



São Paulo, Brazil.
Image: Ana Paula Hirma

Best Practice in National Support for Urban Transportation

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

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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 cities 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 city-level or 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 127 urban rapid transport projects, as well as data on urban transport capacity. To understand which countries are the most successful at growing their rapid

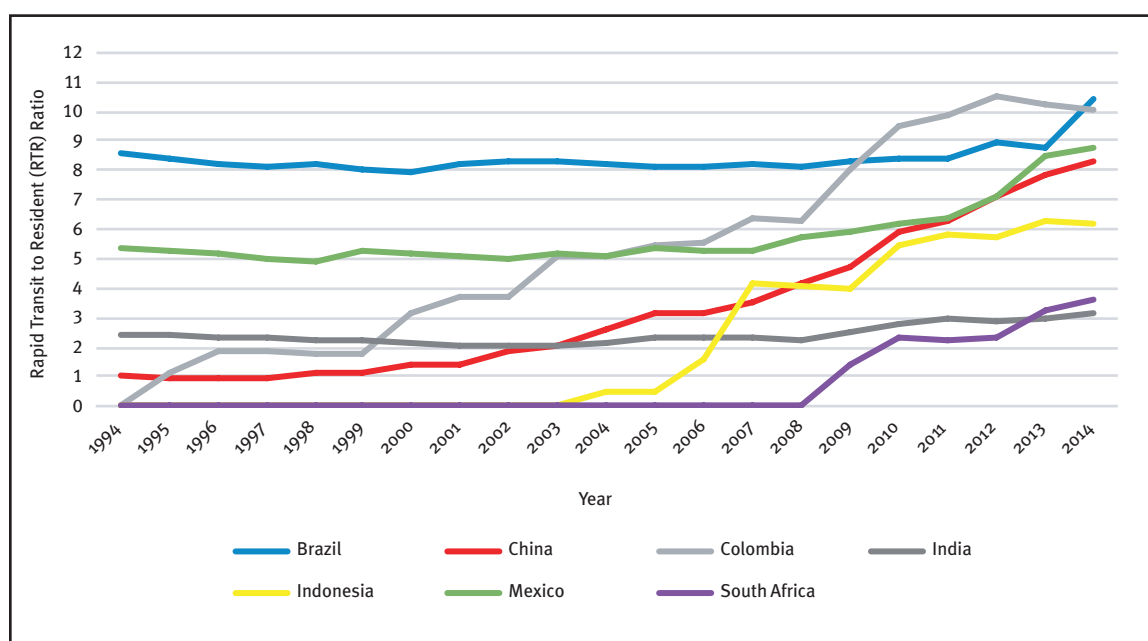


Figure 1: Change in RTR Ratio in Seven Countries, 1994-2014

	RTR Growth: Annual Kilometer of Mass Transit Added per 1 Million Resi- dents, 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, Gover- nance, and Imple- mentation
France	0.80	\$82	\$66	43%	High
Colombia	0.49	\$19	\$27	69%	Medium
China	0.49	\$44	\$62	56%	High
Indonesia	0.44	\$3	\$5	43%	Low
South Africa	0.26	\$2	\$6	3%	Low
Mexico	0.26	\$6	\$15	42%	Medium
Brazil	0.18	\$25	\$77	50%	Medium
United States	0.16	\$26	\$82	44%	Medium
India	0.07	\$6	\$39	36%	Low

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 determines 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.

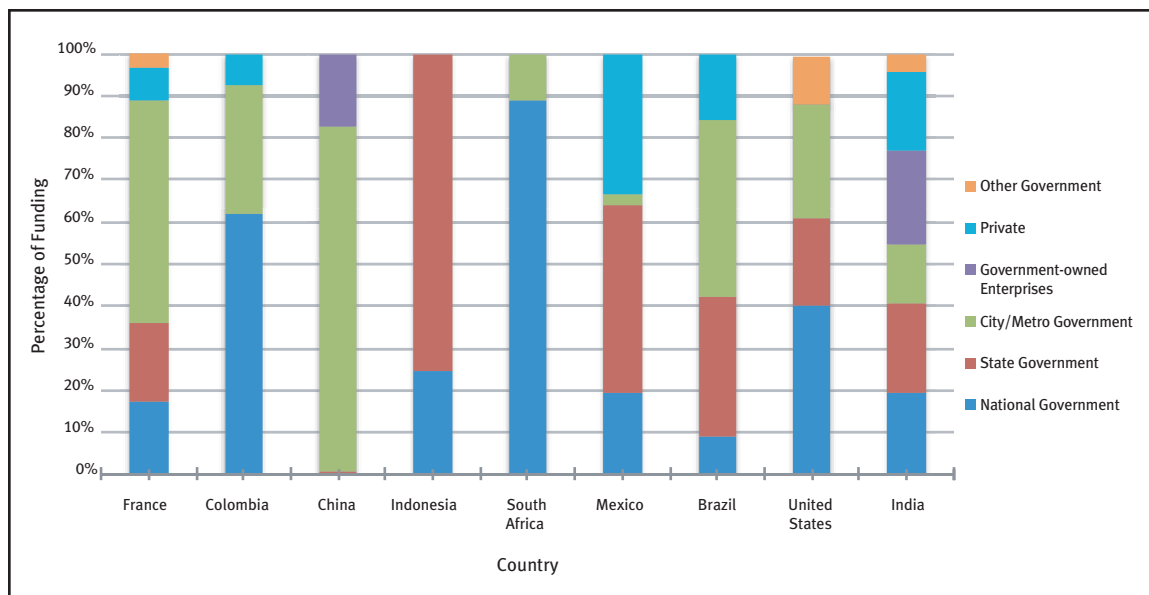


Figure 2: Sources of Mass Rapid Transit Funding (as an average percent of total project cost)

