ITDP

Medellin, Colombia BRT. Image by: Luc Nadal

Best Practice in National Support for Urban Transportation

Part 1: Evaluating Country Performance in Meeting the Transit Needs of Urban Populations

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Introduction

With the world's urban population projected to increase from 3.4 to 6.4 billion between now and 2050, the sustainability of the earth will depend on these new urban residents living as sustainably as possible. One key element of this will be making sure the majority of these new urban residents can live well without depending on the use of the private automobile. Success in large measure will depend on whether the expansion of urban mass transit systems will be able to keep pace with this rapidly growing urban population. Many innovative cities have, on their own initiative, brought about significant long term shifts away from private car use. Overall, however, cities have not expanded their mass transit infrastructure at a pace sufficient to meet the growing needs of their new urban residents, or to stem the risk of irreversible climate change. In a few countries, like Colombia and Mexico, national governments have played an important role making sure that cities have the financing and technical assistance they need to meet their growing mobility challenges.

This paper explores where, whether, and how cities have obtained sufficient help from their national governments to meet their growing urban mobility challenges. With the growing risk of permanent damage to the earth from climate change, it has become imperative to figure out whether there is a role for national governments, and then what that role is, in scaling up municipal level successes to achieve national level changes in urban mobility patterns.

This paper is the first of a multi-part series that tries to specify the best role that national government has played and can play in helping cities deliver the most and highest quality urban mass transit at the fastest speed. This paper reviews the performance of nine countries in terms of the total amount, the quality and the speed of their mass transit infrastructure expansion. After reviewing that data, the paper finds that high quality BRT has allowed some countries to develop more mass transit faster. It will, then, look at which countries are doing the best at developing high quality mass transit of a scale and speed sufficient to curb climate change.

The countries reviewed are: Brazil, China, Colombia, France, India, Indonesia, Mexico, South Africa, and the United States. This group, which represents nearly half the world's population, is a sample of the most important countries, both developed and developing, urbanized and urbanizing, and those that have and have not historically invested in mass rapid transit.

This first paper develops a basic comparative framework for evaluating the degree to which countries have grown their rapid transit networks since 1980. It looks at the types of infrastructure, the quality of that infrastructure and amounts of money invested in each country. This data is, then, compared to urban population growth.

The second paper in the series will take a bottom-up approach, examining in detail a sample of projects in each of these nine countries to understand how transport infrastructure is financed in each country and the degree to which national policy and funding has influenced municipal actions. The third paper will examine in detail those national policies and funding mechanisms that the bottom-up analysis identified as clearly important. All together, the three papers will offer an understanding of the potential for national government to accelerate the expansion of high quality mass transit. It will identify the national government investment and financing practices that have proven most effective in meeting the rapid rise in demand for mobility in growing cities.

France, as an example of a European

approach to urban mass transport, emerges as a clear standard-bearer, with nearly five times more rapid transit per urban resident than the United States, and nearly seven times more than any of the developing countries studied. France, however, achieved this at a very high cost. The most interesting case study is the fast-paced and inexpensive rise of high-quality, mass rapid transit in Colombia (and, to a lesser degree, Mexico and Indonesia), especially as compared to China's slightly slower and much more expensive growth per urban resident in mass rapid transit.

These case studies demonstrate how some countries, despite recent efforts, are making insufficient progress in growing their rapid transit per urban resident. The differences in national policies and funding that explain these differences will only be addressed in future sections.

Key Findings

- In a sample of 9 key countries, only a few are able to substantially increase the amount of quality rapid transit relative to population.
- A good indicator of how well countries are doing is the kilometers of mass rapid transit per urban resident, in cities with population over 500,000. This is known as RTR.
- By this measure, France, as an example of a European approach, is doing the best, but at a high cost.
- Colombia and Indonesia have improved the most at the lowest cost.
- Focusing transit investment on BRT was critical to significant recent growth in kilometers of mass rapid transit in a number of countries.
- The quality of the investment also matters, particularly for BRT. Mainly projects rated Silver or Gold on the BRT Standard inspired replication and scale up. Colombia and Mexico were best practices at building high-quality BRT.
- The explanation for the differences in performance will be discussed in future chapters.

