money for rapid transit investments but municipalities were unable to put together projects of sufficient quality to be eligible for the money. Lack of capacity to plan, design, and implement a major project can be a barrier to rapid transit infrastructure growth, even when funding and financing suffice. The types of capacity required to grow rapid transport infrastructure as well as the indicators used in this analysis for each type of capacity are discussed below:

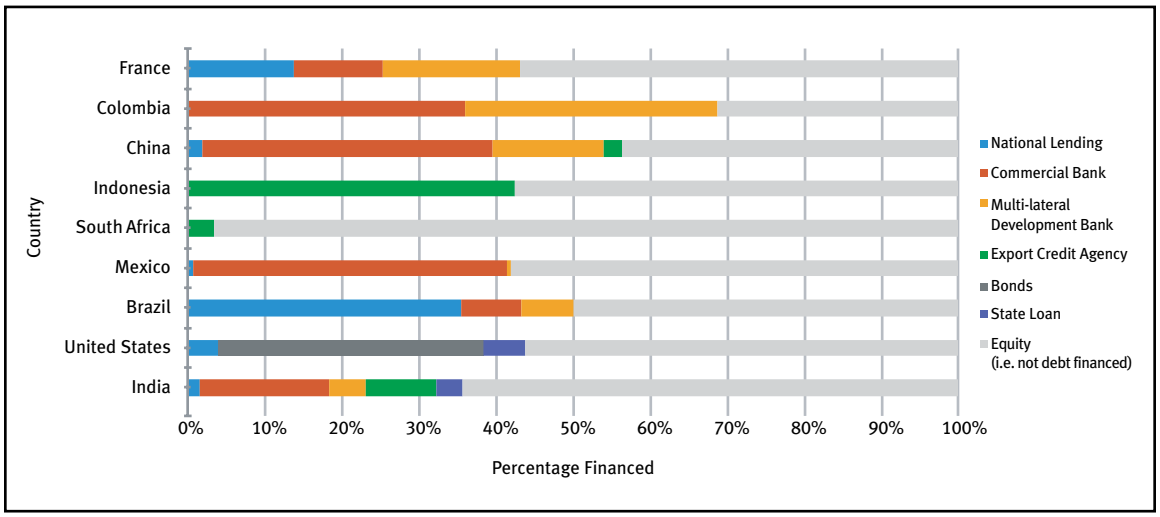


Figure D: Rapid Transit Debt Finance By Country and Source

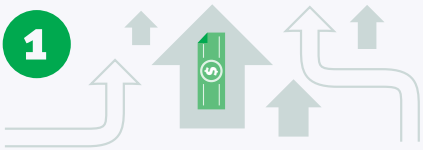
- **Transport Governance Capacity: Metropolitan areas need a planning authority that is legally and politically empowered to develop and coordinate transport infrastructure and policy across modes and cities within a metropolitan area.** This requires institutions to be empowered with the political and legal authority to achieve goals. One indicator of this is the presence of metropolitan or regional planning commissions.

- **Planning Capacity: Cities need a well-established, budget-constrained mobility planning process that effectively guides long-term transportation infrastructure development.** This requires institutions to have the proper organization, tools, and processes in place to achieve goals. One indicator of this is the presence of well-planned, long-range, capital-constrained mobility plans.

- **Technical Capacity: Countries need to be able to plan and implement high-quality, well-designed transport infrastructure without major project delays.** This requires an institution's staff (or consultants) to have the technical ability to collect, analyze, and use data or to plan, finance, design, and engineer infrastructure to achieve goals. It also requires in-house expertise to structure tenders and monitor performance by contractors. One indicator of this is the record of project quality and on-time, on-budget project delivery.

How Can Countries Grow their Rapid Transit Infrastructure?

1



Increase Funding, Make it Stable and Predictable

Many countries are spending less than 0.10% of GDP per capita on transit. Increasing to even 0.15% of GDP spent on transit would yield massive infrastructure gains. Consistent, reliable funding would allow authorities to make effective long-term plans.

2

Give Cities the Power

City-level governments are the most directly accountable to the users of transit. When cities control the funds, have legal authority, and have the technical capacity to plan, design and build projects, the result is more, and better, rapid transit at a lower cost than regional or national governments.

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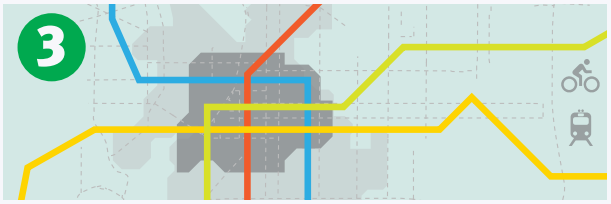
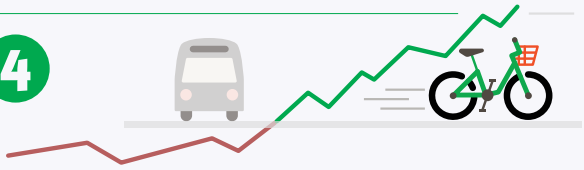
3



Ensure Cost-Effectiveness of High Quality Transit

Countries should invest more in transit that gives their cities the biggest bang for the buck, such as BRT, and cycling lanes, and less in expensive and limited metro systems and rail.

4



Finance More Infrastructure Using Debt

Debt-finance allows cities to grow the infrastructure quicker, incentivizes better oversight and project quality, and allows the taxpayers that benefit from a project to pay for it.

5

Better Credit Ratings Mean More Money for Rapid Transit

Cities should focus on improving their credit ratings for greater access to, and efficiency of, the lenders and bond markets needed to finance rapid transit.

1. Introduction

A robust rapid transit network is essential to a healthy environment, a vibrant urban economy, and a high quality of life for residents of large cities. However, many cities are not able to build rapid transit at the scale and at the rate necessary to meet the needs of growing urban populations. Current growth rates of rapid transit infrastructure are not sufficient to end dependence on private motor vehicle use and stem the risk of catastrophic climate change. This paper, which focuses on how rapid transit infrastructure is funded and financed, is Part 2 in a series of three internationally comparative research papers exploring the policies and practices required to increase the growth of rapid transit systems. This paper incorporates a data set of financing details for 123 urban transit projects from nine different countries as well as data on institutional capacity in those countries. The data provides a comparative look at funding and financing practices from around the world. It uses this, other data collected for Part 1, and supporting research, to provide general conclusions on how countries can increase their rapid transit infrastructure.

Part 1, *Evaluating Country Performance in Meeting the Transit Needs of Urban Populations,* released in May 2014, was an international comparative study of the growth of rapid urban transit infrastructure around the world: Brazil, China, Colombia, France, India, Indonesia, Mexico, South Africa, and the United States. Together these countries represent nearly half of the world's population, its largest emitters of greenhouse gases, and a wide range of economic and infrastructural development. Fundamental to the analysis is a simple indicator for rapid transit infrastructure development: the rapid transit to resident ratio ("RTR ratio"), which measures the number of kilometers of rapid infrastructure per million residents (only residents of metro areas with populations greater than 500,000 are counted). The RTR ratio allows comparison of rapid transit infrastructure levels between countries of different sizes, as well as of a single country at various points in history. This illustrates the degree that a country is building urban rapid transit infrastructure faster or slower than its urban population is growing. It also allows comparisons of relative transit infrastructure development between countries of very different sizes. The analysis was based on a comprehensive database of the world's rapid transit infrastructure, with data including the year opened, length of system, cost, and BRT Standard ranking.

Part 2 builds on the analysis of historic growth and international comparisons of rapid transit levels established in Part 1 and focuses on the rate of RTR change since 2000. It then explores the key factors that explain these differences in performance. Specifically, it explores differences in the level and source of funding, the level and source of financing, and the capacity of institutions to plan, design, and implement new rapid transit. The analysis is based on the funding and financing practices from recent BRT, rail, and urban highway projects in each country. This analysis uses empirical data to shed light on the questions of why some countries succeed in growing their rapid transit quickly, while others do not. A number of comparative indicators are used such as per capita transit spending, funding sources, levels of debt finance, debt-finance types, as well as institutional capacity indicators—all of which illustrate what countries and cities need to grow their rapid transit infrastructure. Part 3 of this series will focus on the specific national policy instruments that countries use to improve rapid transit in cities.

1.1. The Urban Transport Project Funding and Financing Database

To isolate why some countries were able to build much more rapid transit than others required understanding the transport development process in each country, namely how urban transit infrastructure projects were

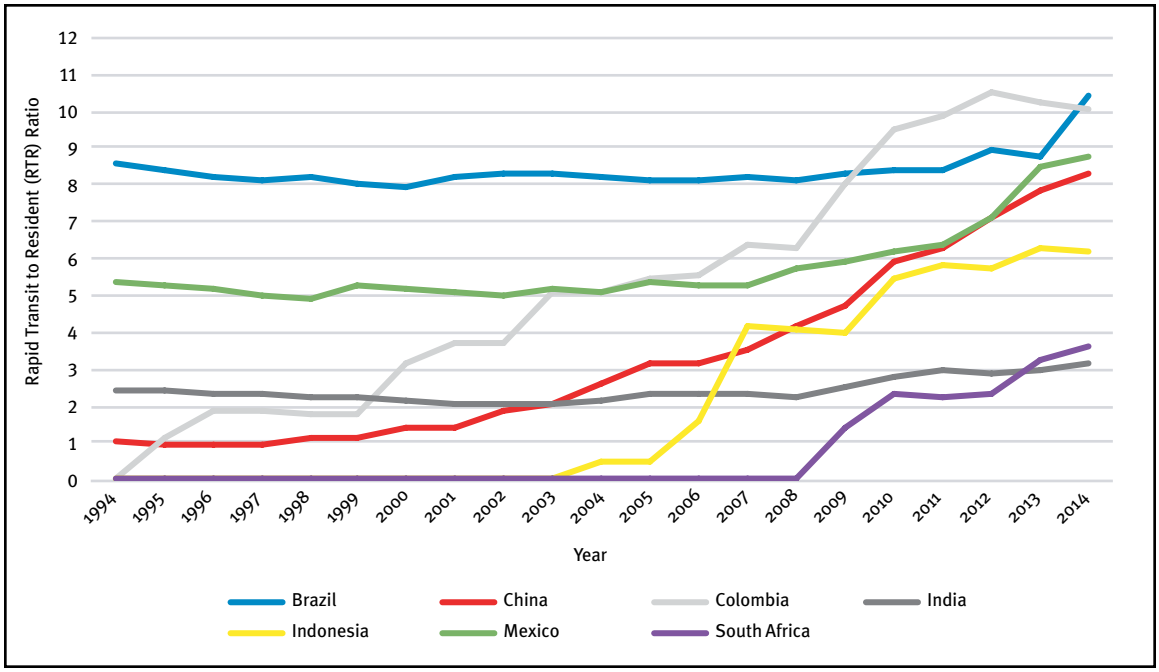


Figure A: Change in RTR Ratio in Seven Countries 1994-2014

funded, financed, and managed in different national contexts. For this purpose, ITDP and its field offices developed a new database for this Part containing all the financing details for more than 127 separate urban transportation projects from the nine countries. Only bus rapid transit projects that met the minimum "Basic" ranking in the *BRT Standard*[1] were included in this sample. For rail, trolleys and light-rail operating in mixed traffic were not counted nor was commuter rail unless it operated like an urban rail project with stations an average of five kilometers or less apart and operated in a continuously urban area (not between urban areas). Highway projects included in the sample were those that were as near city centers as possible and served urban populations.

The number of projects included from each country varies according to the number of projects developed in each country (small countries have fewer projects) and the availability of data. For each project included in the sample, information was collected regarding how much the project cost, corridor length, and sources and amounts of both project funding and debt finance. While a high percentage of all recent transit projects from these countries was included in the sample, the overall sample size is still too small to prove, using regression analysis, the variation in RTR growth among countries. Nonetheless, the comparative data is still valuable to highlight different patterns and approaches to funding, financing, and developing transit infrastructure in different countries.

	BRT	Rail	Highway	TOTAL
United States	3	4	3	10
Colombia*	9	3	3	17*
Mexico	9	4	7	20
China	4	7	4	15
Brazil	8	7	4	19
Indonesia	3	5	9	17
India	5	5	3	13
France	3	5	3	11
South Africa	4	0	1	5
TOTAL	48	40	37	127

Table 2: Sample of Transport Projects by Country and Modal Type

*The sample of Colombian transport projects also includes two Metrocable urban gondola lift systems in addition to the 15 BRT, rail, and highway projects.

The following sections explain the analysis of these projects and institutional capacity in

[1] https://www.itdp.org/the-brt-standard

these countries. Section 2 focuses on the way in which each of these projects was funded. The third section analyzes how they utilized debt finance. The fourth section examines several indicators of institutional capacity for developing and managing urban transit. The paper concludes with general recommendations for increasing investment in transit necessary for reaching the targets discussed at the end of this section.

1.2 Funding versus Financing

Project funding refers to the money that will be used to pay for a project's capital costs. Funders are divided into the following five categories:

1. Municipal funding
2. State or provincial funding
3. National government funding
4. Private sector funding (often backed by right to collect fares/user fees)
5. Other funding including different levels of government and quasi-public government-owned enterprises

For the purposes of this report, the funders of a project are considered to be those who had discretion in choosing to fund the project. For instance, if a city chose to fund a transit project using funds under its discretion, the city is considered the funder, even if the city's funds were originally from a national gas tax, because it was the city that had discretion over how to ultimately spend the funds. If a private sector funder provided up-front capital in exchange for the right to collect user fees in the future, which are the ultimate source of revenue, the private sector is considered the funder.

Each funder derives its funding from various sources. For instance, a municipality may be the project funder, and derive its budget from an amalgam of property taxes, other taxes, and may include transfers from other levels of government. Disaggregating the exact amounts of these funds proved to be impossible in many cases. For a private sector company funder of a project, the ultimate source of funding is generally user fees, government operating subsidies, or related business (property development on public land, for instance)—though this information is often kept private. Thus, the analysis rests with the funding source and provides further detail on the ultimate source of revenue where possible and where there are policy implications. Funding sources include not only the parties that make grants to projects but also parties that pay down the debts on loan-financed projects over time. Federal districts, which are the physical size of a city but legally considered states, such as Mexico City or Jakarta, Indonesia, are classified as state governments.

Financing refers to any debt finance that is used to pay for up-front capital costs. In other words, if a project costs $200 million, and a city pays $50 million in cash of its general budget and borrows $150 million from a commercial bank, the project is considered to be 75 percent debt financed by a commercial bank and 100 percent funded by the city (since the city ultimately pays the loan back). Data on financing was distributed into the following five sources of financing:

1. Bonds
2. National government loan (includes national development bank loans)
3. Multilateral development bank loans
4. Private commercial loan
5. Bilateral or export credit agency loans

Data were collected for each of these sources of financing because the terms and conditions for each of these types of financing vary.

2. Urban Transit Funding and Cost of Infrastructure

For a city to build enough rapid transit to meet its needs, it must have the funds to pay for it, and the more cost effectively it can meet these needs, the less funds it will need. Therefore, the availability of sufficient funds and the effective use of these funds are both critical to reaching the RTR target. Even if a city borrows money to pay for infrastructure, it will still need to have the funding in place to repay the loan. In many countries, more attention should be paid to understanding existing revenue streams and finding and securing new revenue streams in order to make transport funding more robust and reliable for improved long-term capital planning and increased investment.

In the analysis of the 127 transport projects in the nine countries, four aspects were critical to funding as it relates to annual RTR growth: the spending levels, the cost of infrastructure, the source of the funds, and the reliability of the revenue stream. Of those, the two factors that appear most associated with annual RTR growth were funding levels, as measured by annual spending per urban capita, and the cost of infrastructure, as measured by the cost per kilometer in millions of dollars.

The chart below lists the countries in order of observed annual RTR growth from highest to lowest along with funding indicators that include rapid transit spending per urban capita (an indicator of the rate of funding), the cost per kilometer of rapid transit (an indicator of cost-effectiveness), the lead funding source, and the reliability of funding sources.

Though each is important, neither high funding per capita nor low-cost infrastructure alone appear determinant of high RTR growth—it is the relationship of these two variables for any given country that ultimately determines its RTR growth. These are the two main levers for rapidly increasing RTR. To increase RTR growth, a country must either increase funding, decrease costs, or accomplish

	Annual RTR Growth: 2000-2014	Spending and Cost of Rapid Transit Infrastructure		Lead Funding Source	Reliability of Funding Sources
		Infrastructure Spending per Urban Capita	Cost of Infrastructure: Million USD per Kilometer of Transit		
France	0.80	$62	$50	City	High—revenue from national payroll tax
Colombia	0.49	$18	$26	National, City	Mixed—local fuel in conjunction with national grants
China	0.49	$46	$64	City	High—revenue from municipal land sales
Indonesia	0.44	$2	$4	National, State	Low
South Africa	0.26	$2	$6	National, State	Low
Mexico	0.26	$6	$15	State	Low
Brazil	0.18	$22	$66	City, State	Mixed sources
United States	0.16	$26	$82	National, State	Mixed— any local sources, national fuel tax unsustainable
India	0.07	$7	$45	National, State	Low

Table 3: RTR Annual Growth and Key Factors in Rapid Transit Infrastructure Funding

both. Even countries with high funding levels will have low infrastructure growth if they are investing only in costly infrastructure. Conversely, countries investing in very cost-effective infrastructure may still have low growth if funding levels are low. These two critical factors must be balanced to achieve high growth in RTR, and the data in this analysis has borne this out.

