ITDP

São Paulo, Brazil.
Image: Ana Paula Hirama

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 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

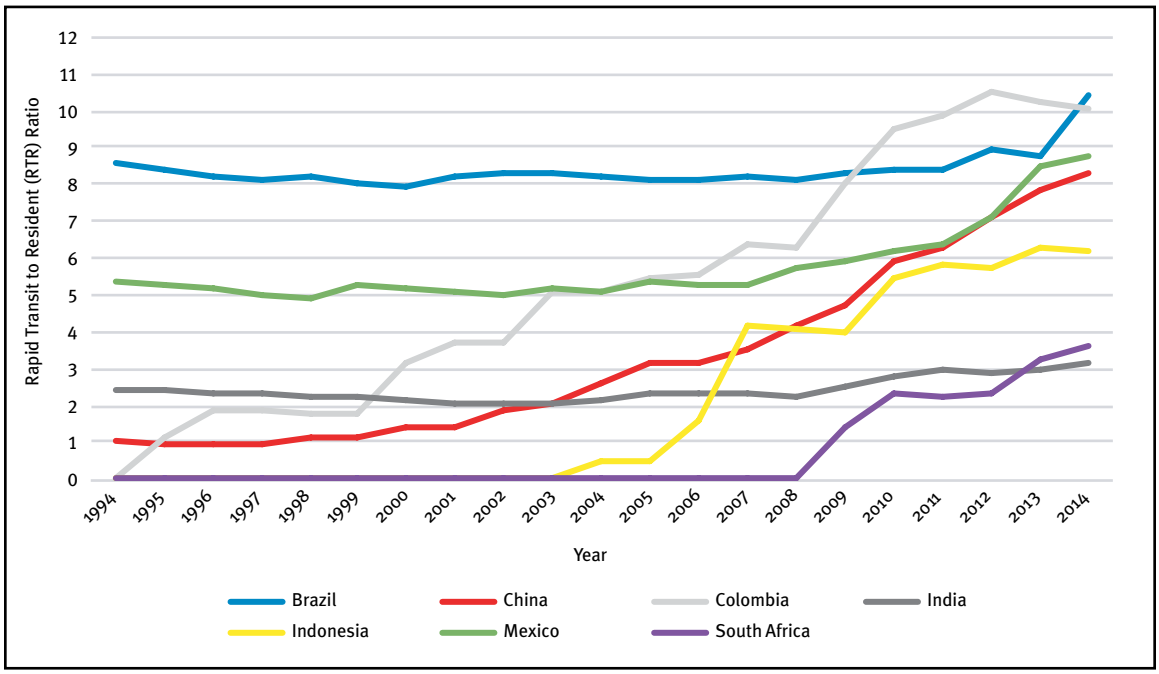

Figure A: Change in RTR Ratio in Seven Countries 1994-2014

	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.

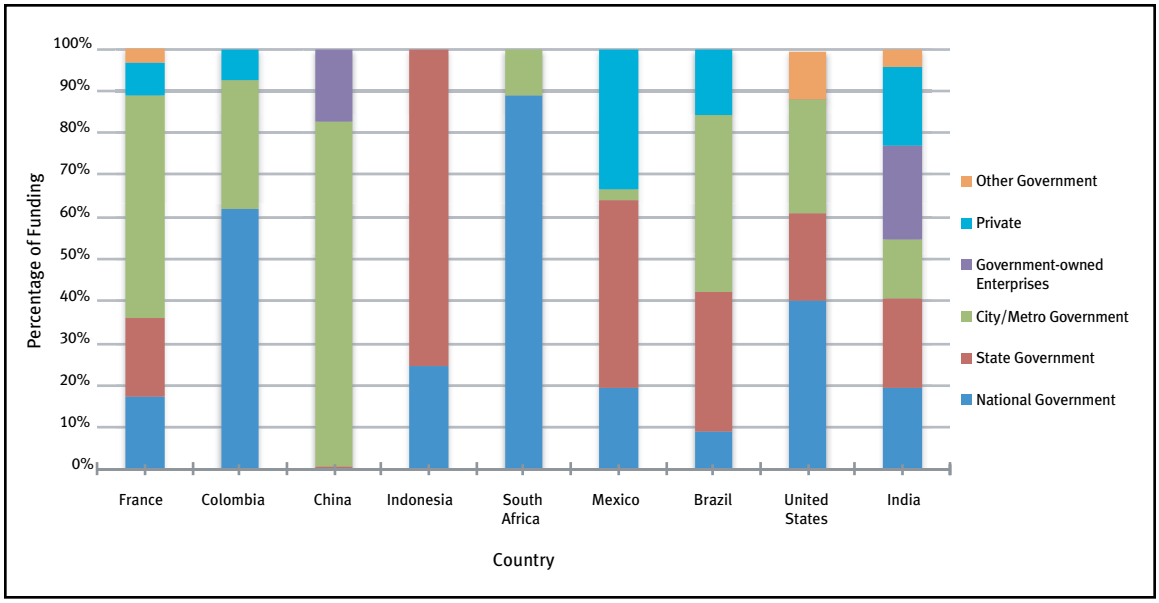

Figure B: Sources of Mass Rapid Transit Funding (as an average percent of total project cost)

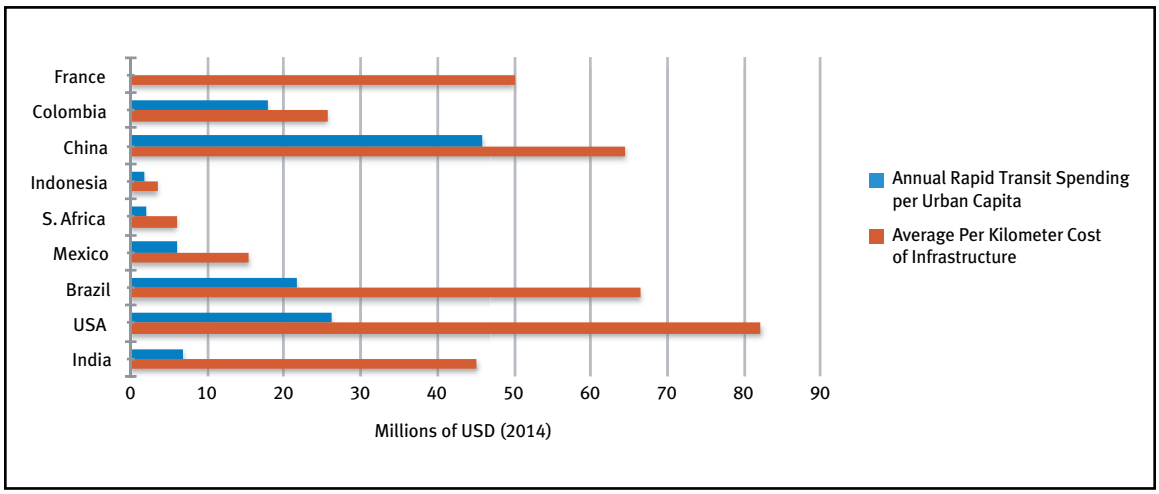

Figure C: Comparison of Spending per Urban Capita and Infrastructure Costs per Kilometer (2000-2014)

- **Cities should build high-quality, cost-effective rapid transit.** Cities that built more bus rapid transit (BRT) than urban rail paid most, however, over the long term when national and state governments build the capacity of local governments to plan,