Measuring Mass Rapid Transit Growth

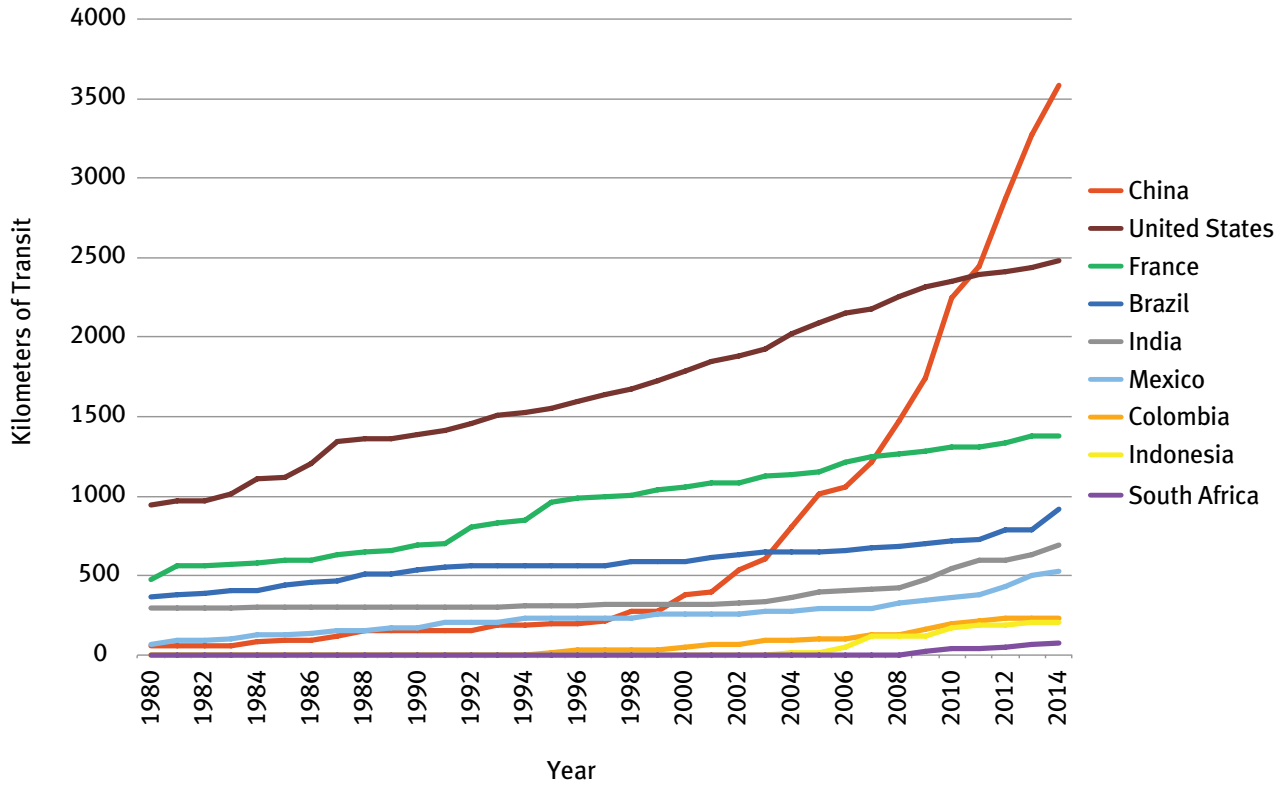
Overall, mass transit investment has taken off in the last two decades in these nine countries, as shown in Figure 1 below. The simplest way to look at the growth in mass rapid transit is by the number of kilometers of rapid transit built since 1980. Mass rapid transit, for the purposes of this report, is taken to include urban-scaled, intra-city bus rapid transit (BRT) that meets the "BRT basic" standard, light rail transit (LRT), and urban heavy metro rail (metro). (Bus and rail services that operate in mixed traffic do not qualify as "rapid transit," and inter-city commuter train services are not included.)

In 1980, nearly 65 percent of the total mass rapid transit in all of nine of these countries was located in the United States (43 percent) and France (22 percent). However, the vast majority of growth in mass rapid transit since then has been in the other countries. Since 2000, over 55 percent of the growth in mass rapid transit kilometers in this sample has occurred in China. This includes approximately 2,800 kilometers of metro rail that China has built since 2000, as well as more than 500 kilometers of high-quality BRT built since 2005. In absolute numbers, China dominates. However, those numbers are not enough to understand the degree to which China's growth in mass rapid transit is keeping pace with its urbanization rate.