Two other key facets of funding that are important for growth in transport infrastructure that emerged from our data are the source of funding and its reliability over time. When the source of funding for a project is concentrated at a level of government that is at or near the city scale, there tends to be higher spending on rapid transit. This is perhaps because mayors are more in touch with urban needs and/or because increased political accountability within the impact area of a project incentivize ensuring a project benefits the community.

When revenue streams for transport funding are highly reliable, they create a stable environment in which authorities can make long-term capital funding plans and also build and maintain capacity. The three countries with the highest RTR growth have both municipal funding as one of the main sources of funding and their revenue streams are highly or moderately reliable.

2.1. Funding and Cost of Infrastructure: Key Determinants of RTR Growth

Cities and countries seeking to increase their RTR will have to carefully balance both funding levels and cost containment. Achieving sufficient funding levels will be the most important and perhaps most challenging aspect of meeting rapid transit infrastructure goals. But this analysis illustrates that funding levels alone do not determine RTR growth. High growth in RTR requires that funding must be high relative to the cost of the infrastructure that it is invested in. Funding levels and costs of infrastructure, however, must be balanced for the required level of growth desired.

Spending on rapid transit for each country was estimated by multiplying the average per kilometer project costs from the sample of projects financing database by the total kilometers of rapid transit used to calculate RTR. Per (urban) capita rapid transit spending was calculated by dividing the total rapid transit spending by the total population in cities greater than 500,000. In the data set, per urban capita spending varies widely among the countries—a testament not only to the variance in gross domestic product (GDP) of these countries but also to their priorities in national development.

The three countries with the lowest spending per capita—Indonesia, South Africa, and Mexico—are in the middle tier of countries achieving RTR growth. While France and China have the highest funding levels per capita and a share of GDP, the United States is third in spending per capita but is in the bottom tier of RTR growth. GDP per capita is also not a perfect predictor of annual spending per capita. The United States has the highest GDP per capita in the sample but spends only a fraction as much money per capita and as a percentage of GDP on rapid transit as China, which has a comparatively low GDP. China spent more per capita on rapid transit than South Africa,

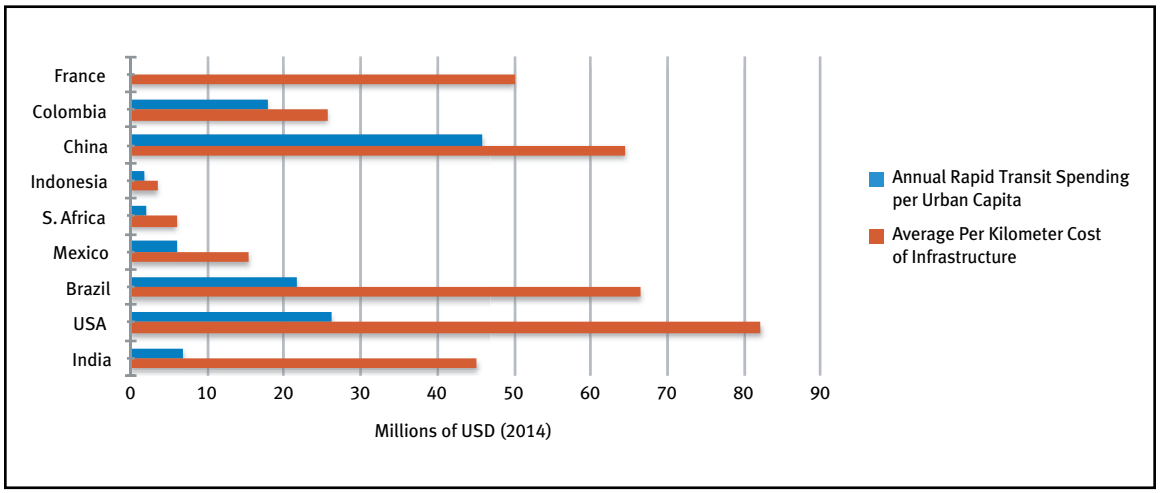


Figure 3: Comparison of Spending per Urban Capita and Infrastructure Costs per KM (2000-2014)

	Annual RTR Growth: 2000-2014	Spending: Annual Rapid Transit Spending per Urban Capita	Estimated Percentage of GDP Spent on Urban Transit	Cost of Infrastructure: Million USD per Kilometer of Transit
France	0.80	$62	0.054%	$50
Colombia	0.49	$18	0.078%	$26
China	0.49	$46	0.154%	$64
Indonesia	0.44	$2	0.003%	$4
South Africa	0.26	$2	0.006%	$6
Mexico	0.26	$6	0.020%	$15
Brazil	0.15	$22	0.071%	$66
United States	0.16	$26	0.030%	$82
India	0.07	$7	0.028%	$45

Table 4: RTR Annual Growth and Key Indicators of Rapid Transit Infrastructure Spending

Mexico, Colombia, and Brazil despite having a similar or lower GDP per capita. Colombia has a lower GDP per capita than Mexico, but spent triple the per capita rate of Mexico on rapid transit. The chart below shows the variance in spending and costs among countries and also the differences among costs and spending levels in each country. The countries with the highest RTR growth are those where per capita spending on transit is highest in relation to the average cost per kilometer.

The cost (per kilometer) of rapid transit investments has almost the same wide variance as the amount spent per capita. This is due to variance in the cost of materials and labor in different countries as well as variance in the types of construction costs included in the estimates. Researchers attempted to limit cost estimates to only transit-specific infrastructure and vehicles, but in some cases details as to which infrastructure features were included in cost estimates were difficult to find. Two of the countries that spent the most per kilometer, France and China, still managed to be in the top tier of RTR growth, because their per capita funding levels were commensurately high. The other two countries that spent the most, Brazil and the United States, are conversely found in the bottom tier group. And similarly to per capita spending, the countries that spent the least per kilometer are in the middle tier of RTR growth.

Indonesia and South Africa built rapid transit as cheaply as $4 million USD per kilometer on average while it costs twenty times as much in the United States. While some of

	Cost of Infrastructure: Million USD per Kilometer of Transit	Percentage of Kilometers Built as BRT	Percentage of Kilometers Built as LRT	Percentage of Kilometers Built as Metro
France	$50	11%	70%	19%
Colombia	$26	94%	0%	6%
China	$64	17%	5%	78%
Indonesia	$4	100%	0%	0%
South Africa	$6	100%	0%	0%
Mexico	$15	88%	3%	8%
Brazil	$66	69%	1%	30%
United States	$82	8%	84%	9%
India	$45	26%	0%	74%

Table 5: Average Cost of All Rapid Transit Infrastructure and Percent of Kilometers Built by Mode 2000-2015

the variance comes from the difference in the cost of materials and labor in these countries, it is by and large due to the type of rapid transit invested in: metro, light-rail transit (LRT), and BRT each carry very different price tags (note South Africa's recent investments in inter-city commuter rail did not count as urban rapid transit for this study). As the table below indicates, the lowest average cost per kilometer comes from countries that invest more in BRT. Indonesia had the lowest per kilometer spending because it invested in mainly basic and bronze BRT systems. The highest costs come from developed countries investing in costly LRT and developing countries building metros. Brazil is an outlier as many of the BRT projects included expensive infrastructure investments such as tunnels and bridges.

It is only when evaluating RTR growth through the prism of both annual spending per capita and cost of infrastructure that a relationship becomes clear. Colombia achieved the same growth in rapid transit infrastructure as China but spent less than half in both its per capita expenditure and its cost per kilometer. The middle tier countries all achieved moderate rates of growth even though their spending per capita was the lowest, because all three spent the least per kilometer. Brazil and the United States spent relatively more per kilometer and moderately more per capita, but only achieved low growth in their RTR. India spent moderately more per kilometer but spent relatively little per capita and because of that achieved the lowest growth in the group. The comparisons here can be helpful for diagnosing how a country can raise its RTR—understanding when more money must be raised and when the investments being made must be reviewed for cost-effectiveness.

2.2. The Institutional Source of Funding for Rapid Transit Infrastructure

The source of funding for rapid transport infrastructure shapes a great deal about the nature of infrastructure development in a country as the funding source generally makes the decisions regarding which projects will be built. In analyzing the funding details of 127 transport projects, five main sources of funding were found:

1. National government
2. State government
3. City/metropolitan governments or transport authorities
4. Government-owned entities
5. Private sector

The chart above shows the average percentage of total project cost contributed by each funding source for all projects in the sample to illustrate the role played by different funders on an average project in each country. This illustrates the way funding is sourced on average for projects of different costs. The chart below shows the amount of funding contributed by each source as a percent of the

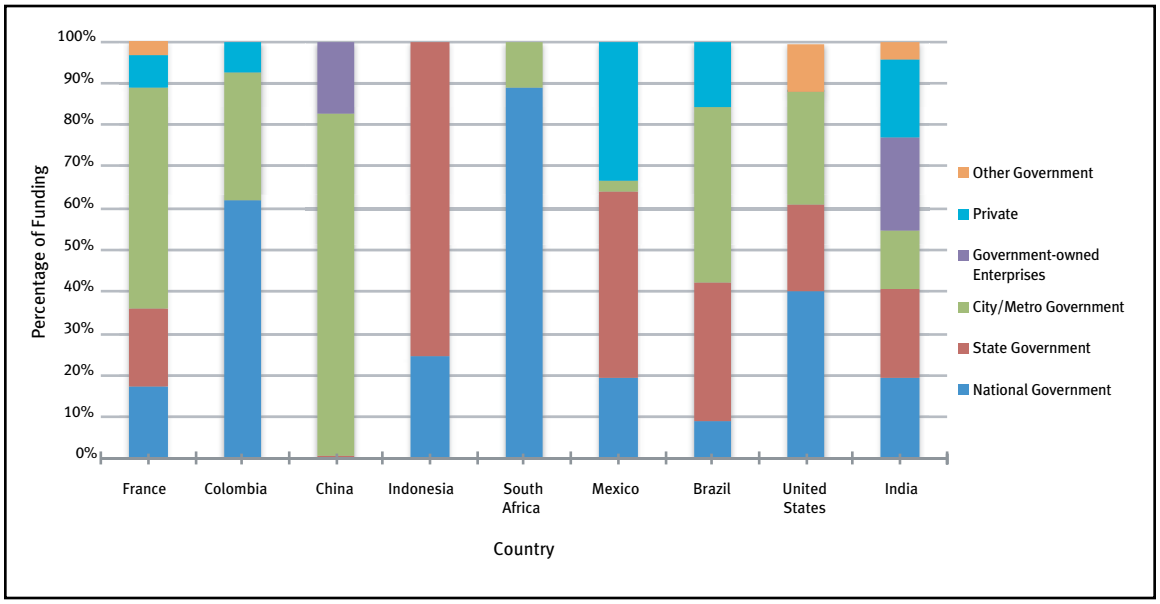


Figure 2: Sources of Mass Rapid Transit Funding (as an average percent of total project cost)

total investment amount for that country, to illustrate the scale of investment by different sources. For most countries the difference between these two charts is small, but in Brazil there are large differences in the amount invested by the city and the state reflecting the city often funding low-cost BRTs and the state funding high-cost metros. In terms of overall funding source mixes, there was wide variation in funding for different countries, though some patterns appeared: Countries with highly fragmented funding sources had lower RTR growth, perhaps because no single political entity could clearly benefit from taking the lead on a rapid transit project. Also, all countries with high RTR had a large portion of funding that came from the city.

Funding sources in this case refer to the level of government that has ultimate spending discretion to choose a project and takes responsibility for paying for the given portion of the total project cost whether paid up front in cash or over time with debt finance. If taxes are collected by a national government and the revenue is passed on to a city or metropolitan government to use at the discretion of the city, then the funding source is considered "city." For example, France collects a national employer tax to support transit that is distributed to the cities to use on transport projects at a particular city's discretion, thus the source of funding is considered to be the city.

If on the other hand the source of funds is a specific national fund earmarked for urban transportation and the national government selects projects to receive the funding, then the source of funds is considered to be national. For example, Colombia's national government developed a program for supporting BRT projects and although the grant money went through the cities, cities were required to spend it on BRT approved by the national government. Thus, the source of those funds is considered national. If the funds are invested by a private company or a government-owned enterprise (GOE), they are marked as such. Such investments of private companies or GOEs are usually made by borrowing money against the expectation of future public funds in the form of user fees and/or fees from concession contracts paid by the government.

While urban transit has many effects at a national scale, especially in terms of the economy and the environment, its largest effects are on the populations of cities/metro areas, and directly elected city/metro leaders are the most politically accountable for addressing them. However, the ability of municipal and state governments to fund rapid transit infrastructure on their own varies considerably by country and reflects the wide differences in institutional structures and revenue-raising powers among countries. When cities do not have the revenue-raising power and/or capacity to fund urban transit infrastructure, the state or national government—entities with lower political accountability to city residents—often step in.

When the impact zone of a given project or policy corresponds with the electoral territory of that level of government, political accountability for the success of the transportation system would be maximized and one would expect a higher political incentive for successful projects. According to that theory, the best level of government to plan and fund urban transport is that which is most closely aligned with the impact zone of the projects under its control—generally a city or metropolitan government or transit authority. As UN-Habitat points out:

> An important trend in municipal finance is fiscal decentralization which has meant the transfer of financial responsibility from central governments to local governments forcing local governments to deliver and fund an increasing number of services. -(Municipal Guide to Finance: UN Habitat, Nairobi: 2009, p. 14)

The results of this analysis bear out this theory: The three countries with the highest RTR growth are also the three countries with the highest proportions of city-sourced funding for transit projects. Urban transit projects in France and China are majority funded from the city/metropolitan level and in Colombia are nearly half funded by the city. In this sample, when cities have significant power to raise and control funds for urban transport, they seem to have higher RTR growth. City funding, however, does not appear sufficient to explain the growth. Brazil also received a significant portion of its transit funding from cities, but its RTR growth has, until recently, been low.

When municipalities lack the capacity to fund at a level sufficient to meet the urban transit needs, state/provincial or national

authorities may need to step in to meet the funding gap until that capacity can be built. In Indonesia, South Africa, India, and Mexico, which have low RTR, the state or national governments have stepped in to help fund some rapid transit. While this is clearly helpful in terms of improving the RTR in the short term, there may also be resistance to ceding control to municipal governments, which in the long run becomes counterproductive. As it will take time to build the capacity to plan and implement projects at the local level, it is best if state or national governments channel as much of the funding through municipal administrations as they can reasonably handle, while also helping build their capacity to plan and implement the needed investments and infrastructure in other ways. So long as state or national governments remain in control of the project selection process, careful policies must be crafted to ensure that the right projects are funded, that the cities build capacity as the investments go on, and that concurrent structural reforms are in place such that cities will have access to sufficient revenue in the future to take leadership in their own transportation investment, implementation, and governance.

Another dimension of funding sources that may affect RTR growth is the number of significant funders of rapid transit in a country. Countries that have just one to three dominant sources of funding achieved higher RTR growth than countries that relied on four or more sources of funding for more than 10 percent of the average project's cost. This may be because when funding responsibility is so diffuse across multiple parties, there is a lack of a central body to lead coordination of the investments. In the United States, for instance, where mayors have limited influence over urban mass transit, mayoral elections rarely hinge on transportation issues despite their general importance to the electorate.

Private sector funding for rapid transit played significant roles in Mexico (33%), India (18%), and Brazil (15%). In many cases, the private sector provides the up-front capital for the transit project initially, and those costs are recovered as the public pays for it through user fees and/or any government concession contracts. BRT projects typically have higher cost recovery from user fees and often cover the costs of bus procurement from private sector operating concessionaires.

Funding Sources by Country

France has four levels of government: national, regional, department, and municipal. The "department" tends to cover the metropolitan regions of large cities and has been coded as "city/metropolitan." In France, 53 percent of project funding for transit projects came from city and metropolitan regional governments (departments). Eighty percent of France's funding for urban rail projects came from city governments, while BRT projects were split among city, state, and national governments with about 30 percent of project funding from each.

The majority of funds in Colombia for transit projects came almost evenly from two sources: municipalities, which raised 48 percent of total rapid transit investment funds, and the national government, which raised 45 percent of total funds, on average. State-level government is not significant in rapid transit funding. In Bogotá, Colombia, for Phase 1 of the TransMilenio BRT, the municipality carried the majority of rapid transit investment responsibility, but in subsequent phases of TransMilenio, the national government has been a significant source of funding. Outside of Bogotá, municipalities needed the help of the national government to make rapid transit investments. Existing and forthcoming rail and cable car projects received majority support from city sources, while BRT received majority support from the national level due to a national policy to support BRT development.

China's municipalities raised 81 percent of the total rapid transit funds, with another 7 percent of average project funding coming from government-owned entities under their control. Rail projects in China received 85 percent of their funding from municipal governments. BRT projects in China get funding almost exclusively from the city (78%) with 14 percent coming from GOEs, mostly municipally owned bus operators.

In Indonesia, state governments have traditionally dominated the funding of urban transit infrastructure mainly because all but one of the eight total rapid transit projects are located in the capital city, Jakarta, and funded by DKI Jakarta, a state-level federal district that governs only metro Jakarta. Jakarta DKI has fully funded all previous rapid transit projects in Jakarta except for the forthcoming Jakarta metro project, which will be 49 percent funded

by the national government (the first project funded by Indonesia's government).

South Africa was the only country where the national government played the majority role in funding rapid transit with 89 percent of funding coming from a national earmark. No rail projects in South Africa were considered for this sample as none of the commuter rail projects there qualified as urban rail. The national government does control the commuter rail, but did not make significant investments during this analysis. The Gautrain, led by Gauteng Province, was the only significant rail investment during the analysis, but because the distance between stations was greater than five kilometers—the defining characteristic to be considered urban rail—it was not included in the study.