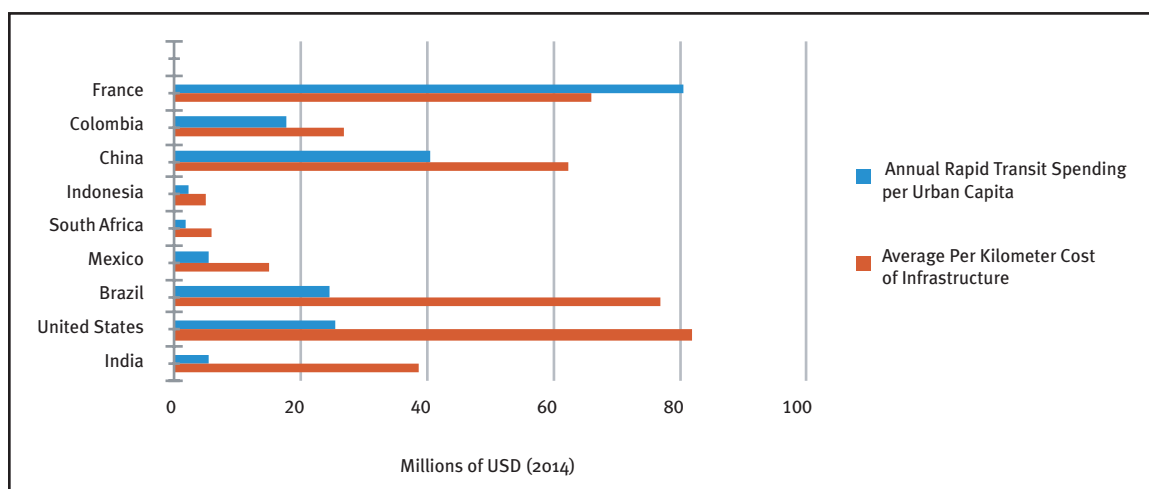


Figure 3: Comparison of Spending per Urban Capita and Infrastructure Costs per Kilometer (2000-2014)

- **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:

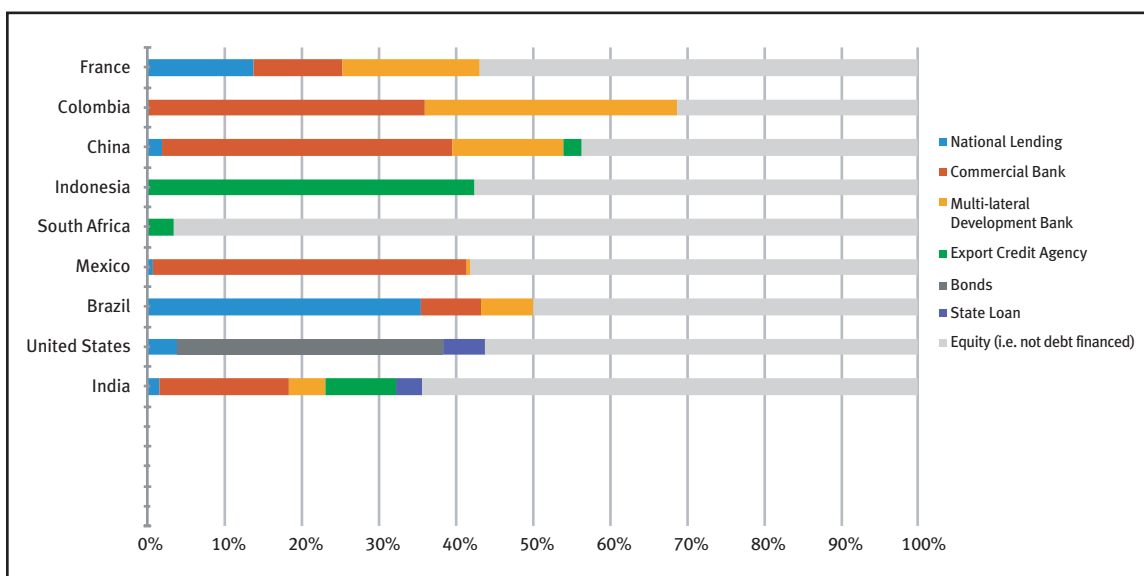


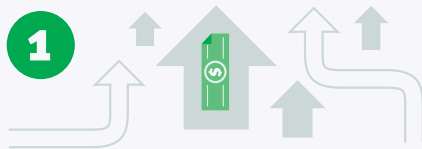
Figure 4: Rapid Transit Debt Finance By Country and Source

- **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?



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.



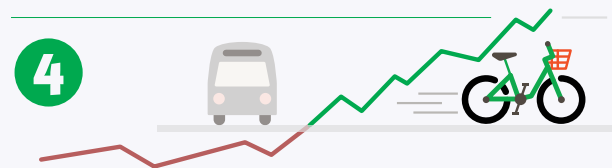
Give Cities the Power

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.



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.



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.



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.



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