China has the world's largest population and third largest land area, and the country is undergoing continued rapid urbanization; it is therefore no surprise that a high proportion of the world's transit is being built there. But comparisons of the growth of urban mass rapid transit are more revealing when they are normalized by urban population. A key indicator in determining whether a country's mass rapid transit infrastructure is keeping pace with urban growth is the number of kilometers of mass rapid transit per million urban residents in cities over 500,000 population, or **the ratio of rapid transit to residents (the RTR ratio)**.

This indicator facilitates comparison between large, fast-growing countries like China and smaller, slower-growing countries like Mexico. Indirectly, it may also prove to be a strong proxy-indicator of whether the cities

Figure 1: Growth of Rapid Transit by Country, 1980 - 2014



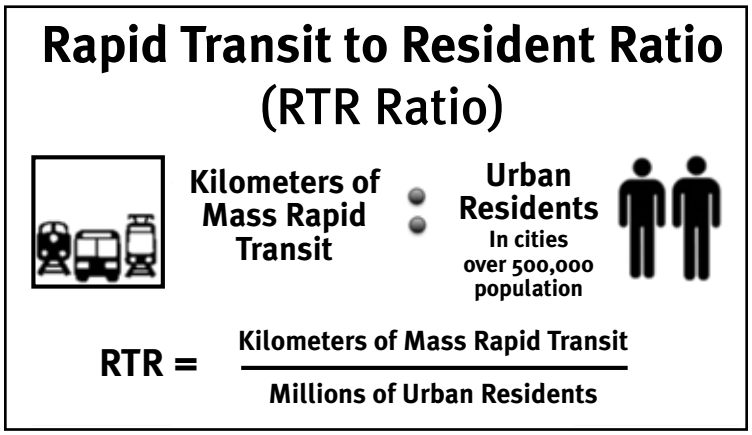
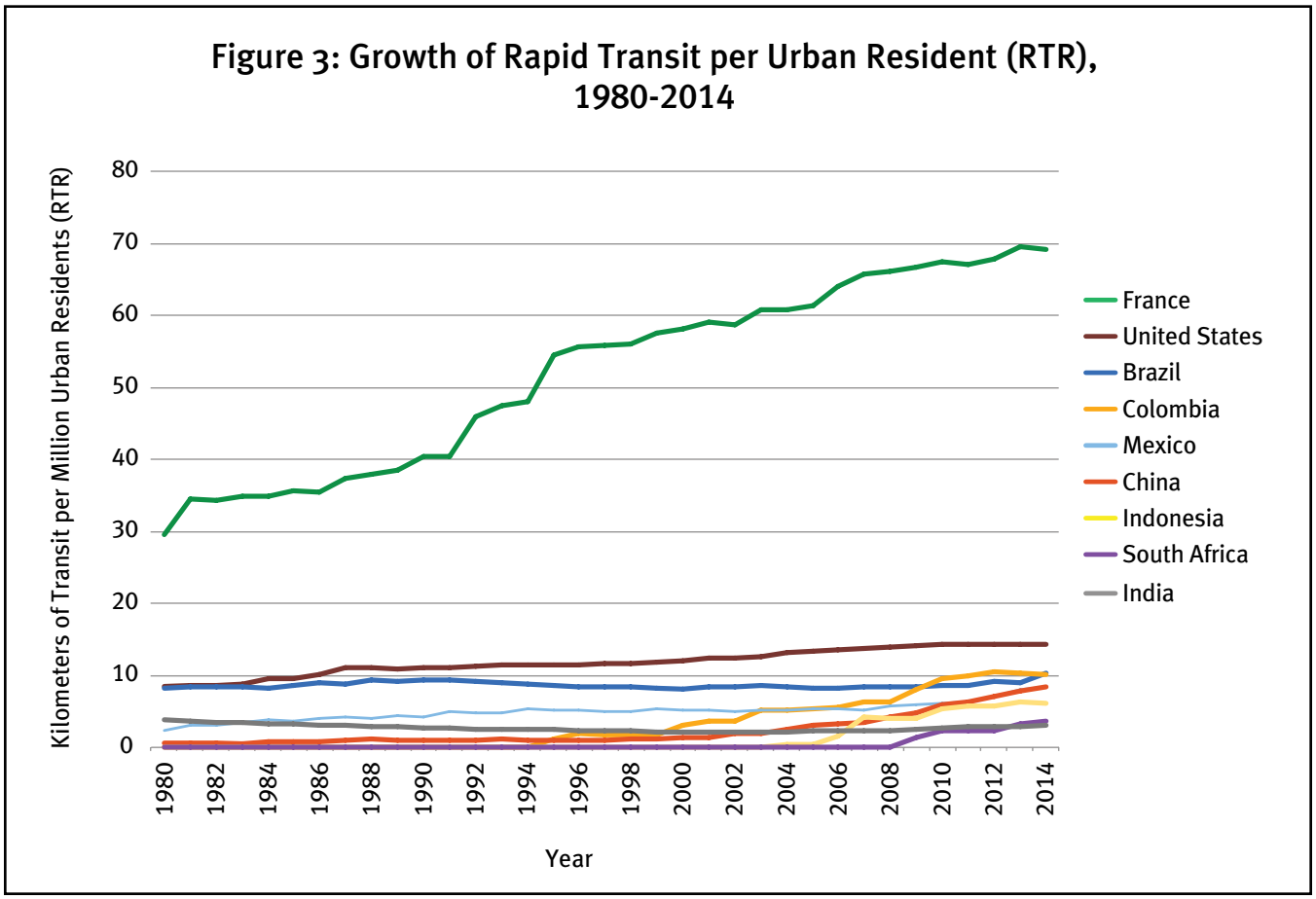