In Mexico, the largest share of funding (45% of the average rapid transit project) comes from the state, followed by the private sector (33%), the national government (19%), and just 3 percent from the city. Mexican cities rely heavily on state- and national-level government support for rapid transit as they are too weak financially to fund infrastructure projects. One special case is the Federal District of Mexico City, which is technically a state-level government with far more funds than a typical city government in Mexico. BRTs and rail projects were funded by similar means with the exception that BRTs drew more private sector funding (38%) than rail (29%). This is largely due to the fact that Protram, the national program that also funded many of these projects, required all projects that it funds to have a 35 percent share of the project's total cost from the private sector. Some experts in Mexico believe that this 33 percent private investment is not sustainable and many of these investments will ultimately have to be taken on by the government.

In Brazil, overall funding for urban transit is led by the city (45% of transit project funding on average) but still dependent upon the state for one-third of each project's funding on average. Funding roles in Brazil, however, are mode-specific. The city leads funding for BRTs averaging 76 percent of project funding while the state leads funding for rail projects averaging 62 percent of project costs. Just two projects were funded by the national government for an average in this sample of 9 percent of each project's funding. The private sector also funds urban transit with an average funding of 16 percent—usually covering the cost of a transit project's fleet through an operations concession.

In the United States, the national government leads funding for urban transit (an average of 45% per project) due to a series of

Relationship to Urban Highway Funding and Growth in RTR

While the analysis is focusing solely on mass transit, data on thirty urban highway projects in the nine countries was collected. One significant observation was that high RTR growth was negatively associated with large national and state investments in urban highway funding and the improvement in the RTR score—or the more states and national governments funded urban highways, the lower the country's RTR score. In the three countries (France, Colombia, China) that performed the best in improving their RTR score, there was no national or state funding of urban highways. China is building more urban highways than anywhere else in the world and this construction is city-driven.

Urban highway funding should come from user fees. Urban highways that are funded by user fees have proved viable around the world, and in some countries the level of cost recovery from users is 100 percent or more (as is the case in Mexico where surplus highway tolls were used to fund transit investments). User-funded highways ensure that only the private vehicle owners whose cars and trucks ply the highway pay for the infrastructure instead of the wider public, much of which may not own a vehicle. Most important, user-funded highway investments better ensure that only highways likely to be heavily used are built, avoiding the sort of white elephants that divert scarce public capital that could be used for rapid transit which is available to anyone and has much lower costs, decreases air pollution, is safer, and has positive health impacts. User fees also work to better manage travel demand by internalizing the cost of operating that mode.

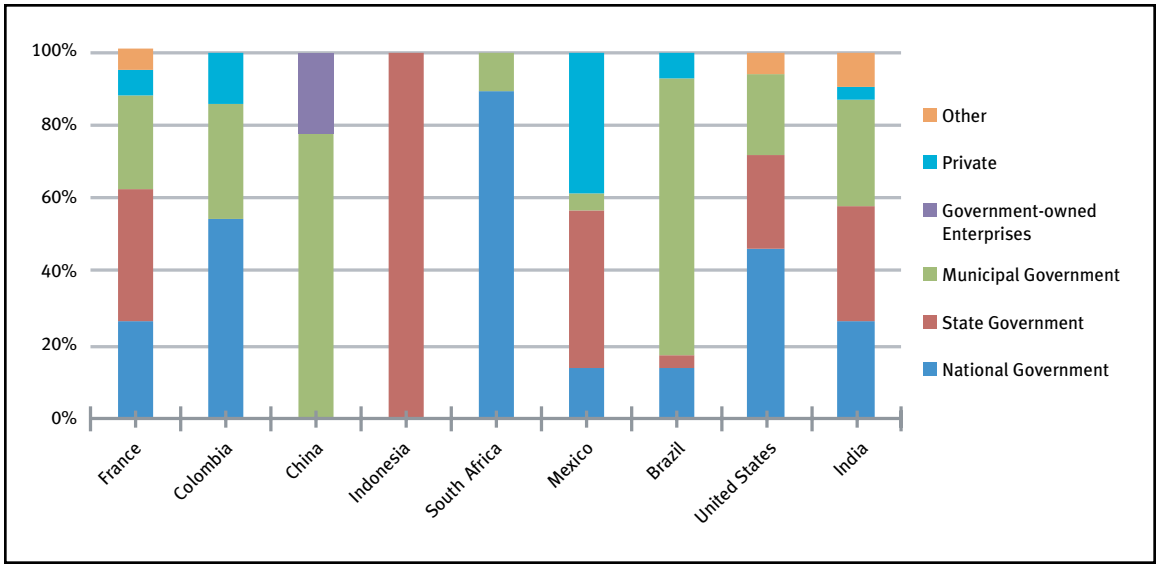


Figure 5: BRT Project Funding

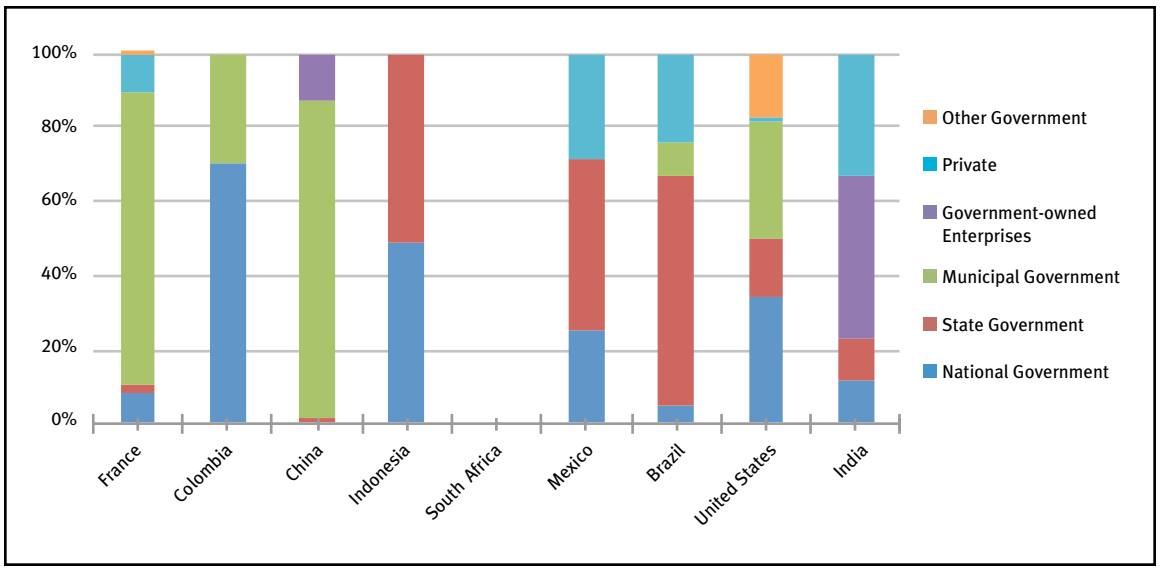


Figure 6: Urban Rail Project Funding

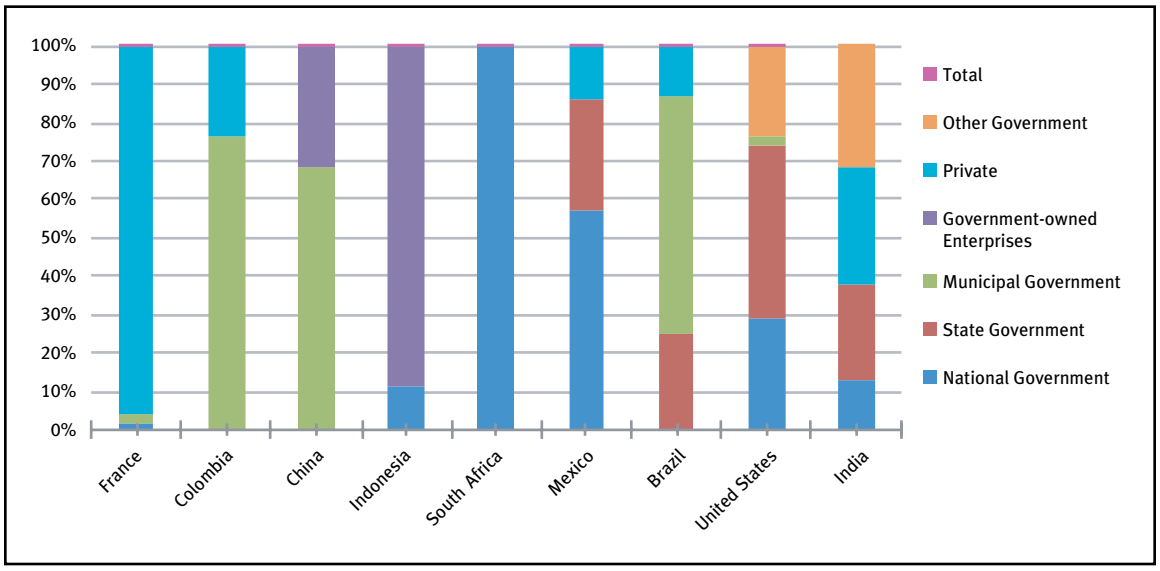


Figure 7: Urban Highway Funding

grant programs that the national government has made available to cities to catalyze transit projects with partial funding (similar to Colombia). The remainder of funding comes from a split between states (21%), cities (19%), and other levels of government such as counties and special or regional transport authorities (15%). The level of support from the national government on average is the same for both rail and BRT.

This funding snapshot of the United States appears to be changing as the role of national government is declining along with the revenues brought in by the national gasoline tax and a lack of a political consensus at the national level raise the tax and invest in urban rapid transit. A growing number of states and cities are finding new revenue streams by increasing state gas taxes and passing voter-approved sales taxes to fund rapid transit infrastructure.

India's transport funding structure is the most fragmented between five similarly sized funding sources: the national government contributes an average of 19 percent of rapid transit project funds, the state 22 percent, GOEs 22 percent, the private sector 1 percent, and city government just 14 percent. This creates a system where cities have the smallest stake in funding their infrastructure. States tend to play the largest coordinating role, but with such diverse funding sources, funding responsibilities and project coordinating roles are very diluted. Indian cities in this sample did not fund rail projects, where GOEs controlled by state governments played a larger role as they can more easily attract debt finance.

2.3. The Reliability of Funding

Growing the transport infrastructure of a city is a long-term process that requires dedicated revenue streams that are relatively stable and predictable over the long term. These ensure that a city has the financial and institutional capacity necessary to plan, implement, and maintain infrastructure projects. However, many transportation authorities have funding sources that are not reliable—funds from one-off programs, single-project grants, or are subject to regular political discretion meaning that long-range financial planning is difficult or impossible. Successful transportation authorities not only need long-range transportation planning processes to project, shape, and respond to a population's transportation demands in a region, but they need long-range capital plans that project and plan the revenues, budgets, and financial strategies necessary to accomplish the planned infrastructure. Long-range capital plans are only useful and effective when revenue and budgets for infrastructure development are relatively stable and reliable and come from dedicated revenues sources such as (inflation-pegged) fuel taxes, sales taxes, long-range federal and/or state infrastructure spending programs, and so forth.

Without reliable funding, transport authorities cannot make effective long-range infrastructure plans because budget capacity is not known. This often happens when cities depend on states and national governments for infrastructure funds from grant programs that are limited in time or scope—or subject to political changes. Under these circumstances, cities oftentimes have to ramp up capacity and develop plans very quickly as soon as funding becomes available and then when the grant period is over, much of the staff and capacity is lost. Under a regime like this, capacity is constantly ramping up, tapering off, and then restarting from scratch with each successive funding cycle. Reliable transportation funding allows a constant level of funding while staff, planning, and institutions continue to build experience, expertise, and capacity over time.

Based on the data collected for this analysis, the reliability of funding appears associated with higher RTR growth. The fastest RTR growth has been achieved in the top three countries where funding is either highly or somewhat reliable. The remaining countries did not have reliable funding sources.

In France, the national government collects an urban mobility tax on employers and channels it to departments and cities for them to use on transport largely at their own discretion, also ensuring that urban areas have the funds they need to develop high RTR values and growth.

Colombia is an example of a country where the national government stepped in with a program to cover a significant funding gap due to weak revenue raising and potentially weak institutional capacity of some municipal governments. Cities have the ability to raise fuel taxes to fund public transport projects, which gave them reliable revenue streams

	Annual RTR Growth: 2000 - 2014	Reliability of Funding Sources
France	0.80	High—Revenue from National Payroll Tax
Colombia	0.49	Mixed—Local fuel in conjunction with national grants
China	0.49	High—Revenue from municipal land sales
Indonesia	0.44	Low
South Africa	0.26	Low
Mexico	0.26	Low
Brazil	0.18	Mixed Sources
USA	0.16	Mixed—Many local sources, national fuel tax unsustainable
India	0.07	Low

Table 6: Annual RTR Growth and Funding Reliability

for their significant contribution. Since the year 2000, Colombia has had reliable funding from the national government and from cities. However, Colombia is rated as mixed reliability for funding because it remains to be seen if the national government will continue its grant program for rapid transit—a significant part of transit funding in Colombia.

China's municipal finances are unique and reflect the lack of property tax there. Its cities raise revenue primarily through the sale of land and development rights, which has funded high per capita spending and high RTR growth over the past decade. Most of the urban infrastructure in China is funded by the annexation of peripheral rural and suburban land by cities. The land is then rezoned for urban uses, improved, and then let on long-term lease to real estate developers. These off-budget municipal revenues are responsible for more than half of municipal transit investment revenue. Otherwise, transit investments are funded primarily by corporate income taxes and a variety of vehicle licensing fees and other fees. For the near term at least, and barring any crash in urban land value, this is a reliable source of revenue for rapid transit development in Chinese cities, although it can be problematic when poor planning of these areas causes urban sprawl.

In Indonesia, funding for urban transport comes from provincial-level vehicle registration fees, provincial-level VAT, and national-government VAT, much of which comes from oil and other extractive industries. The recent decision of Indonesia to remove oil subsidies should make more national funding available for urban transit investment. Municipalities outside of Jakarta need to bolster their ability to collect revenue locally.

In South Africa, the national government collects fuel taxes, though the revenue is not earmarked for urban transit or urban transport, it is roughly similar to annual spending on urban transportation, with roughly one-third going to subsidize the national highway program's deficits, and the remaining two-thirds being spent on urban transit.[2] Other sources of municipal revenue must be developed to increase the capacity of municipal government to fund urban transit infrastructure as it gradually assumes its legal authority to manage urban transportation.

In Mexico, the funding is not highly reliable, especially outside of Mexico City. Since Mexico City is a Federal District with powers similar to those of a state and since the country's economic activity is concentrated there, the state VAT tax receipts are sufficient to pay for a significant share of the city's infrastructure needs. Outside of Mexico City, cities and states struggle to fund infrastructure needs. Mexico's municipalities and states are dependent on national government transfer bylaws that discourage and restrict state and municipal revenue-raising capacity. Outside of Mexico City, states depend heavily on the formula-based distribution of national government funds, many of which

[2] Assessment of public transport in South African cities Philip van Ryneveld, April 2010, for the Institute of Transportation and Development Policy.

come from the sale of oil by Pemex, the former state oil company. In addition, many of the rapid transit projects reviewed here were funded by Protram, the revenues for which come from tolls on intercity highways controlled by the national government.

The reliability of funding streams in Brazil is low as there are no fully dedicated funding streams for transit infrastructure. State budgets in Brazil are heavily dependent on the Brazilian equivalent of a value added tax, and municipal government budgets are also heavily dependent on taxes on services. Brazil's fuel tax has just been reactivated, but the funds are not specifically reserved only for transport funding.[3] Since 2010, Brazil's growth in RTR has been driven by economic stimulus packages from the national government. Before that, Brazil's RTR growth had been stagnant for more than two decades, and there is a concern that if the stimulus packages stop, so will investment in transit.

In the United States, a significant portion of urban transit investment has been funded out of the nationally collected gasoline tax since 1970. A fixed percentage of this was earmarked for transit, creating a reasonably stable funding stream. However, the gas tax was never pegged to inflation and declining revenues have threatened to bankrupt the national transportation fund. Increasingly, state governments are turning to earmarked taxes collected at the state level to fund urban transit while cities are passing voter-approved taxes (often sales taxes) to fund urban transport. In California, revenues from carbon trading programs also help fund sustainable transport projects under State Assembly Bill AB 32 and State Senate Bill SB 375.

2.4. Summary of Findings on Funding for Urban Transport

Virtually every country in the world must undergo a radical shift in the way it provides and facilitates mobility in the next decade to ensure that its cities have a sustainable future and the world can avoid catastrophic climate change. Most countries must make significant changes to the way they fund urban transport to grow their rapid transit infrastructure along with other investments in non-motorized transport and transport demand management. This sheds light on certain aspects of how countries must reconsider the way in which such infrastructure is funded, the amount of funding per capita, the source of that funding, its reliability, and the cost of infrastructure that it funds.

Many factors determine a country's ability to grow its urban transit infrastructure but none are as critical as the nature of its funding. Just as the growth of RTR varies highly country by country, so do the critical aspects of funding: the amount of funding per capita, cost-effectiveness of its investment, the sources of funding, and its reliability. The above research and analysis support the following conclusions about how transit funding policy can best ensure that countries and cities can meet the ambitious transit development goals needed to ensure competitiveness, quality of life, environmental quality, and stave off climate change:

1. **Funding levels and costs per kilometer of rapid transit must be aligned for RTR growth.** RTR is a direct outcome of the amount of funding per capita and the cost of infrastructure per kilometer. The higher the funding and the lower the costs per kilometer, the higher a country's RTR. Countries can achieve high RTR goals with relatively low investment only if the cost per kilometer of rapid transit is very low. This does not mean building low-quality transit, but instead ensuring the cost-effectiveness of quality transit.

[3] CIDE (contribution of intervention in the economic domain), is a tax levied on some specific products in Brazil, including importation and commercialization of oil, natural gas, and others fuels in the internal market. CIDE's revenue is designated to fund environmental projects, transport infrastructure, and payments of subsidies for fuels prices and transportation. Currently, 71 percent of this revenue goes to the federal government's budget, while 21.75 percent goes to state governments, and 7.25 percent goes to cities. In order to improve CIDE's benefits to the society and increase the amount of resources used in transport infrastructure projects, Brazil could consider transferring a larger part of the resources collected through CIDE directly to city governments for use in sustainable transport.

2. **Cities should be empowered with the financial and institutional capacity to make urban transit investments.** City or metropolitan governments are the most directly politically accountable to users for quality mobility and accessibility. When cities have been in control of the funds, our analysis shows higher RTR growth (more rapid transit), built at a lower cost per kilometer.

3. **Funding for urban transit infrastructure must be reliable—characterized by predictable, long-term revenue flows from dedicated sources.** Without reliable funding, transport authorities cannot make highly effective long-range infrastructure plans because budgets and spending capacity are not known in advance.

4. **Cities should build high-quality, cost-effective rapid transit.** Cities that built more BRT than urban rail paid less per kilometer of rapid transit, and their BRT systems had higher quality ratings on the BRT Standard. This could be because cities' capacity to implement high-quality BRT improves as they build more of it and/or because low-quality designs have lower impact and are less likely to be replicated.

5. **When cities do not have the financial and institutional capacity necessary to implement rapid transit, the state or national government should step in.** Higher government authorities and the private sector are often needed to intervene to support rapid transit in the short term. However, RTR improves the most over the long term when national and state governments build the capacity of local governments to plan, fund, and finance rapid transit.

6. **Public funds should be used for rapid transit; urban highway funding should come from user fees.** User-funded highways have proved viable in developed and developing countries alike and ensure that only the private vehicle owners who benefit from urban highways pay for their cost. Most important, this ensures that scarce public investments are not diverted from public rapid transit.

3. Financing Urban Transit

Urban transit infrastructure requires large, up-front capital investments while its social and financial returns generally accumulate slowly over a long period. Because of the high amount of capital required initially, the long-term accumulation of returns, and because funding is often limited within government budgets—such investments are generally best financed in large part through long-term debt so that the cost of the infrastructure can be paid off as its returns accrue. Debt finance is especially important for developing countries where capital is limited and development needs are great. Further, debt finance also ensures that the population benefiting from the project will be the population that is paying off the project over time. Projects paid for in cash use money accumulated through taxes in the past to pay for infrastructure that has a future benefit. Additionally, many debt-financed projects often undergo significantly more review and vetting resulting in higher project quality, because lenders, as a third party, have a strong incentive to critically evaluate a project's risk of failure to ensure that the investment is a good one and that the loan will be repaid. In order to meet transit expansion and RTR targets, even wealthy countries make use of debt finance to amortize the cost of such infrastructure.

In this section, financing refers to any debt finance on a project such as a loan or bond. Funders use debt financing to borrow money for a project's up-front capital cost, allowing the funders to pay the debt back in small installments with interest over a longer term. It is important to remember that commercial, national, and development banks generally provide loans to projects but rarely actually fund projects. Banks provide loans to a project's funder, who then pays them off over time. Debt finance is critical for governments to leverage limited capital for much larger projects, but revenue streams for project funding must be sufficient to make the loan payments over time (thus this paper's primary focus on funding of projects). Rapid transit development and investment is constrained in many countries that have low or costly access to debt finance due to poor debt ratings, high interest rates, limited capacity in structuring financing arrangements, corruption, and/or laws that impose limits on debt levels for cities and states.

This section draws upon the debt-finance data collected from ITDP's sample of 123 urban transit projects to first analyze the extent of countries' use of debt for urban transport infrastructure using an average level of debt finance for each country. This is followed by a discussion of each of the five main sources of debt for transportation infrastructure in all countries—bonds, national development banks, multilateral development banks, commercial banks, and bilateral lending (including export credit agencies).

3.1. Responsible Borrowing and Credit Worthiness

Debt is a necessary tool to reach transit expansion targets, but should not be undertaken lightly. There are circumstances when a country must be wary of increasing its debt. Irresponsible borrowing for poor projects that do not generate expected returns can snowball into a sovereign, sub-sovereign, and currency debt crisis—of which there have been several since 1980—that can set back an economy for a decade. Subnational debt, the sort that finances most urban rapid transit infrastructure, is responsible for about one-third of Brazil's sovereign debt, about 27 percent of India's sovereign debt, and about 25 percent of government-guaranteed debt in Mexico.[4]

[4] Canuto, O. and Liu, L. 2010. "Subnational Debt- Make it Sustainable" World Bank .(http://siteresources.worldbank.org/EXTPREMNET/Resources/C13TDAT_219-238.pdf); Guigale, Trillo, and Oliveira (http://www.frpii.org/english/Portals/0/Library/Inter-Governmental/Subnational%20Borrowing%20and%20Debt%20Management.pdf).

Before a country takes on significant new sub-sovereign debt, the current debt levels must be sustainable, and procedures should be in place to make sure only good projects are funded and will make a return equivalent to the cost of capital in that country. While the field of sovereign and sub-sovereign risk analysis is complex, some key indicators were compiled for each of the nine countries studied to get a general idea of their readiness to absorb more debt. The table below considers their growth rates (IMF), their credit risk (Standard & Poor's), the real interest rate in the country (World Bank), and their current debt service or level of foreign indebtedness (World Bank).

Countries that are growing faster tend to be able to absorb debt better than those growing slower, as there is a greater chance the loan will be repaid. Growth rates greater than 5 percent in 2014, as in China (7.4%), Indonesia (5.0%), and India (7.4%), are high enough to support more borrowing.

The baseline cost of capital in each country, the nominal interest rate, was assessed in real terms, and listed in nominal terms for purposes of comparison between different sources of financing later in this section. Very low interest rates—as in those less than 5 percent—are also conducive to increased borrowing, whereas very high interest rates, such as in Indonesia, are less conducive to increased borrowing.

Standard & Poor's and Moody's both rate a country's debt as a credit risk. The higher the rating, the lower the risk of the country borrowing more money, and the lower the cost of international capital to that country. These agencies weigh many factors when considering a country's level of risk to an investor. The higher the risk, the harder and more expensive it is to borrow money, decreasing levels of debt finance.

The debt service ratio shows the percentage of debt payments as a share of total export earnings, and is an indication of a country's ability to borrow from international sources and especially important for developing countries that rely on international debt for exposure to currency crisis. The United States and France do not have values as they rely on domestic financing. Less than 5 percent is not problematic; more than 15 percent is considered very high.

On a project-by-project basis, there must be a revenue stream that can be relied upon to make the payments against the loan. Lenders and borrowers should critically examine the risk of any project before taking out debt

Country[5]	Real Interest Rate 2013[6]	Nominal Interest Rate	S & P Sovereign Rating	Debt Service
France	2%*	4%	AA	-
Colombia	9.30%	11.00%	BBB	14.50%
China	4.20%	6.00%	AA-	1.50%
Indonesia	7.00%	11.70%	BB+	19.40%
South Africa	2.50%	8.50%	BBB-	8.30%
Mexico	2.20%	4.20%	BBB+	10.30%
Brazil	18.40%	27.40%	BBB-	28.60%
United States	1.70%	3.30%	AA+	-
India	3.20%	10.30%	BBB-	8.60%

Tabe 7: Key Factors Affecting Debt-Finance

[4] Canuto, O. and Liu, L. 2010. "Subnational Debt- Make it Sustainable" World Bank .(http://siteresources.worldbank.org/EXTPREMNET/Resources/C13TDAT_219-238.pdf); Guigale, Trillo, and Oliveira (http://www.frpii.org/english/Portals/0/Library/Inter-Governmental/Subnational%20Borrowing%20and%20Debt%20Management.pdf).

[5] Sources: IMF (GDP Growth), Standard & Poor's (Rating), World Bank (Debt Service, Real Interest Rate) http://data.worldbank.org/indicator/DT.TDS.DECT.EX.ZS/countries http://data.worldbank.org/indicator/FR.INR.RINR

[6] The real rate is the nominal rate minus inflation. In the case of a loan, it is this real interest that the lender receives as income.

finance. Projects should be evaluated for the user demand, revenue generation, quality of design, durability of infrastructure, costs of maintenance and operation, and any other risk to expected project returns—be they financial or social. For most transit projects, fare revenue will not suffice to pay for the entire project cost and many cities and states lack the fiscal ability to take on debt due to inability to develop sufficient revenue streams—which underscores the importance of funding from the last section.

3.2. Comparative Average Levels of Debt Finance

One simple and helpful indicator for understanding how well countries are accessing and using debt to leverage transportation is the level of debt finance used to finance transit projects. All other things being equal, a well-designed project backed by reliable revenue sources and with a reasonable projected rate of return should qualify for a debt to equity ratio of about 70:30. For example, if a total investment is $100 million, $30 million would be a direct cash investment from the funder, while the other $70 million would be debt financed and paid from a bank loan or the proceeds of a bond sale, both of which will need to be repaid in the future, generally through fare revenues and/or other sources. The advantages of this for reaching RTR targets are clear: a city with just $30 million in its coffers can build $100 million in infrastructure. Yet the portion of a project's total cost that is financed with debt for any given single project varies widely—often from zero to 80 percent even among similar projects in the same city. Many factors affect this variation—including the quality of a project, the creditworthiness of its funding source, the availability of cash grants to offset debt needs, and the general accessibility of debt-finance instruments. ITDP used its data set of 123 urban transit projects to develop the average per project levels of debt finance for each of the countries analyzed in this paper.

Typically, one expects local transit authorities and/or private sector funders to finance approximately 70 percent of a project by debt. Average per project levels of debt finance show that all nine countries analyzed here are paying for at least 50 percent of their rapid transit infrastructure in cash. This lower than expected average results from different causes in different countries. In countries like France, the United States, India, Brazil, and Mexico, the national government offers large grants to some transit projects, which lowers the borrowing needs on the part of localities, which will oftentimes then use debt finance for only 70 percent or so of the remaining portion of infrastructure cost after the grant, though this may be lower in developing countries. In other countries, like Indonesia, the availability of more capital funds than can be spent under current government anticorruption protocols, and reluctance to use international competitive bidding limit borrowing.

Colombia had the highest level of debt finance at 69 percent, which is a rather optimal level of average debt finance for a middle-income or developing country. This is partially due to a complicated system of national borrowing from multilateral development

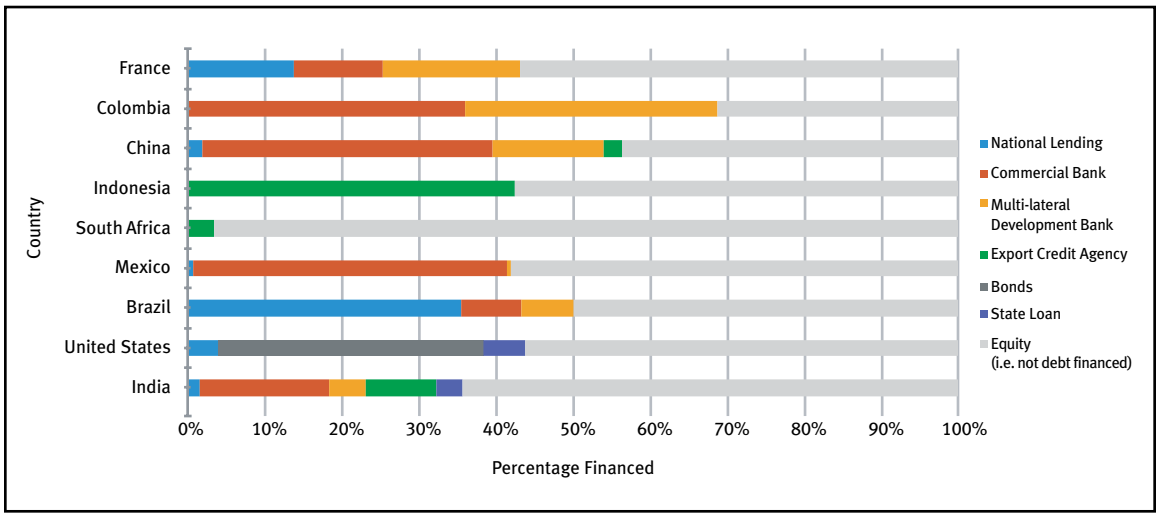


Figure D: Rapid Transit Debt Finance By Country and Source

	RTR Growth: Annual Kilometer of Mass Transit Added per 1 Million Residents, 2000-2014	1. Funding: Annual Rapid Transit Spending per Urban Capita	3. Financing: Average Level of Debt Finance on Rapid Transit
France	0.80	$62	43%
Colombia	0.49	$18	69%
China	0.49	$46	56%
Indonesia	0.44	$2	43%
South Africa	0.26	$2	3%
Mexico	0.26	$6	42%
Brazil	0.18	$22	50%
United States	0.16	$26	44%
India	0.07	$7	36%

Table 8: Average Annual RTR Growth, Spending, and Debt-Finance Levels 2000-2014

banks, which allows the national government to then make annual transfers to cities, which again borrow against such transfers to finance large transit infrastructure projects. Since the sample here had relatively low levels of debt finance for total project investment costs, there did not appear to be a very clear relationship between debt finance levels and higher RTR growth. This is at least partially due to the fact that while debt finance may increase funding, countries may still spend that funding on more costly infrastructure, reducing RTR growth, among other factors. One relationship that was observed, however, was that per urban capita spending was higher in countries that also had higher levels of average debt finance, underscoring debt finance's contribution to increasing funding levels. Thus, it still stands to reason that if countries were better at leveraging capital for transit infrastructure with debt, more capital would be available to enable higher growth in such infrastructure.

South Africa has by far the lowest debt finance rate at just 3 percent of each project on average. This low rate is due to multiple reasons: very poor credit ratings in both South Africa and Indonesia prohibit access to bond markets. Also South Africa, like Indonesia, had significant cash on hand and developed primarily very low-cost BRT, so the need for debt was low. One DKI Jakarta transport official said that the state of DKI Jakarta had sufficient cash on hand to fund the rapid transit projects and thus opted not to increase its debt levels in order to help its credit rating. In Indonesia, many governments opt to finance without recourse to MDBs in order to avoid international competitive bidding requirements.

In France it seems that bond financing accelerated after the financial crisis of 2008 and its ongoing fallout, the European sovereign debt crisis. Before 2008, local governments financed capital investment via bank loans, with the Dexia local credit bank as the major lender. By 2011, the Dexia group was bankrupt, bailed out, and restructured out of the local government lending sector. Meanwhile, private European banks, also in dire straits, were wary of lending large sums to local governments in a time of fiscal austerity and governments at risk of default. At this point local governments started turning to the bond market to cover their financing needs (though this is not reflected in the chart above because the projects analyzed were financed before the debt crisis).[10]

In Brazil, many projects receive loans for a high portion of the project's overall cost—up to 84 percent in this sample—from national development banks. A high number of BRTs, however, had no debt finance for the surface infrastructure—perhaps because again it

[10] http://www.lesechos.fr/idees-debats/cercle/cercle-84150-financement-obligataire-une-opportunite-pour-les-collectivites-locales-1001995.phphttp://www.latribune.fr/entreprises-finance/banques-finance/industrie-financiere/20121220tribi000738623/25-milliards-d-euros-un-record-pour-les-emissions-obligataires-des-collectivites-locales.html

is more affordable relative to rail investments—which brings down the average on the whole. Similarly in China, many BRTs were not financed, but rail projects were. Municipal and state debt ceilings also significantly limit debt finance in both Brazil and Mexico. In the United States, many projects also have easy access to debt finance through bond markets to finance local responsibilities and are supported by national programs that provide grants to environmentally sustainable projects. This lowered the portion of a project that localities needed to cover with debt finance.