Figure 2: Rapid Transit to Resident (RTR) Ratio

in that country will have a high quality of life, health, and economic competitiveness. Linking RTR ratios to outcomes in these cities is an area of study that is ripe for future research.

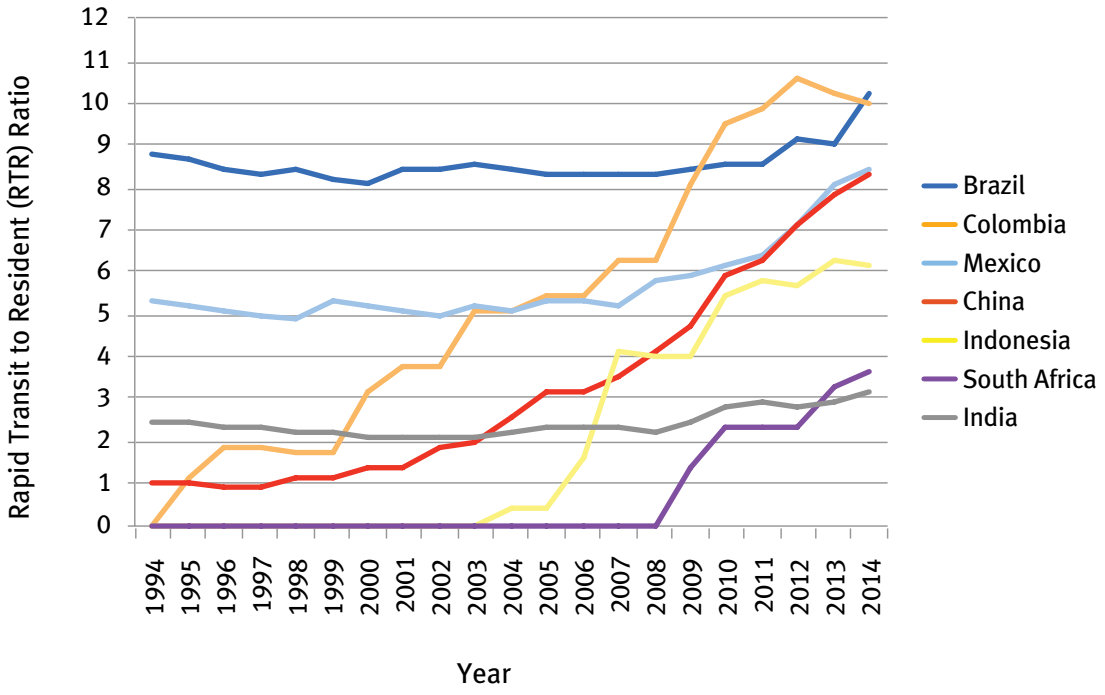
Figure 3, below, is identical to Figure 1 except that the y-axis represents kilometers of rapid transit per million urban residents in cities over 500,000 population (RTR) instead of the total number of kilometers and paints a very different picture of which countries have high levels of rapid transit and growth in rapid transit. In Figure 3, France's current 70 kilometers of rapid transit per million urban residents dwarfs all other countries including the US, which has less than one-fifth the RTR ratio at 14.4 kilometers per million urban residents. And China's soaring growth in rapid transit is much tempered in Figure 3. Although China's growth in kilometers of mass rapid transit was huge in absolute terms in Figure 1, when normalized by its urban population growth in Figure 3 it arrives at a modest RTR ratio of 8.4 kilometers of rapid transit per million urban residents - three fifths of the US RTR and well behind Colombia (10.1) and nearly even with Mexico (8.4) in 2014. Most other countries have significantly flatter growth showing that rapid transit made only small gains over urban population growth. Most troublingly, despite many billions invested in metro rail in recent years, India has the lowest transit access for its citizens of the countries studied with just