3.3. Sources of Debt Financing by Country

The analysis of debt financing for 123 transit projects in nine countries found five main sources of financing*:

1. Bonds
2. National government and national development bank loans (NDB)
3. Multilateral development bank (MDB) loans
4. Commercial loans
5. Bilateral loans or loans from export credit agencies

* In India, there were also three projects with small state government loans

In each of the countries one or two types of credit have tended to dominate the financial system for different reasons. The following financing sources dominate in these countries:

1. Subnational bond financing—France, the United States
2. Multilateral development bank and commercial loans—Colombia
3. National development bank loans—Brazil
4. Commercial loans—China, Mexico, India, South Africa
5. Export-credit financing—Indonesia

This list loosely relates to the level of debt financing seen in each country—with those with access to bond markets, MDBs, and national development banks having higher levels of debt financing, and those that relied on commercial banks and bilateral lending having lower ratios. Each of these sources of financing has its advantages and disadvantages. The main differences include:

1. Eligibility for debt (i.e., credit rating accepted)
2. Cost of the capital (i.e., the interest rate)
3. Length of the credit (the repayment period on the debt) and the grace period
4. Conditions placed on the loan (conditionality)
5. Transaction costs of securing the loan (time and work required to secure the loan)

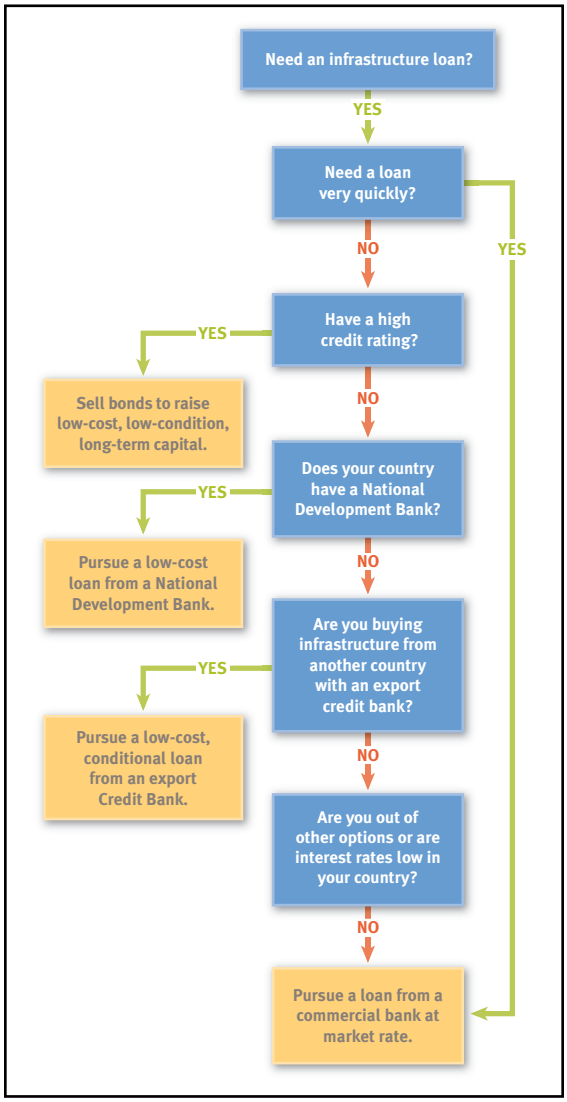


Figure 5: Debt-Finance Source Flowchart

To the borrower, the ideal source of financing would have a very low interest rate, a very long repayment period with a long grace period, few conditions, and minimal transaction costs. To the lender, these issues help mitigate the risk of default. The riskier the project or the borrower, the more precautions are put in place. There are generally specific reasons why one particular type of financing has come to dominate borrowing in the urban

	Bonds	Multilateral Development Bank	National Government or Development Bank	Commercial Bank	Export Credit Financing
Cost of Capital	Low	Low	Low	High	Low
Credit Rating Required	High	Low	Low	High	Low
Length of Credit Term	Long	Medium/Mixed	Medium/Mixed	Medium/Mixed	Long
Conditionality	Low	Medium/Mixed	Medium/Mixed	Medium/Mixed	High
Transaction Costs	Low	High	Medium/Mixed	Low	Medium/Mixed

Table 9: Lending Attributes of Various Debt-Finance Sources

transit sphere in each country.

Countries should pursue increased access to the lowest-cost debt finance for infrastructure, primarily bonds and development bank loans. Countries where cities' infrastructure development is constrained by a lack of low-cost debt finance should consider programs that improve municipal credit ratings and/or lending to cities through national development banks.

3.3.1. Bond Finance–Dominated Countries: The United States

Countries with good credit ratings and strong governmental and financial institutions often rely heavily on bond financing for infrastructure, though bonds are also employed in some emerging markets. The sample of countries used in the analysis bolstered this finding, with the United States relying the most on bond financing. Bonds can be a very low-cost, long-term way of financing transit infrastructure with virtually no conditionality other than that the state, municipality, or transit authority must be rated by one of the three bond rating agencies (Standard & Poor's, Moody's, or Fitch). To be eligible for bonds, government bodies must have in place transparent accounting procedures in order to gain the confidence of rating agencies. The government body receives a rating, and the cost of capital (the interest rate) will be set based on that rating. The most established municipalities and state governments in developed countries with perfect payment histories generally have an AAA rating, and pay interest similar to the cost of a treasury bill[11], making the cost of capital for municipal bonds quite low. The Greater Cleveland Regional Transport Authority in the United States, for instance, has a AAA rating from Standard & Poor's, allowing it to float twenty-year bonds at little more than the cost of a treasury bill (currently around 3.5%), while New York has a AA rating and therefore pays around 5 percent. Maturity periods for bonds are typically long—usually at least ten years and can be as many as thirty years, with no conditions and low transaction costs.

In the United States, borrowing for transit overall is lower than in most of the best performing countries because there is usually a significant federal funding share in most transit investments, and the federal grants are funded out of current accounts rather than debt financed. Bond financing is primarily used for the share of the project funded by the state or city/metropolitan authority. Most transit investments are made by transit authorities and are financed with either general obligation bonds of the state or city government that borrows against future general tax revenues or more project-specific revenue bonds that borrow against specific revenue sources. Those that borrow against user fees such as toll roads or transit fares generally do not need to be

	Bonds
Cost of Capital	Low
Credit Rating Required	High
Length of Credit Term	Long
Conditionality	Low
Transaction Costs	Low

Table 10: Bond Market Attributes

[11] Historically, municipal and public authority bonds have been within 1 percent to 2 percent of the price of a treasury bill, sometimes higher and sometimes lower. The variance between the best rated and worst rated municipal bonds is also usually around 1 percent to 2 percent but it can be more in times of financial turmoil. (http://www.munibondadvisor.com/market.htm)

voter-approved. Other revenue bonds impose new taxes earmarked to pay for transit infrastructure such as the half-cent sales tax in Los Angeles, known as Measure R, that was passed by popular referendum in 2008 to fund transport infrastructure.

It is often difficult for cities in developing countries to get bond ratings because they require transparent and easily auditable accounting procedures. This process can have a significant transaction cost, but is generally worthwhile in the long run for both better access to capital and improved financial transparency. Since bond financing has the lowest cost of capital and the least conditionality, all developing countries should endeavor to eventually have the credit rating and accounting transparency necessary to issue subnational bonds. Mexico City, for instance, was able to issue bonds for construction of its Metro Line 12 on the Mexican bond market, most of it at a 7.1 percent interest rate, 3 percent below commercial rates.[12]

3.3.2. National Development Bank–Led Financing: Brazil

National governments sometimes lend money to states, cities, and the private sector for urban transit projects. This is often done through a national development bank (NDB) that is committed to providing credit toward projects that encourage general economic development, though sometimes national governments make loans directly to projects. This can be a highly effective method for a country to ensure access to low-cost debt finance for infrastructure projects that are critical for development, especially when credit ratings or other restrictions limit bond market access.

	National Government or Development Bank
Cost of Capital	Low
Credit Rating Required	Low
Length of Credit Term	Medium/Mixed
Conditionality	Medium/Mixed
Transaction Costs	Medium/Mixed

Table 11: National Development Bank Lending Attributes

National development banks allow policy makers to set lending practices and requirements according to national policy objectives, and these can vary from country to country. Typically, NDB loans to cities and states have below-market interest rates, do not require a high credit rating, have medium- to long-term repayment periods, and feature lower transaction costs. Conditionality can be mixed—whereas MDB loans may require opening a project to international bidding, NDB loans may allow or require national bidding. While the goals of such national bank conditionality tend to focus more on economic growth and competitiveness than on sustainability considerations, they have strong potential to also support environmental or social goals with low-cost loans for sustainable modes of transport.

The world's largest development bank is the China Development Bank (CDB), with four times the assets of the World Bank. CDB is directly involved in many rail rapid transit projects. Although it regularly lends money to the municipal investment corporations that fund the BRT infrastructure, the CDB is not as important to the overall financing picture as commercial credit or quasi commercial credit in China. Its interest rates are not that different from those of other commercial credit available in most provinces, and its principal advantage is in the length of the loan repayment period and the larger size of the loans.

Brazil is home to one of the world's largest development banks, the National Bank for Economic and Social Development (BNDES), as well as National Savings Bank (Caixa Econômica Federal, or "Caixa"), both of which provide the vast majority of lending to urban transit investments in Brazil at very low rates. Since 2005, BNDES has been responsible for most of the rapid transit financing in Brazil. In 2008, the national government, however, began using Caixa as the lending institution for its Accelerated Growth Program (PAC) that financed many new transit systems. Until recently, BNDES and Caixa loans were at around 5 to 6 percent interest and were thus much lower than commercial rates in Brazil, which often are twice as high, that they effectively represent publicly subsidized loans. This was made possible by

[12]http://www.bnamericas.com/news/infrastructure/DF_issues_US*161mn_in_bonds_to_fund_metro_line_12

large transfers from the national treasury and by access to worker pension funds. Recently, Brazil has announced plans to increase the interest on BNDES loans as a way of addressing Brazil's growing debt.

Other countries have national development banks, but they have not had a significant role in the projects analyzed. The reasons for this are unclear, but the existence of NDBs in these countries does offer a mechanism for these countries to access financing and this could help grow their RTR. Mexico has a development bank, BANOBRAS, but it has to date played a limited direct financing role in rapid transit infrastructure, aside from some facilitation of PROTRAM grants and UTTP loans. South Africa's national development bank has also not been active in financing rapid transit. Colombia has recently created its own national development bank, Findeter.

Some countries do not have national development banks. While France and the United States do not, they do still occasionally give national government loans to local governments. Two highway projects in the United States researched for this sample had received federal Transportation Infrastructure Finance and Innovation Act loans. Given the mature bond markets in these countries, the need for a development bank may not be high, though the United States has recently considered creating infrastructure banks. Indonesia does not have a national development bank. India had a development bank in the past, but over time its role has diminished, and it increasingly functions like any other commercial bank.

3.3.3. Multilateral Development Banks and Commercial Credit: Colombia

Multilateral development banks (MDBs) are intergovernmental financial institutions that are generally capitalized to some degree by developed member countries and whose purpose is to lend money to developing member countries (though some development banks, such as the European Investment Bank EIB, the house bank of the European Union, lend primarily within highly developed member countries). Of the countries reviewed, multilateral development banks provided the dominant share of the overall transit infrastructure finance in Colombia with finance from the World Bank, the Inter-American Development Bank (IDB), and the Development Bank of Latin America (CAF—Cooperación Andina de Fomento). Other countries relied on financing from MDBs—France on the EIB; India on the World Bank and the Asian Development Bank (ADB); and China on the ADB and the World Bank.

	Multilateral Development Bank
Cost of Capital	Low
Credit Rating Required	Low
Length of Credit Term	Medium/Mixed
Conditionality	Medium/Mixed
Transaction Costs	High

Table 12: Multilateral Development Bank Lending Attributes

Multilateral development banks have significant advantages in financing sustainable urban transit infrastructure. The World Bank's International Bank for Reconstruction and Development (IBRD), the ADB, the EIB, the IDB, and other regional development banks offer different borrowing mechanisms for national governments and sometimes subnational governments and commercial clients. The IBRD, for instance, currently charges the London Inter-Bank Offered Rate (LIBOR) plus 0.85 percent for interest plus a 0.25 percent commitment fee and a 0.25 percent front end fee for an eighteen- to twenty-year variable rate loan.[13] The other multilateral development banks offer comparable rates in somewhat different packages as they tend to compete with each other to secure borrowers. All the MDBs fund their lending by selling bonds on the international capital markets that are very low risk because they are backed by the full faith and credit of the member countries, and because governments tend to repay the World Bank before any other form of debt. They then lend the money out at a marginally higher rate than they pay for it, and they charge service fees. LIBOR today is under 1 percent interest, so this is currently very low-cost credit.

The World Bank has an additional loan window called the IDA (International Development Agency) that makes no- and low-interest loans as well as grants to only the least-developed

[13] "IBRD Lending Rates and Loan Charges," http://treasury.worldbank.org/bdm/htm/ibrd.html, accessed 9-8-2015.

countries. No projects in this study used the IDA, though it has been used for transit projects such as the Dar es Salaam, Tanzania, BRT. [14]

The advantage of MDB financing is that the interest rate is usually as low and the terms as long as any other lending source, without the loan being tied to companies of a particular nationality. The disadvantages to borrowing from MDBs, from the perspective of the borrower, are several. First, the project must be opened up to international competitive bidding. Secondly, the fees are often expensive. Third, the transaction costs are high. Projects funded by MDBs must pass a series of evaluation criteria to secure approval from the bank's board of directors, such as internal rate of return analysis and environmental and social appraisals. As a result, project quality and transparency are often higher, but the project requires more administrative work on the part of the borrower. This all takes a long time, often several years, which may be beyond the political time horizon of a politically elected project proponent. The loans may come with a variety of other conditions. These conditions can be used to further numerous purposes, some oriented to social and environmental outcomes, others more related to trade or balance of payment concerns. For instance, the loan may require that the cost recovery ratio on a transit system increase fares in a way that has adverse impacts on low-income people, as a World Bank loan to the Hungarian rapid transit authority BKV, did.[15]

On the other hand, the loan might be more likely to be approved if it is consistent with the development bank's stated policy goals and commitments. For instance, in 2012, the multilateral development signed an agreement to shift the $175 billion it cumulatively planned to lend in the transit sector in the following twenty years to more sustainable modes. While enforcing this is difficult, the banks have formed a Working Group on Sustainable Transport and associated observer organizations are now working to monitor and report progress toward these commitments. This creates incentives for MDBs to lend more for rapid transit.

Finally, a significant problem for MDB finance of urban transit is that some of the development banks have limited ability to do sub-sovereign lending. For the World Bank, all lending to a city must be approved and facilitated by the national government. If a national government and a municipal government are from different political parties, the municipality could potentially find it difficult to get a loan from an MDB. Some of the regional development banks are finding mechanisms to get around this to lend directly to cities and states.

Colombia's rapid transformation from a country with virtually no rapid transit to a country with an RTR of more than ten kilometers per million urban residents came as a direct result of national policy to scale up BRT following the successful implementation of the TransMilenio BRT network in Bogotá. Colombia is a true best practices success story driven by a national program to leverage MDB and private sector finance to invest in BRT and quickly raise RTR. The national government essentially was able to pool loans from the World Bank, CAF, and the IADB to create a source of funding for its national BRT program. These funds were then granted to cities, with a matching requirement and other conditions on project quality. The MDBs were also involved in project review.

While Colombia's national government relied heavily on MDB loans or the partial grants it made to cities for BRT projects, the cities still relied on commercial bank financing to finance their portion of the project cost, which was usually around 30 percent (it varied from 15 to 40%) of total project cost. Commercial financing in Colombia is shorter term and is used differently there than in other countries. In essence, all major transit projects are funded out of a 70 percent national government cost-sharing agreement. This funding comes on a fixed annual basis, not in a lump sum. However, the municipality providing the 30 percent matching funding must also pay its construction companies up front for a BRT or metro, and the amounts are significantly larger in the first years than the national 70 percent share. As a result, the municipality turns the national government's revenue stream over to the construction

[14] http://www.worldbank.org/ida/papers/IDA17_Replenishment/IDA%27s%20Long%20Term%20Financial%20Capacity%20and%20Financial%20Instruments%20%283-Mar-2013%29%20-%20Final.pdf

[15] https://www.itdp.org/wp-content/uploads/2014/07/Wheels-Out-of-Balance_ITDP.pdf

company, which in turn uses the contract with the municipality and the promise of the national government payments to borrow money from a commercial bank. Normally, the loan amount is for nearly 100 percent of the infrastructure costs as the contract with the construction company is also required to provide five years of maintenance. Unlike infrastructure loans in some other countries, this credit is quite short term, normally only five to seven years.

MDBs have played an important role in other countries as well. In China, the Asian Development Bank has recently financed some of the best municipally funded BRT systems, such as in Lanzhou and Yichang. These ADB loans in China are one to two percentage points below the commercial interest rates, and hence are a very attractive form of project financing. The ADB's willingness to finance BRTs has helped create incentives for Chinese cities to build more cost-effective mass transit. Currently the ministry of finance has reserved MDB lending for "pilot" projects that require technical help, but China can well afford to do more MDB borrowing, and the quality of the projects was clearly improved by ADB involvement. Expanding MDB urban transit lending in China is thus a good opportunity.

In Brazil, the IDB and World Bank financed several important urban transit projects, many of them fairly old and in the highway and metro sector, as the Brazilian national development banks have largely dominated the lending market for public infrastructure. In India, the World Bank has financed the Pimpri Chinchwad BRT and a few other urban transport improvements. India too could make greater use of MDB financing.

3.3.4. Commercial Credit–Dominated Financing: China, Mexico, and India

Commercial loans from private banks play at least a small role in lending to infrastructure projects in most countries—especially to private sector partners but also to some public sector transit authorities. However, in countries where there is little access to bond markets or national development banks for transit investments and where MDB loans cannot finance a majority of the projects, project proponents will resort to commercial loans from private banks to finance a high proportion of infrastructure.

Commercial loans for public transit infrastructure occur in three basic types:

	Commercial Bank
Cost of Capital	High
Credit Rating Required	High
Length of Credit Term	Medium/Mixed
Conditionality	Medium/Mixed
Transaction Costs	Low

Table 13: Commercial Bank Lending Attributes

1. Direct commercial lending to governments
2. Commercial lending to government-owned enterprises (GOEs)
3. Commercial lending to private sector investors in public infrastructure through public private partnerships.

Direct commercial lending to governments happens in countries like Mexico where city and state governments borrow directly from private banks. In other countries, such as China and India, city and state governments are not allowed to borrow directly from commercial banks but can create government-owned enterprises (GOEs, also called special purpose vehicles or "SPVs" in India) that can borrow from private banks.

Commercial lending to private sector investors in public infrastructure through public private partnerships is the third form of commercial lending to public transit infrastructure. In such deals, a private company will borrow from a commercial bank (in some places private firms can also borrow from development banks) to raise funds for some form of capital investment, usually rolling stock but sometimes for infrastructure as well. The private firm will also often invest its own equity into a project (though usually 20% or less of total project cost). These investments will then be paid back over time either through user fees or payments for service by the government or a combination of the two. While the government is not technically taking out a loan in this scenario, the private sector investment can still essentially be thought of as a mode of financing for the government itself because it mobilizes private capital up front and essentially uses public funds (via transferring fare revenue collection rights and/or additional service payments/subsidies) to pay off that capital over time. This is another effective way for cities and states to get investment infrastructure when there are restrictions on other forms of

lending; however, project proponents must gauge carefully the ultimate cost of capital and the corresponding risk assumption under such arrangements.

Commercial Lending for Transit Infrastructure in China

Within China, the government makes a distinction between commercial banks and "policy" banks, which more directly seek to achieve policy outcomes through lending. Though both are owned by the government, the only "policy" bank that makes loans for urban transit is the China Development Bank. The other banks, although government owned, are all considered "commercial" banks because they lend at commercial rates for commercial periods of time and at a scale comfortable to a commercial bank. This is not to say that there is not government interference with commercial banks. Political influence over the municipally owned banks in particular seems to have an impact on urban transport project lending. According to ITDP interviews with transport and bank officials, loans for the projects that are a priority of the mayor yet face the greatest economic uncertainty tend to be funded by the municipally owned banks, which the city's mayor has more control over.

Commercial loans in China are largely made to GOEs at the city level, which unlike city governments, are allowed to borrow directly from commercial banks. These GOEs are also controlled by the mayor and for most purposes are an extension of the municipal government, so loans are considered by the banks as direct loans to the municipality and thus enjoy lower interest rates. Most cities have municipal bus companies that are city-owned enterprises, and these enterprises are often in control of bus procurement in BRT projects. They tend to borrow from commercial banks. There are also a few private concession metro systems in China. In these deals, private investors borrowed money from commercial banks to pay for the rolling stock. The investors were repaid over time by the municipality in the form of lucrative operating contracts. The real cost of capital in these instances ended up being higher than for other available forms of financing in China, so this arrangement has not gained much traction.

Commercial Lending for Transit Infrastructure in Mexico and India

In Mexico, states and especially cities have very limited means of raising tax revenues outside of the Federal District of Mexico City. State budgets are often so tight that states will take commercial loans to finance general budgets. Furthermore, in the wake of the 1994–95 financial crisis, debt ceilings were implemented limiting states and cities from borrowing money from private Mexican banks using future federal government transfers as collateral, as these loans were a cause of the financial crisis. City and state governments are also not allowed to raise loans in foreign currencies, and most rail projects require foreign exchange. Most rail and BRT projects in Mexico are set up—at least in part—as public private partnerships (PPPs) as a way of getting around borrowing limits and restrictions on international borrowing.

Mexico's BRT program known as PROTRAM (a national government program funded by national toll road revenue surpluses, and financed partly by MDB loans) mandated that a project needed 30 percent private sector investment to be eligible for PROTRAM grant funds. A large part of the commercial financing in Mexico finances the private sector investment share of these PPP BRT projects.

India has two major state banks that played a key role in financing urban rail infrastructure. The Mumbai metro was financed in part by loans from the IDBI (formerly known as the Industrial Development Bank of India, now just IDBI) and both the Hyderabad and Bangalore metro systems were financed in part by loans from the State Bank of India. Both of these banks retain majority ownership from the government of India, though they function as commercial banks rather than development banks since the Industrial Development Bank (Transfer and Undertaking and Repeal) Act of 2003. As such, these loans from SBI and IDBI have been classified as private commercial loans.[16] [17]

India also created special purpose vehicles (SPVs) to implement most of its metro projects,

[16] http://www.idbi.com/idbi-bank-history.asp

[17] *Banking Theory Law N Practice*. Tata McGraw-Hill Education. p. 8. Retrieved Nov 4, 2014.

and these SPVs received loans from commercial banks, and were eligible for viability gap funding from the ministry of finance. BRT projects also tend to be managed by public authorities that tender out their operations to private operators to form a particular type of PPP. The private operators, which usually have a contract with the BRT authority, use their operating contract to secure financing for the procurement of the BRT bus fleet. In India, commercial banks funded rail and highway projects but financed very little BRT. Of the five BRT projects, three received commercial bank financing, and the loans were to the operators for bus procurement. In all, the loans were for less than 10 percent of the total project costs. For highways, commercial banks financed two out of three projects, although lending levels varied widely. One project was for 84 percent of total project cost and one was for 9 percent. Rail consistently received financing at higher shares of the total project costs. Four out of five projects commercially financed between 10 and 63 percent of total project costs.

3.3.5. Bilateral and Export Credit Lending: Indonesia

Many countries develop bilateral lending practices and/or export credit agencies, which provide generally low-cost loans to foreign governments so that those governments can purchase the lender's domestically made goods. Many of the national development banks also function as export credit banks to lend outside the country. The objective of these loans is to make local firms more internationally competitive and increase economic development by increasing exports. The limitation of such loans is that they at least partially tie the borrower to procurement of goods and services from corporations from the lending country.

	Export Credit Financing
Cost of Capital	Low
Credit Rating Required	Low
Length of Credit Term	Long
Conditionality	High
Transaction Costs	Medium/Mixed

Export Credit Bank Lending Attributes

For example, most sales of Boeing aircraft to the airlines of foreign countries are backed by the US Export-Import Bank (sometimes referred to as "Boeing's Bank" for that reason), in order to help them compete with Airbus, a French company, which receives comparable loans from the export credit agencies of European governments. These financial agencies appeared in this review as sources of financing for both rail projects and for bus procurement in BRT projects. Export credit agencies frequently offered intergovernmental loans for rail projects at rates far below the cost of similar term US Treasury Bills (currently around 2.2% for a 20-year treasury bill or 2.4% for a 30 year), but the loans are generally tied to a specific rail technology provider from the lending country.[18]

Bilateral and export credit agency loans were not a significant form of financing for any country. For Indonesia, there was just one export credit loan, for the Jakarta metro. The Jakarta metro was financed by a loan from JICA (Japanese International Cooperation Agency) at just 0.2 percent interest with a ten-year grace period and a forty-year repayment period.[19] This is a highly subsidized loan, far below the cost of any alternative sources of financing in Indonesia or internationally. However, the loan is tied to procurement from Japanese construction and rail companies for most of the key elements of the project. These can end up being monopoly supply relationships that can increase the long-term cost of the supply of spare parts, which constitute a large share of transit system operating costs. The TransJakarta BRT, by comparison, was funded almost entirely out of cash from the DKI Jakarta budget's current account, including bus procurement.

India has also relied on export credit agencies, but less so than Indonesia. The Delhi metro is also being financed by extremely low-interest loans from JICA, which also financed the Kochi metro and the Bangalore metro. Agence Française de Développement (AFD), the French development agency, also provided loans for the Kochi and Bangalore metros.

[18] http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=longtermrate
[19] http://www.jica.go.jp/english/news/press/2009/090331_01_ref.html

In many these cases, the availability of very low-interest export credit financing from the country providing the technology can play a key role in the selection of rail technology.

South Africa, China, and Brazil also received bilateral loans for a small number of transit projects, though it was a relatively minor share of their overall financing picture. In fact, many of the BRT projects also used the export credit agencies of the countries where buses are manufactured. Bogotá, Colombia's TransMilenio and Johannesburg, South Africa's Rea Vaya both relied on Brazil's BNDES bank for bus procurement, and Mexico City's Metrobus and TransMilenio relied on the Nordic export credit agencies. The interest rates (1% to 2%, or 100 to 200 base points) on these deals were closer to commercial interest rates but generally below the interest rates that would otherwise have been available from a commercial bank. These loans were far smaller, however, than the loans for the rail sector.

3.4. Summary of Conclusions Regarding Financing of Rapid Transit

Debt finance is a critical tool for achieving efficient use of capital, high growth in rapid transit infrastructure, and ensuring that high-quality projects are implemented and paid for by the population who benefits from them. No country can increase its RTR without judicious use of debt finance to leverage more capital for development objectives.

- **Cities should improve access to low-cost debt finance for rapid transit.** There are five main sources of debt for transit infrastructure projects, which are listed in general order of desirability (or cost and conditionality of loans) for government borrowing:

    6. Bonds
    7. National development bank loans
    8. Multilateral development bank (MDB) loans
    9. Commercial loans
    10. Bilateral loans or loans from export credit agencies

    Countries where urban infrastructure development is constrained by lack of low-cost debt finance should consider measures to improve municipal credit ratings, which may lower borrowing costs. National governments can also lend directly to cities through national development banks.

- **Each source of financing has its advantages and disadvantages along the following five criteria:**

    1. Eligibility for debt (i.e., credit rating accepted)
    2. Cost of the capital (i.e., the interest rate)
    3. Length of the credit (the repayment period on the debt) and the grace period
    4. Conditions placed on the loan (conditionality)
    5. Transaction costs of securing the loan (time and work required to secure the loan)

- **Levels of debt finance for rapid transit projects should approach or exceed 70:30.** The higher the level of debt finance, the higher overall funding and ultimately RTR growth are likely to be for rapid transit in a country.

- **Cities should improve their credit ratings.** Better credit ratings mean lower interest rates with lenders, improved accountability and transparency, and wider access to lenders and bond markets.

4. Institutional Capacity to Plan and Implement Transportation Infrastructure

Implementing rapid transit is a complex task and cities must have the institutional capacity to plan, finance, design, build, and operate a network of rapid transit sufficient to meet growing mobility demands. Funding for infrastructure is often difficult to procure, but when the institutions are not in place to properly plan, design, and implement infrastructure, its growth and quality will suffer. There are many examples of countries that had the money for a rapid transit project but it was never implemented due to some lack of institutional capacity. In some cases projects stall halfway through construction due to a lack of institutional capacity for project oversight, planning, budgeting, and spending. In other cases, good plans never come to fruition due to lack of expertise in creating the financial architecture. Still in other cases there is little or no planning to begin with because planning institutions, if they exist, lack a framework, the political authority, and/or the technical expertise to make plans and prepare projects. Each of these instances is an examples of how a lack of institutional capacity can be a barrier to rapid transit infrastructure growth, even when funding and financing suffice.

The United Nations Development Programme (UNDP) and United Nations Disaster Risk Reduction Offices (UNISDR) define institutional capacity as the capability of an institution to set and achieve social and economic goals, through knowledge, skills, systems, and institutions. While institutional capacity is often mentioned in development contexts and is well understood in general terms, it can often be difficult to define in specific terms and in measurable ways. For the purposes of this study, we discuss at least three types of institutional capacity related to mobility:

1. **Transport Governance Capacity of an Institution:** The degree to which an authority has the clear legal and political authority to plan, finance, and build rapid transit infrastructure across a metropolitan region.

2. **Planning Capacity of an Institution:** The degree to which the institutions have the proper organization and processes to plan and facilitate projects efficiently and effectively, including financial planning, urban and transport planning, data collection, and project preparation resources.

3. **Technical Capacity of an Institution:** The degree to which the institution's staff (or consultants) have the technical ability to collect, analyze, and use data to plan, design, and engineer infrastructure and/or to structure complicated finance schemes, tendering agreements to achieve goals.

For the purposes of this study, we created criteria that act as a (partial) indicator of whether a country is likely to have each of the above capacities necessary for robust rapid transit infrastructure growth. While capacity is a broad and complex subject that cannot be totally understood through a few indicators, the indicators still allow good insights and more objective comparisons of a country's capacity along organizational, technical, and political legal lines. The indicators are as follows:

1. **Indicator of Transport Governance Capacity of an Institution:** Presence of institutions with clear authority to plan, design, and implement rapid transit projects across metro areas.

2. **Indicator of Planning Capacity of an Institution:** Presence of well-established mobility plans that guide long-range transport planning.

3. **Indicator of Technical Capacity of an Institution:** The record of the country in planning and implementing high-quality, well-designed transport infrastructure without major project delays.

The table below illustrates and compares the institutional capacity of the nine countries in this study based on the first three of the indicators above. Institutional capacity alone does not determine RTR, but for the most part, it is clear that countries without strong planning institutions, unified metropolitan transit governance, or good technical capacity cannot achieve high RTR growth. Indonesia is the country that displays the highest RTR growth with the weakest capacity, though this is something of an anomalous result due to the one BRT system in Jakarta, which is one city in Indonesia that has more unified planning and higher capacity.

	City Mobility Planning Institutions	Urban Transport Governance	Technical Capacity
France	Strong mobility planning framework in place (PDU)	United metropolitan planning organizations (department level) with transit agencies that design, plan, and operate transit	High-quality design and project delivery
Colombia	Cities have transportation master plans	Mixed capacity for metropolitan planning with specialized public authorities established in major cities to plan, design, build, and operate transit	High-quality design and project delivery, with some exceptions
China	Strong five-year city transportation planning frameworks	Powerful government-owned metro companies, municipal investment companies, and engineering	High-quality design and project delivery, with some exceptions
Indonesia	Weak mobility planning institutions	Fractured metropolitan governance and weak transit authorities	Weak technical capacity—poor project designs and record of project delivery
South Africa	Major cities have long-range transit plans, but multimodal planning weak	Fractured metropolitan transport governance, however municipal governments growing capacity to implement rapid transit	Major cities have capacity to plan, design, finance, and deliver rapid transit
Mexico	Weak planning institutions	Weak and often fractured transport governance, though specialized rapid transit authorities plan, design, and operate rapid transit	Mixed project quality and delivery
Brazil	Nascent city mobility plans	Nascent metropolitan governance with varying transit authority by city	Mixed record of project design quality and delivery
United States	Strong local transportation planning institutions (MPOs)	Metropolitan Planning Organizations, transit authorities, and municipal departments have relatively clear roles and generally functional coordination.	High-quality design and delivery, especially through private sector contractors.
India	Comprehensive mobility plans exist but have little authority, otherwise weak planning institutions	Unified metropolitan authorities not empowered, though special purpose vehicles allow rapid transit to bypass some government bureaucracy and develop rapid transit	Mixed record of project design quality and delivery

Table 15: Institutional Capacity Ratings

4.1. Transport Governance Capacity

Transportation authorities require sufficient political and legal authority to plan and implement transportation infrastructure. For transit projects to move forward, government institutions must have a clear legal mandate to design, build, and manage a rapid transit network across the metropolitan area. One common example of how a lack of capacity in transport governance can be a barrier is when multiple municipal governments within a single metropolitan area lack the coordination and legal mandate necessary to lead implementation of transportation policy and infrastructure at the metropolitan scale and across multiple municipal boundaries.

To address this issue many countries, states, and/or cities have created metropolitan transportation authorities that ensure that the key political and financial powers for all municipalities in the metropolitan area are unified under a metropolitan authority that can make decisions for the greater good of the metropolitan region. Other governments, such as those in India, allow the creation of SPVs, which are semiprivate entities under control of a transport authority but working outside of government to design, build, and operate rapid transit, bypassing government bureaucracy. Others have resolved the issue by contracting private firms to manage entire transit systems. These authorities tend to operate services that cross municipal administrative boundaries.

In the United States the Metropolitan Planning Organizations coordinate metropolitan transit. These federally mandated, federally funded transportation policy-making organizations are made up of representatives from local government and transportation authorities and channel federal funds to local projects based on both their long-range and short-range transportation plans. In the United States, the planning, design, and implementation of rail projects has been under regional transit authorities that are generally though not always directly under state control. These authorities have been successful at bridging the boundaries of smaller municipalities to serve regional transit needs. BRT projects, because they use surface streets, are generally collaborations between municipal departments of transit and regional transit authorities. In general responsibilities are clear and projects get designed, built, and implemented, though sometimes slowly due to overly cumbersome procedural rules, many imposed by the federal government.

In China, major rail projects are managed by municipal government-owned metro companies. Construction of BRT projects is generally under government-owned engineering and construction companies, and operations are generally under the municipal bus company or a special BRT company.

In Colombia, the precedent of TransMilenio and national government requirements led to the creation of special BRT agencies in most cities. These agencies have sufficiently broad powers to design, build, and implement BRT systems successfully.

In Jakarta, Indonesia, many of the technical problems on TransJakarta were the result of poor governance inside the municipal department of transportation (DISHUB) and confusion resulting from the creation of TransJakarta, a public authority with extremely weak administrative authority.

In South Africa, BRT has been led directly by municipal departments of transport. While this model has not been entirely successful, responsibility for BRT is at least clearly delineated.

Mexico is more typical, creating metro companies to manage metro projects, and following the Bogotá model by creating special BRT agencies to manage BRT systems. In Brazil, São Paulo has a public bus authority and a metro company, both with skilled staff and considerable powers. Belo Horizonte has a weaker transit authority but it still has been able to plan and implement highly successful BRT projects. In Rio de Janeiro, there is a private-sector-led model, with the subway contracted out to a private operator. A private sector consortium of bus operators took the lead in designing, building, and operating the new BRT systems under contract with the city.

In India, metros have been designed, built, and implemented by corporatized metro companies that have been quite successful. Responsibility for BRT, however, has rarely been as clear. The national funding (JNNURM) encouraged the creation of SPVs to manage the BRT systems, and in a few cities (Ahmedabad, for instance), these have been somewhat successful, but they are in fact entirely controlled by the municipal commissioner and are not true independent authorities, and in other cities (Delhi, for instance), an SPV was created that was never given the actual powers or

capacities needed to design, build, and implement BRT projects.