Case Study: Colombia

In 1994, Colombia had zero kilometers of mass rapid urban transit. Fifteen years later, Colombia had more kilometers of rapid transit per urban resident than any other developing country in this analysis, including China, which has been vaunted for its rapid metro development. Not only did Colombia increase the number of kilometers of mass rapid transit per urban resident 40 percent more than China did between 2000 and 2010, but it did so while spending over 50 percent less money per urban resident. Why was Colombia so successful in raising its RTR ratio?

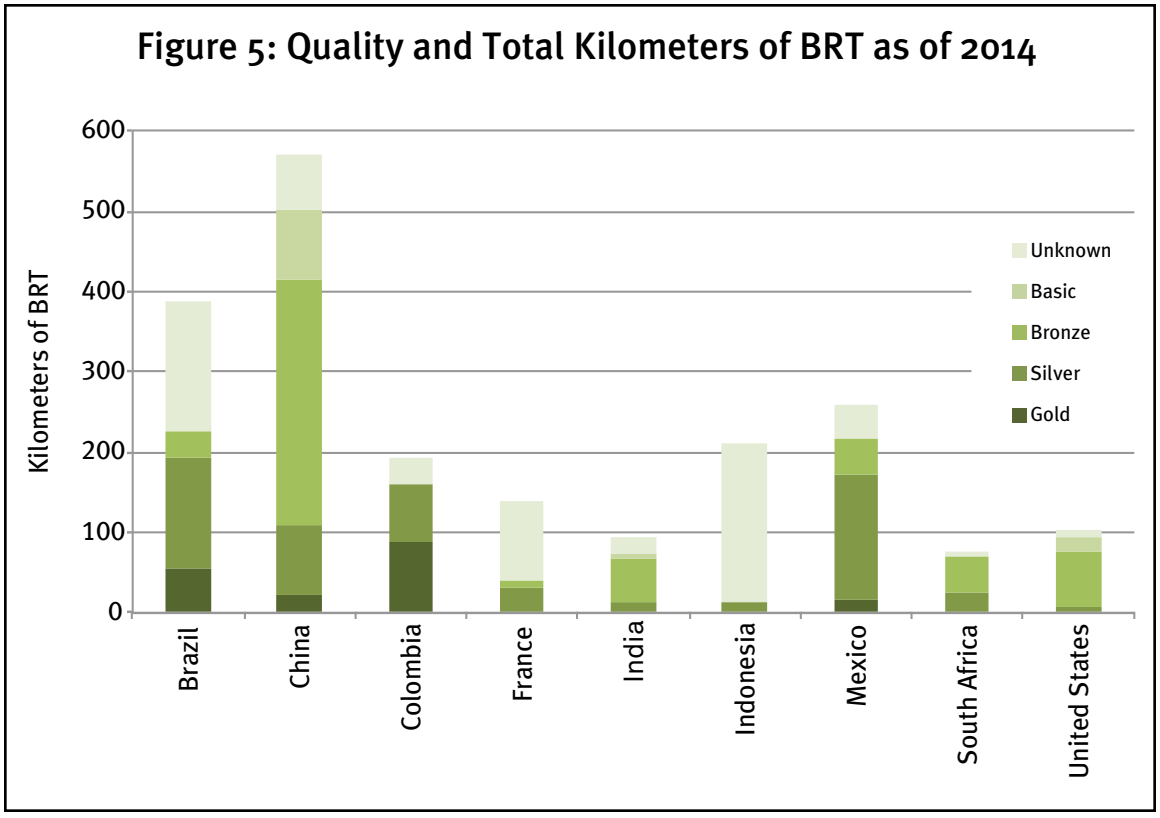
Figure 4: Change of RTR Ratio in Seven Countries, 1994 – 2014



The acceleration in Colombia's RTR ratio was made possible by the demonstration of a successful, robust BRT system in Bogotá, developed by visionary mayor Enrique Peñalosa. The success of Bogotá's system inspired a national program to strategically invest in BRT in Colombia's largest cities. (BRT was chosen due to its low-cost and quick implementation compared to metro and LRT.)

3.2 kilometers of rapid transit per million residents.

The RTR ratio is effective not only for comparing urban rapid transit access in countries of different sizes, but also for monitoring a single country over time as it grows, urbanizes, and builds additional urban rapid transit. Of the nine countries examined here, all managed to grow their mass rapid transit systems more quickly than they urbanized, though the rate of growth in RTR ratio varied. France's high RTR ratio growth rate, which is due to continued investment in mass rapid transit, is especially impressive given that its 1980 RTR ratio was double the 2014 RTR ratio in the United States. Colombia, Mexico, and China are also exhibiting strong growth, as shown in Figure 4. Brazil has experienced a period of decline followed by very slow growth. It is, however, expected to climb quickly to an RTR ratio of 12.2 by 2016, as it builds rapid transit in advance of global sporting events. (South Africa managed to achieve a significant bump in its RTR ratio due to investments made prior to the World



Cup held there in 2010.) The United States and India, however, are barely adding enough new kilometers of mass transit to grow their transit faster than their urban populations. This is especially disconcerting in the case of India, which has a low RTR ratio, with little growth.

Where countries have had a big change in the RTR ratio, bus rapid transit systems have helped achieve the dramatic change.

The Quality of Transit Investments

Most of the metro and light rail investment has been of reasonably good quality. BRT, however, has been of much more variable quality.

This paper relies on *The BRT Standard* to assess the quality of BRT investments. Much of the BRT in China, Indonesia, and the United States is of fairly low quality. As seen in Figure 5, the quality of BRT systems varies widely and where a gold-standard or silver standard BRT served as a pilot or demonstration project, a greater replication of higher standard BRT has occurred. Colombia, as discussed previously (on page 6), did the best in part because TransMilenio served as a catalytic gold-standard BRT project. Mexico City led the way with a silver-standard BRT. Without those high quality demonstration projects, there is a problem with high quality BRT projects reaching scale.

RTR Ratio Growth by Mode

Country	2014 GDP per Capita (PPP)[1]	2014 RTR Ratio (Kilometers of rapid transit per million urban residents)
France	$40,445	69.2
United States	$54,678	14.4
Brazil	$15,153	10.3
Colombia	$13,459	10.1
China	$12,893	8.4
Mexico	$17,925	8.4
Indonesia	$10,157	6.2
South Africa	$12,507	3.6
India	$5,777	3.2

Figure 6: GDP per Capita and RTR Ratio by Country

To some degree, a country's rank with regard to RTR ratio seems to generally follow its rank in GDP per capita—in other words, wealthier countries tend to have more transit per capita. South Africa, with a GDP per capita ($12,500) similar to Colombia and China, ranks far behind those two counties when it comes its RTR ratio of 3.5, which is similar to lower income countries such as India, which has half the GDP per capita of South Africa. Colombia, however, is ranked 83rd in the world for GDP per capita ($13,500), yet its RTR ratio exceeds that of Mexico (which has a GDP per capita that is 33 percent higher, at $17,900, and is ranked 65th) and is nearly identical to that of Brazil (ranked 77th, with a GDP per capita of $15,200). Colombia's rapid expansion of mass transit proves that with investment in BRT, the growth of mass transit can exceed GDP growth, meaning that the mass rapid transit systems in developing countries can catch up to developed countries—in fact, China, Colombia, and Mexico are on course to have a higher RTR ratio than the United States within five to ten years.

Figure 7 below shows the growth in RTR ratio in five-year increments by country and by mode. However, because France's growth dwarfs that of the developing countries, Figure 8 (on page 8) shows the recent growth of the RTR ratio by mode in only the seven developing countries included in this analysis. In this chart, it becomes immediately apparent that BRT has become the main mode by which a developing country can quickly increase its RTR ratio.