In France, Urban Transport Organizing Authorities (AOTU) act as inter-municipal transit authorities where there are multiple municipalities within one "urban transport perimeter." The AOTU carries out the mobility planning, delivers the Urban Development Plan (PDU, see below in the Planning Capacity Section), plays a role in budgeting transportation funds (collected as a mobility tax on employers), coordinates with other levels of government, and implements transport policy and projects at the regional scale

Multiple countries are trying to address gaps in metropolitan governance with policy prescriptions. Brazil recently passed its Metropolis Statute[20] to provide states with new instruments for regional and municipal planning, increase the social use of urban property, and improve the democratic management of cities. However, it still remains unclear if and how Brazilian states will use this legislation to improve metropolitan and regional planning. Similarly, in India, some state governments are working to develop new Unified Metropolitan Transport Authorities in major urban areas including Chennai, a large city in the state of Tamil Nadu. However, these authorities are still young and currently lack significant power and funds. South Africa, Indonesia, and Mexico lack formal, nationwide institutions for unified metropolitan planning.

4.2. Planning Capacity

Planning capacity refers to the degree to which cities have the proper organization, tools, and processes in place to plan their infrastructure growth according to their needs. Some of the countries that are the most successful in growing RTR all had strong mobility planning frameworks in their cities. Such planning frameworks draw on data and the needs of citizens to identify and create long-term plans for transportation infrastructure. Another key component of strong planning capacity is that these mobility plans or related capital investment plans are capital-constrained, meaning that the plans incorporate realistic plans for funding and financing the infrastructure. The ability to do long-range capital investment planning for transport, however, also depends on the availability of dedicated, predictable revenue sources for transport infrastructure spending.

French Mobility Planning: Best Practices

One of the best examples of mobility planning comes from France, which has required urban mobility plans called "Plans de déplacements urbains" (PDUs) since the passing of its national transport law in 1982. Subsequent laws on clean air, energy, and urban renewal also reinforced the role of the PDU. Each urban transport plan must now also include an environmental assessment section that guides efforts to reduce transportation-related energy use, noise, and emissions of pollutants and greenhouse gases. It is a lever for efforts to save energy and reduce emissions of greenhouse gases, and can help limit the impact of movements on the green and blue.

The development of an urban transport plan is mandatory in urban agglomerations with more than 100,000 inhabitants and is established for a period of five to ten years.

The objective of the PDU is to ensure a sustainable balance between the mobility needs of residents and the protection of their environment and their health. The measures put in place include:

- Improving the safety of all trips;
- The reduction of car traffic (or traffic)
- The development of public transit and means of efficient movement and less polluting for the environment, including the use of cycling and walking
- The development and operation of networks and roads of cities, to make them more effective, including sharing between different modes of transport and promoting the implementation of information campaigns on traffic
- The organization of on-street parking and parking lots
- Transport and delivery of goods, while streamlining the greater supply conditions in order to maintain trade and craft activities

[20] Law No. 10.257 / 2001

- The establishment of integrated pricing and ticketing for all trips

- Encouragement for companies and public authorities to facilitate the transport of their staff, including the use of public transportation and carpooling, realizing a corporate travel plan

Cities and metropolitan areas in the United States have a series of mobility plans to guide transportation policy and investments. Depending on the state, most cities are required to have their own transportation plan. Metropolitan Planning Organizations are required to develop two types of plans: 1) a Long-Range Transportation Plan (LRTP) that incorporates a great deal of technical data about transportation patterns as well as a fiscally constrained long-range transportation plan covering a planning horizon of at least twenty years, and 2) A Transportation Improvement Program (TIP): a fiscally constrained program that is based on the long-range transportation plan, but focused on near-term spending, regulating, operating, management, and financial tools. These plans must be in compliance with federal clean air laws and in California they must also abide by laws aimed at low-carbon development.

Mobility plans, however, do not guarantee high capacity for transportation planning. In Brazil, a recently passed national mobility law requires all cities with more than 20,000 residents to prepare mobility plans, though it does not fund this mandate nor does it specify what the mobility plans must contain. Thus there is concern that many cities will not prepare a useful mobility plan. Hopefully over time, Brazil will develop its capacity for mobility planning—similar to the way France did. India is another example of a country where many cities have mobility plans, but mobility planning capacity remains low. After India launched its massive Jawaharlal Nehru National Urban Renewal Mission (JnNURM) city modernization plan in 2005, it required any cities applying for transportation funding to develop Comprehensive Mobility Plans (CMPs) to access the funding, which also covered 50 percent of the cost of the CMP. In many cases the CMPs contained a good deal of data and analysis and ambitious sustainable mobility goals for the city. However, the plans were not integrated into the decision-making or budgeting process of the city and had little direct impact on transportation infrastructure planning or development in the cities.

The major cities of Colombia, Mexico, South Africa, and Indonesia all have some form of transportation or transit master plan. However, none of these plans are mandated by national government and serve more as individual policy documents than the type of ongoing, iterative, capital-constrained planning process that lends itself to most effective transportation infrastructure implementation.

4.3. Technical Capacity

The technical capacity of a country's urban transport authorities refers to the quality of its planning and design of infrastructure and its ability to deliver it on time. Technical capacity is a function of the expertise of a country's planners, designers, engineers, construction companies, and financial architects—be they in the public sector or the private sphere. Improving technical capacity is not always as easy as adding more money for more consultants to a project—as even consultant-carried projects require technical capacity for strong oversight of all phases: planning, design, financing, construction, and operation.

Technical capacity is also often a function of the level of development of a country and how many highly trained planners, engineers, financiers, and construction managers reside there. Not surprisingly, France and the United States have a very strong technical capacity and project delivery records, though in the United States political considerations often water down project design quality and delivery. China, which is currently building more rapid urban transit than any country before, also has strong competency in project design and delivery. Support for growing rapid transit infrastructure in the future often relies on the success of recent similar projects to justify future investments. When rapid transit projects are poorly designed and ineffective, the public appetite for additional investment in rapid transit often wanes.

Indonesia and India are examples of countries that generally lacked technical capacity to implement high-quality rapid urban transit. In India only a few municipal administrations have the capacity to design, build, and implement rapid transit systems. Project

implementation capacity was poor not only in the medium-sized cities but also notoriously so in Delhi, Mumbai, and Kolkata. In India, several BRT systems have not succeeded at improving speed, capacity, or ease-of-use. This problem has been overcome, in some cases, by the creation of government-owned companies, principally for the construction of metro systems. These bodies are largely autonomous from municipal or state governments, though they are bodies of the state government. The Delhi Metro Rail Corporation became well known for its high quality of project implementation. Cities that have not gone this route have an extremely weak project implementation record. To some extent, municipalities and state governments in India are trying to replicate this success in the metro area by setting up similar SPVs for managing BRT system development and implementation. BRT projects in Pune, Surat, Rajkot, and other cities have been very slow to deploy due to weak project management capacity at the municipal or state level. Ahmedabad's successful BRT was managed by an SPV, though this body was for all intents and purposes (at least in the beginning) an office of the municipal government. The government of India, through its Smart Cities Mission, is attempting to replicate the SPV model for project implementation at the national level.

Indonesia, with help from the GEF and ITDP, built a large and extraordinarily cheap BRT system in Jakarta. However, despite technical assistance from ITDP, local authorities compromised on a number of design elements such that the BRT does not offer as high a quality of service as it might have. Outside of Jakarta implementation capacity to date has been nearly nonexistent and the quality of projects implemented extremely poor. In addition, measures intended to stem corruption have added extensive red tape to government procurement in Indonesia while largely failing to contain the corruption problems that led to the regulations in the first place. DKI Jakarta officials have said that funding is readily available for projects, and that financing would also be easy to obtain from both domestic and international sources, but for the fact that they are unable to spend the money they already have due to these administrative obstacles. As a result, Indonesia received a "poor" classification for technical capacity.

In Colombia, municipal project implementation capacity existed primarily in Bogotá, and to a lesser extent Medellín and Cali. The lure of national government funding for BRTs helped build the project implementation capacity at the metropolitan level in other cities. When the national government funded BRT development in major cities, it set up joint offices to manage financial and technical planning to bolster capacity in partnership with the cities. This was not entirely successful, however, and some of the municipalities either developed fairly low-quality BRT projects (Barranquilla, Bucaramanga), or the project has been extensively delayed (Cartagena) due to weak municipal capacity to implement the project. Weak governance also plagues Bogotá, where TransMilenio suffers from increasingly poor quality of service, overcrowding, and other issues as more recent administrations have proved incapable of effectively addressing TransMilenio's growing pains. Cali initially developed a good BRT system, but has been stuck for many years trying to decide whether to build LRT or BRT on the next critical urban spine. For this reason, Colombia's implementation capacity was given a "moderate" rating.

In China, municipal capacity to design and build rapid transit systems varies with the city, but in general Chinese municipalities have highly competent engineering staff that have proved able to build metro systems rapidly and of reasonable quality. Nevertheless, knowledge of BRT system engineering is less well developed. China designed and implemented a number of very poor BRT systems that nearly discredited the concept there. A new generation of BRTs designed with international technical support (ITDP was engaged in BRT planning in Guangzhou, Lanzhou, and Yichang) returned legitimacy to the BRT concept in China. These new BRTs also bolstered the technical capacity of China's municipal governments to successfully design and implement such projects. BRT projects are within the funding and financing capacity of most Chinese municipalities, so the slow dissemination of BRTs is primarily a function of lack of technical capacity.

In Mexico, planning and implementation capacity inside the Federal District of Mexico City is strong, which has consistently expanded its good quality BRT network as well as continued to expand its metro, but similar expertise is lacking in the rest of the country. Funding for rapid transit has been available for

far longer than it has been effectively deployed. Both PROTRAM and the Global Carbon Fund administered by BANOBRAS have had extensive funds that were undersubscribed for a long time due both to the lack of capacity at the metropolitan level to design and build rapid transit systems that qualified, and lack of capacity inside BANOBRAS and PROTRAM to effectively administer the funds. Technical support to metropolitan areas (normally administered by state governments) for project development and implementation, and to the national funding programs for program administration thus remain a priority.

In Brazil, Curitiba, São Paulo, and more recently Rio de Janeiro and Belo Horizonte have proved they have the capacity to design and implement high-quality rapid transit systems, as has the state government of São Paulo. Other metropolitan areas and state governments, however, have demonstrated less technical capacity to deliver on high-quality projects, though the funding is available.

In South Africa, both Johannesburg and Cape Town have skilled metropolitan government staff that have delivered on high-quality BRT projects, and Gauteng Province delivered the Gautrain project. The national department of transportation in South Africa would have been willing to fund more projects in other cities besides Johannesburg and Cape Town for equity reasons, but the projects in these cities are taking much longer to materialize largely due to weak municipal and provincial administrative implementation capacity. Cape Town had planned to develop BRT since 2004, led by the government of the Western Cape, but the provincial department of transportation proved incapable of implementing the project, and it was only implemented when the municipality of Cape Town took control of the project. The project in Tshwane is near completion after long delays, and projects in Rustenburg and Ekurhuleni are also hoped for.

4.4. Summary of Conclusions Regarding Institutional Capacity

In addition to adequate funding and access to low-cost financing, countries must have the capacity to manage their urban areas, and plan and implement rapid transit infrastructure effectively in order to grow RTR efficiently. Institutional capacity is a very multifaceted and broad aspect of a city's or a country's capacity to develop rapid transit. The indicators used in this report are not able to measure every aspect of a country's institutional capacity, but do indicate and allow comparison as to whether key tools for capacity development are in place in each country. Our analysis finds that:

- **Transport Governance Capacity: Metropolitan areas need strong authorities with clear mandates to plan, design, and implement rapid transit across modes and cities within metropolitan areas.** There are two dimensions to governance capacity: first is the legal and institutional empowerment to develop transit infrastructure and the second is the ability to coordinate such infr astructure across a metropolitan region. One indicator of this is the presence of strong transit authorities and metropolitan or regional planning authorities.

- **Organizational Capacity: Cities need a well-established, budget-constrained mobility planning process that effectively guides long-term transportation infrastructure development.** This requires institutions to have the proper organization, tools, and processes in place to achieve goals. One indicator of this is the presence of well-planned, long-range, capital-constrained mobility plans.

- **Technical Capacity: Countries need to be able to plan and implement high-quality, well-designed transport infrastructure without major project delays.** This requires an institution's staff (or consultants) to have the technical ability to collect, analyze, and use data or to plan, design, and engineer infrastructure or to structure complicated finance schemes to achieve goals. It also requires in-house expertise to structure tenders and monitor performance by contractors. One indicator of this is the record of project quality and on-time, on-budget project delivery.

Appendix –Project Financing Data

City	Project	Infrastructure Type	Year Opened	Project Total Cost in 2013 USD	Length (km)	National Government	State Government
BRAZIL							
Curitiba	BRT "Linha Verde"	BRT	2010	$241,542,000	34	31%	0%
Rio de Janeiro	TransOeste	BRT	2012	838,258,000	55	0%	0%
Rio de Janeiro	TransCarioca	BRT	2014	$573,942,000	39	0%	0%
Belo Horizonte	Antônio Carlos-Pedro 1	BRT	2014	$361,870,000	15	0%	34%
Belo Horizonte	Cristiano Machado	BRT	2014	$28,284,000	7	0%	0%
Fortaleza	Avenida Alberto Craveiro	BRT	2014	$15,124,400	3	0%	0%
Rio de Janeiro	TransOlimpica	BRT	2015	$657,012,000	23	0%	0%
Sao Paulo	Expresso Tiradentes	BRT	2007	$1,290,262,677	10	75%	0%
São Paulo	Monorail line 15 - silver (vila prudente - Hospital Cidade Tiradentes)	Rail	2014	$2,414,347,000	25	0%	100%
São Paulo	monorail line 17 - gold - Jabaquara-São Paulo/Morumbi	Rail	2015	$2,070,086,956	18	0%	100%
Salvador	Metro (Line 1 and 2)	Rail	2014	$1,565,217,391	35	35%	31%
Rio de Janeiro	SuperVia Renovation	Rail	2020	$1,607,408,360	225	0%	40%
São Paulo	Line IV Metro - yellow	Rail	2010	$2,902,921,000	14	0%	74%
Rio de Janeiro	Metro Line 4: Ipanema to Jardim Oceanico	Rail	2016	$3,825,000,000	16	0%	88%
Rio de Janeiro	PPP|Port Maravilha Light Rail	Rail	2016	$450,000,000	28	0%	0%
Rio de Janeiro	Linha Amarela	Highway	1997	$320,000,000	20	0%	0%
São Paulo	BR-116/SP - RodoAnel - Trecho Norte	Highway	2018	$2,323,000,000	44	0%	100%
Belo Horizonte	VIA 710 (Andradas/Cristiano Machado	Highway	2015	$74,820,000	4	0%	0%
Fortaleza	Eixo Via Expressa/Raul Barbosa	Highway	2014	$64,930,000	7	0%	0%
MEXICO							
Monterrey	Ecovía Line 1	BRT	2014	$128,230,227	30	37%	22%
Puebla	RUTA, Line 1	BRT	2013	$123,998,824	19	26%	37%
Puebla	RUTA, Line 2	BRT	2014	$248,665,446	20	24%	35%
Chihuahua	Vivebús	BRT	2013	$77,138,153	20	21%	31%
Estado de Mexico	Mexibus Línea 1 - Cd Azteca - Tecamac	BRT	2010	$125,791,216	16	0%	60%
Estado de Mexico	Mexibus Línea 3 Chimalhuacán - Pantitlán	BRT	2013	$134,024,021	15	15%	25%
Mexico City	Metrobús Líneas 1-4	BRT	2005	$578,173,869	93	0%	70%
Mexico City	Metrobús Línea 5	BRT	2013	$63,523,884	10	0%	70%
León	Optibús Etapa 1	BRT	2003	$66,957,736	25	0%	38%
Mexico City	Supervía Poetas	Highway	2012	$463,117,871	7	0%	0%
Mexico City	Segundo Piso Fase 1 (Distr. Vial San Antonio)	Highway	2003	$82,145,415	4	0%	100%
Mexico City	Segundo Piso Fase 2 (San Antonio - San Jerónimo)	Highway	2004	$218,685,450	10	0%	100%
La Laguna	Periferico Gómez Palacio - Lerdo	Highway	2012	$25,271,343	17	100%	0%
Aguascalientes	Paso a desnivel del 2 anillo (Av. Aguascalientes)	Highway	2010	$15,603,150	1	100%	0%
Querétaro	Anillo Vial Metropolitano II	Highway	2010	$30,068,776	10	100%	0%
Oaxaca	Distribuidor Vial 5 Señores	Highway	2014	$21,110,362	2	100%	0%
Mexico City	Metro Línea 12 Extension	Rail	2015	$621,687,640	4	24%	76%
Mexico City	Línea 12 Metro Ciudad de México	Rail	2012	$2,167,883,661	25	27%	73%
Zona Metropolitana/ Valle de Mexico	Suburban Rail Line 1	Rail	2009	$2,109,555,525	27	20%	0%
Monterrey	Línea 3 Tren subterráneo de Monterrey	Rail	2015	$438,554,217	8	28%	37%

City Government	Government Owned Enterprise	Other	Private Investment	National Development Bank	State Government	Commercial Bank	Multilateral Development Bank	Export Credit Agency	Other	Portion of Project with No Loan Financing
60%	0%	0%	9%	3%	0%	6%	31%	0%	0%	60%
96%	0%	0%	4%	0%	0%	3%	0%	0%	0%	97%
94%	0%	0%	6%	75%	0%	4%	0%	0%	0%	21%
65%	0%	0%	1%	49%	0%	1%	0%	0%	0%	50%
92%	0%	0%	8%	84%	0%	6%	0%	0%	0%	10%
90%	0%	0%	10%	70%	0%	7%	0%	0%	0%	23%
84%	0%	0%	16%	0%	0%	11%	0%	0%	0%	89%
24%	0%	0%	1%	22%	0%	1%	0%	0%	0%	77%
0%	0%	0%	0%	31%	0%	0%	0%	0%	0%	69%
0%	0%	0%	0%	58%	0%	0%	0%	0%	0%	42%
0%	0%	0%	34%	0%	0%	24%	0%	0%	0%	76%
0%	0%	0%	60%	44%	0%	0%	37%	0%	0%	18%
7%	0%	0%	19%	0%	0%	13%	30%	0%	0%	57%
0%	0%	0%	12%	43%	0%	8%	0%	0%	0%	49%
55%	0%	0%	45%	54%	0%	32%	0%	0%	0%	15%
48%	0%	0%	52%	0%	0%	36%	8%	0%	0%	56%
0%	0%	0%	0%	26%	0%	0%	74%	0%	0%	0%
100%	0%	0%	0%	44%	0%	0%	0%	0%	0%	56%
100%	0%	0%	0%	93%	0%	0%	0%	0%	0%	7%
0%	0%	0%	41%	1%	0%	44%	9%	0%	0%	46%
0%	0%	0%	37%	2%	0%	50%	0%	0%	0%	48%
0%	0%	0%	41%	2%	0%	45%	0%	0%	0%	53%
20%	0%	0%	28%	1%	0%	40%	0%	0%	0%	59%
0%	0%	0%	40%	1%	0%	49%	0%	0%	0%	50%
0%	0%	0%	60%	1%	0%	71%	0%	0%	0%	28%
0%	0%	0%	30%	2%	0%	32%	0%	0%	0%	66%
0%	0%	0%	30%	2%	0%	32%	0%	0%	0%	66%
26%	0%	0%	36%	0%	0%	25%	0%	0%	0%	75%
0%	0%	0%	100%	0%	0%	100%	0%	0%	0%	0%
0%	0%	0%	0%	0%	0%	4%	0%	0%	0%	96%
0%	0%	0%	0%	0%	0%	4%	0%	0%	0%	96%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	3%	0%	0%	0%	97%
0%	0%	0%	0%	0%	0%	30%	0%	0%	0%	70%
0%	0%	0%	80%	0%	0%	80%	0%	0%	0%	20%
0%	0%	0%	34%	0%	0%	40%	0%	0%	0%	60%

City	Project	Infrastructure Type	Year Opened	Project Total Cost in 2013 USD	Length (km)	National Government	State Government
INDIA							
Indore	Indore iBus BRT	BRT	2013	$54,125,347	11	25%	11%
Ahmedabad	Janmarg BRT Phase 1 + 2	BRT	2009	$264,313,320	88	32%	14%
Delhi	Delhi High Capacity Bus System (HCBS) Pilot	BRT	2008	$23,458,613	6	0%	100%
Surat	Surat BRTS	BRT	2014	$137,081,466	11	44%	18%
Pimpri Chinchwad	Primpri Chinchwad BRTS	BRT	2015	$246,719,614	45	32%	15%
Mumbai	Worli-Bandra Sealink	Highway	2010	$379,752,075	6	0%	6%
Bangalore	Kempegowda International Airport (KIA) Road/Expressway - NH-7 Upgradation Project	Highway	2014	$271,466,288	22	40%	0%
Hyderabad	Hyderabad Outer Ring Road (ORR) Phase 1 & 2	Highway	2009	$1,275,119,617	22	0%	67%
Delhi	Delhi Metro Phase 1 + 2	Rail	2002	$7,310,987,706	167	16%	20%
Mumbai	Mumbai Metro Line 1	Rail	2014	$811,107,286	11	11%	0%
Hyderabad	Hyderabad Metro Phase I	Rail	2017	$3,900,000,000	72	8%	11%
Bangalore	Bangalore Namma Metro Phase 1	Rail	2015	$4,427,089,468	42	11%	11%
Kochi	Kochi Metro Phase 1	Rail	2016	$934,630,895	26	14%	16%
USA							
Cleveland	HealthLine	BRT	2008	$207,680,000	11	49%	30%
Eugene	Franklin Corridor (Green Line)	BRT	2007	$26,567,460	6	81%	0%
Los Angeles	Orange Line (Original)	BRT	2005	$375,640,000	23	6%	50%
Charlotte	LYNX Blue Line	Rail	2007	$503,130,000	16	43%	25%
DC Metro Area	Silver Line Phase 1	Rail	2014	$3,142,470,000	19	31%	6%
Minneapolis	METRO Blue Line	Rail	2004	$902,914,600	20	58%	17%
Los Angeles	Crenshaw Light Rail	Rail	2018	$1,750,000,000	14	6%	14%
Austin	183A Turnpike	Highway	2007	$383,426,843	19	0%	25%
Washington DC Metro Area	Intercounty Connecter	Highway	2011	$2,484,620,000	29	1%	99%
New York City Metropolitan Area	Kosciuszko Bridge Replacement, I-278 over Newtown Creek	Highway	2018	$989,000,000	2	85%	15%
COLOMBIA							
Bogotá	TransMilenio Phase 1	BRT	2000	$761,560,732	41	48%	0%
Bogotá	TransMilenio Phase 2	BRT	2006	$1,387,547,763	42	56%	0%
Bogotá	TransMilenio Phase 3	BRT	2012	$909,542,468	37	56%	0%
Barranquilla	Transmetro	BRT	2010	$270,135,988	14	61%	0%
Cali	Mio	BRT	2009	$835,293,533	49	73%	0%
Cartagena	Transcaribe	BRT	2014	$551,884,038	13	26%	0%
Pereira	Megabús	BRT	2006	$143,811,800	27	52%	0%
Bucaramanga	Metrolínea	BRT	2009	$345,876,940	50	58%	0%
Medellín	Metroplus	BRT	2012	$392,999,415	13	58%	0%
Medellín	Metro de Medellín	Rail	1995	2,174,000,000.00	35	40%	0%
Medellín	Tranvía de ayacucho	Rail	2018	$324,599,000	4	70%	0%
Bogotá	Metro de Bogotá	Rail	2018	$3,450,000,000	35	70%	0%
Medellín	Metrocable Línea J	Cable	2008	$47,000,000	3	0%	0%
Medellín	Metrocable Línea K	Cable	2004	$24,000,000	2	0%	0%
Medellín	Carrera 80	Highway	2014	$46,102,000	4	0%	0%
Cali	Avenida Colombia Underpass	Highway	2013	$12,435,326	1	0%	0%
Cali	Intersección a desnivel autopista sur calle 10 con carrera 44 (Highway Underpass)	Highway	2018	$17,289,473	0	0%	0%

City Government	Government Owned Enterprise	Other	Private Investment	National Development Bank	State Government	Commercial Bank	Multilateral Development Bank	Export Credit Agency	Other	Portion of Project with No Loan Financing
16%	45%	1%	2%	0%	0%	2%	0%	0%	0%	98%
46%	0%	0%	8%	0%	0%	8%	0%	0%	0%	92%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
27%	0%	0%	11%	0%	0%	9%	0%	0%	0%	91%
53%	0%	0%	0%	0%	0%	0%	13%	0%	0%	87%
0%	94%	0%	0%	0%	9%	84%	0%	0%	0%	7%
0%	0%	0%	60%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	33%	0%	0%	9%	48%	0%	0%	43%
0%	64%	0%	0%	3%	2%	0%	0%	54%	0%	41%
0%	7%	0%	82%	0%	0%	55%	0%	0%	0%	45%
0%	0%	0%	81%	0%	0%	63%	0%	0%	0%	37%
0%	79%	0%	0%	7%	15%	10%	7%	37%	0%	24%
0%	71%	0%	0%	5%	17%	21%	28%	0%	0%	29%
5%	0%	16%	0%	0%	0%	0%	0%	0%	5%	95%
19%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
44%	0%	0%	0%	0%	0%	0%	0%	0%	95%	5%
32%	0%	0%	0%	0%	16%	0%	0%	0%	32%	52%
17%	0%	47%	0%	0%	3%	0%	0%	0%	63%	33%
0%	0%	24%	1%	0%	13%	0%	0%	0%	0%	87%
80%	0%	0%	0%	31%	11%	0%	0%	0%	47%	11%
5%	0%	70%	0%	22%	0%	0%	0%	0%	55%	24%
0%	0%	0%	0%	22%	0%	0%	0%	0%	71%	8%
0%	0%	0%	0%	0%	0%	0%	0%	0%	10%	90%
34%	0%	0%	18%	0%	0%	0%	14%	5%	0%	81%
39%	0%	0%	6%	0%	0%	53%	17%	6%	0%	24%
39%	0%	0%	5%	0%	0%	53%	17%	6%	0%	24%
29%	0%	0%	10%	0%	0%	52%	18%	0%	0%	30%
27%	0%	0%	0%	0%	0%	48%	22%	0%	0%	30%
14%	0%	0%	60%	0%	0%	62%	8%	0%	0%	30%
36%	0%	0%	12%	0%	0%	54%	16%	0%	0%	30%
24%	0%	0%	18%	0%	0%	52%	18%	0%	0%	30%
39%	0%	0%	3%	0%	0%	53%	17%	0%	0%	30%
60%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
30%	0%	0%	0%	0%	0%	0%	77%	0%	0%	23%
30%	0%	0%	0%	0%	0%	49%	21%	0%	0%	30%
100%	0%	0%	0%	0%	0%	70%	0%	0%	0%	30%
100%	0%	0%	0%	0%	0%	70%	0%	0%	0%	30%
28%	0%	0%	72%	0%	0%	0%	0%	0%	0%	100%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
100%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%

City	Project	Infrastructure Type	Year Opened	Project Total Cost in 2013 USD	Length (km)	National Government	State Government
CHINA							
Beijing	BRT Line 1	BRT	2004	$84,058,342	79	0%	0%
Lanzhou	Lanzhou BRT	BRT	2012	$70,249,206	9	0%	0%
Guangzhou	Guangzhou BRT	BRT	2010	$176,471,365	23	0%	0%
Yichang	Yichang BRT	BRT	2015	$163,492,063	24	0%	0%
Lanzhou	Lanzhou Metro Line 1	Rail	2015	$3,168,000,000	34	0%	14%
Guangzhou	Guangzhou Metro Line 1	Rail	1999	$1,623,000,000	19	0%	0%
Shenzhen	Shenzhen Metro Line3	Rail	2011	$1,855,408,197	33	0%	0%
Guangzhou	Guangzhou Metro Line 2	Rail	2000	$1,449,180,328	18	0%	0%
Guangzhou	Guangzhou Metro Line 3	Rail	2002	$2,458,403,066	36	0%	0%
Shanghai	Metro Line 2	Rail	2000	$1,540,983,607	19	0%	0%
Beijing	Metro Line 4	Rail	2009	$2,573,770,492	29	0%	0%
Guangzhou	Inner loop	Highway	2000	$1,030,819,672	27	0%	0%
Beijing	4th Ring Road	Highway	2001	$879,333,253	65	0%	0%
Guangzhou	Xinguang Expressway (Xinjiao Nan Rd to Guangming Bei Rd Section)	Highway	2007	$396,148,063	15	0%	0%
Yichang	Dongshan Si Rd	Highway	2018	$396,148,063	23	0%	0%
FRANCE							
Besançon	Line 1 Tramway	Rail	2014	$289,175,000	15	14%	0%
Dijon	Line 1+2 Tramway	Rail	2012	$506,060,000	19	12%	10%
Le Havre	Line 1+2 Tramway	Rail	2012	$541,490,000	13	13%	3%
Reims	Line 1 Tramway	Rail	2011	$486,070,000	11	0%	0%
Lyon	Line 4 Tramway	Rail	2013	$310,360,000	16	0%	0%
Paris	TVM Rungis - Croix de Berny RER	BHLS	2007	$107,767,000	22	27%	73%
Rouen	TEOR (Phase 1)	BRT	2002	$205,592,000	38	37%	23%
Metz	Mettis	BHLS	2013	$198,193,700	18	17%	9%
Paris	A86 Duplex Toll Tunnels	Highway	2011	$2,600,000,000	79	0%	0%
Gascogne (Langon-Pau)	A65	Highway	2010	$1,394,094,000	150	0%	0%
Loiret	A19 (Artenay - Courtenay)	Highway	2009	$1,128,219,000	101	6%	0%
INDONESIA							
Jakarta	Transjakarta - Line 12	BRT	2012	$34,310,345.73	24	0%	100%
Jakarta	Transjakarta - Line 11	BRT	2011	$37,028,244.38	11	0%	100%
Jakarta	Transjakarta - Line 2 & 3	BRT	2004	$81,378,081.38	14	0%	100%
Jakarta	MRT	Rail	2018	$1,539,009,854.64	14	49%	51%
Medan	Medan-Kualanamu Highway	Highway	2014	$131,120,412.73	18	100%	0%
Surabaya	Surabaya-Gempol	Highway	2013	$97,342,548.43	14	0%	0%
Jakarta	Jakarta Outer Ring Road - JORR W2 (Kebon Jeruk - Ulujami)	Highway	2013	$214,153,606.54	8	0%	0%
Jakarta	Kemayoran - Kampung Melayu	Highway	2020	515,568,967.20	10	0%	0%
Jakarta	Semanan - Sunter	Highway	2020	1,052,857,003.80	20	0%	0%
Jakarta	Ulujami - Tanah Abang	Highway	2020	518,380,219.99	9	0%	0%
Jakarta	Pasar Minggu - Casablanca	Highway	2020	597,684,220.77	9	0%	0%
Jakarta	Sunter - Pulo Gebang - Tambelang	Highway	2020	475,083,227.88	9	0%	0%
Jakarta	Duri Pulo - Kampung Melayu	Highway	2020	764,313,248.32	13	0%	0%
SOUTH AFRICA							
Johannesburg	Rea Vaya 1a	BRT	2009	$311,634,023	30	85%	0%
Johannesburg	Rea Vaya Phase 1b	BRT	2013	$234,725,000	18	83%	0%
Tshwane	A Re Yeng Phase IA"	BRT	2017	$96,840,800	7	87%	0%
Cape Town	MyCiTi Phase IA as of 2010	BRT	2010	$404,514,085.00	17	100%	0%
Johannesburg	Gauteng Freeway Improvement Project Phase I	Highway	2011	$3,067,205,737.08 "	185	100%	0%

City Government	Government Owned Enterprise	Other	Private Investment	National Development Bank	State Government	Commercial Bank	Multilateral Development Bank	Export Credit Agency	Other	Portion of Project with No Loan Financing
63%	37%	0%	0%	0%	0%	37%	0%	0%	0%	63%
53%	47%	0%	0%	0%	0%	32%	53%	0%	0%	16%
96%	4%	0%	0%	0%	0%	77%	0%	0%	0%	23%
100%	0%	0%	0%	0%	0%	30%	62%	0%	0%	8%
58%	28%	0%	0%	26%	0%	39%	0%	0%	0%	36%
100%	0%	0%	0%	0%	0%	0%	0%	33%	0%	67%
85%	15%	0%	0%	0%	0%	50%	0%	0%	0%	50%
100%	0%	0%	0%	0%	0%	27%	0%	0%	0%	74%
100%	0%	0%	0%	0%	0%	41%	0%	0%	0%	59%
67%	33%	0%	0%	0%	0%	33%	0%	0%	0%	67%
85%	15%	0%	0%	0%	0%	32%	0%	0%	0%	68%
100%	0%	0%	0%	0%	0%	0%	19%	0%	0%	81%
75%	25%	0%	0%	50%	0%	0%	0%	0%	0%	50%
0%	100%	0%	0%	0%	0%	65%	0%	0%	0%	35%
100%	0%	0%	0%	0%	0%	40%	0%	0%	0%	60%
86%	0%	0%	0%	28%	0%	0%	21%	0%	0%	51%
77%	0%	1%	0%	22%	0%	0%	50%	0%	0%	28%
81%	0%	3%	0%	60%	0%	0%	0%	0%	0%	40%
52%	0%	0%	48%	0%	0%	48%	0%	0%	0%	52%
100%	0%	0%	0%	0%	0%	8%	0%	0%	0%	92%
0%	0%	0%	0%	0%	0%	21%	0%	0%	0%	79%
28%	0%	12%	0%	0%	0%	15%	0%	0%	0%	86%
50%	0%	5%	19%	0%	0%	0%	36%	0%	0%	64%
0%	0%	0%	100%	0%	0%	80%	0%	0%	0%	20%
0%	0%	0%	100%	0%	0%	80%	0%	0%	0%	20%
6%	0%	0%	88%	0%	0%	73%	0%	0%	0%	27%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	85%	0%	15%
0%	0%	0%	0%	0%	0%	0%	0%	90%	0%	10%
0%	100%	0%	0%	0%	0%	22%	0%	0%	0%	57%
0%	100%	0%	0%	0%	0%	22%	0%	0%	0%	57%
0%	100%	0%	0%	0%	0%	22%	0%	0%	0%	57%
0%	100%	0%	0%	0%	0%	22%	0%	0%	0%	57%
0%	100%	0%	0%	0%	0%	22%	0%	0%	0%	57%
0%	100%	0%	0%	0%	0%	22%	0%	0%	0%	57%
0%	100%	0%	0%	0%	0%	22%	0%	0%	0%	57%
0%	100%	0%	0%	0%	0%	22%	0%	0%	0%	57%
15%	0%	0%	0%	0%	0%	0%	0%	15%	0%	85%
17%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
13%	0%	0%	0%	0%	0%	0%	0%	13%	0%	88%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	100%

ITDP | Institute for Transportation & Development Policy

9 East 19th Street, 7th Floor, New York, NY 10003 USA
Tel: +1-212-629-8001 • Fax: +1-646-380-2360 • Email: mobility@itpd.org
www.itdp.org

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