A Sustainable Smart Future
New Transport Investment Tool Shows Indian Cities the Way Forward

By Harshad Abhyankar and Shreya Gadepalli

In the next fifteen years, the top hundred cities of India will grow by 125 million new inhabitants, roughly the population of Japan. This is a growth of 60 percent. Unfortunately, India is not investing in mass transit at anything close enough to meet even basic mobility needs, much less to address the issues of inequity and environmental degradation that are growing faster than the population. India has just 3.2 kilometers of rapid transit per million urban residents1, a third of its peers China and Brazil, and less than a twentieth of France.

In 2014, Prime Minister Narendra Modi was elected under a promise of economic growth. Smart Cities was high on the agenda. Through the Smart Cities Challenge, the national government is inviting cities to establish successful models of urban growth. Walking, cycling, and bus-based public transport are high priority areas, intended to shape the urban landscape of tomorrow.

The Smart Cities Challenge is a step in the right direction. However, this initiative does not assess the amount of urban transport investment these cities require to become sustainably smart. ITDP developed a model to do precisely that. The model compares two investment scenarios—Business as Usual (BAU) and Sustainable Smart Future—for each of these cities. (For the purposes of this modeling, we consider metropolitan areas, often consisting of two or more urban local bodies, to be a single city.)

In the BAU scenario, walking, cycling, and public transport continue to be neglected. Trips by city buses stagnate at near present levels—consistent with recent trends. Informal public transport—minibuses and shared autos—cater to part of the public transport demand. With growing incomes, personal motor vehicle ownership doubles every decade (increasing 7 percent per year). More and more people depend on cars for their daily travel needs and cities try to accommodate this deluge of traffic through investments in more roads, flyovers, and parking. As a result of bad urban planning that causes urban sprawl, commutes get longer, intensifying the impact of traffic. Infrastructure costs, user costs, travel times, pollution, and traffic safety worsen.

On the other hand, in the Sustainable Smart Future, cities focus on capping personal motor vehicle use at 20 percent or less through various travel demand management measures, especially parking control. To serve the travel needs of their growing populations, cities invest in adequate walking, cycling, and public transport infrastructure and systems. They also adopt a transit-oriented development (TOD) approach to create dense yet livable neighborhoods along mass transport lines. Cities remain compact and accessible. Trips are short and convenient, and accomplished by walking, cycling, or transport.

Needless to say, transport needs of large cities are different from those of the medium-size cities. The larger cities—eight in all (with a population of five million or more)—should aim to restrict the modal share of personal motor vehicles to no more than 15 percent of all trips. The medium-size cities (one–five million population) could allow a little higher—up to 20

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percent of all trips by personal motor vehicles. All cities regardless of size should also use the TOD approach to keep trip lengths at existing levels or lower.

Large cities may have metro rail on some lines but will also require a large network of bus rapid transit (BRT) and a substantial increase in regular bus services. Medium-size cities, on the other hand, do not need any metro. However, they should invest in an extensive network of BRT along with a wide coverage of frequent, high-quality regular bus service. Cities of all sizes must invest in safe and convenient walking and cycling infrastructure.

There is a startling contrast in the outcomes of the two scenarios. The Sustainable Smart Future is unequivocally the better choice—not only in terms of reducing pollution, fatalities, travel time, and climate impact, but also in the amount of investment required. The financial savings, traffic deaths avoided, greenhouse gas (GHG) emissions reduced, and fuel cost reductions amount to a savings of 40 to 60 percent. More than twenty thousand lives could be saved each year from reducing the number of traffic crashes. About 3.4 trillion Indian rupees (US$ 52 billion2) would be saved over the next decade and a half, a 39 percent reduction over the BAU scenario.

The model takes the existing population of each city, the share of various transport modes used, and an inventory of existing transport infrastructure to set the baseline. Where specific data was not available, baselines were set based on information from other cities of similar size and demographics. Using population growth as the primary input, and empirical factors such as trip rates, trip lengths, and trips per bus, the model calculates the transport infrastructure needs in the two scenarios for each city.

2 R1 USD = 65 Indian rupees
In the BAU scenario, minimal investment is made in city buses to retain services at existing levels, while the majority of funds go to building new road infrastructure to serve trips by personal motor vehicles at acceptable levels of service. In the Sustainable Smart Future model, the control point is trips by personal motor vehicles, capped at 15 to 20 percent depending on city size. The model then assesses the transport infrastructure needs—kilometers of mass rapid transit (including BRT), bus and minibus fleets, kilometers of footpaths and cycle tracks—to effectively serve the remaining 80 to 85 percent of trips in each city in addition to maintaining existing road infrastructure in good order.

Based on this information, the model calculates the investment required for capital expenditure as well as operations and maintenance costs over the coming decade and a half. The model also compares the performance of the two scenarios against various parameters such as air quality, GHG emissions, road safety, and fuel consumption.

Consider the example of Ludhiana—a city with about 1.8 million inhabitants in 2015. The chart above shows the modal split in the baseline year (2015) as well as the two scenarios in 2031. In the BAU scenario, the city would have to spend Rs 125 billion (US$1900 million) to meet the transport needs of its three million people in 2031. About 90 percent of these funds would be spent on roads, flyovers, and parking to serve personal motor vehicle use. The assessment does not take into account the cost of land required for nearly tripling the road infrastructure. The charts below show how lopsided the spending in the BAU scenario is toward infrastructure that benefits personal motor vehicles.

Today Ludhiana does not have any quality walking and cycling infrastructure. It is planning only a small BRT network. In its Sustainable Smart Future, Ludhiana would have to invest heavily in walking and cycling infrastructure, on a much larger bus fleet as well as expanding the BRT network. The tool suggests that Indian cities would need about 40 kilometers of footpaths, 20 kilometers of cycle tracks, 2,000 shared bicycles, and 650 buses per million residents. The cities should also strive to achieve an RTR of at least 25 kilometers MRT per million. Even with such investments, Ludhiana can expect to achieve its mobility target with Rs 42 billion (US$660 million), a savings of 67 percent compared to BAU. This investment will not only provide sustainable mobility to all people, but also reduce traffic fatalities, GHG emissions, and spending on fossil fuels by 45 to 60 percent.

Like the case above, the model was used to assess the investment required in the top hundred cities of India in the two scenarios and how the two scenarios fare across various parameters. The model suggests that until 2031, the hundred cities need to collectively build 14,000 kilometers of footpaths, 7,500 kilometers of cycle tracks, provide more than 600,000 shared cycles for their residents, manufacture 250,000 buses, and build 4,500 kilometers of BRT. The charts on the next page vividly compare the investment in both scenarios and show the benefits achieved in the top hundred cities.

As these outcomes show, adopting the Sustainable Smart Future model brings down capital expenditure, fuel consumption, and travel costs, saving money for government and individual citizens. National and state governments can use this tool to demonstrate a clear, direct comparison of the costs, literal and otherwise, of business as usual. This comparison...
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is a powerful eye-opener that could give the right push toward adopting a sustainable transport policy.

Will this make a difference for Indian cities? There are already some positive signs. The Smart Cities Challenge and the Atal Mission for Rejuvenation and Urban Transformation of the national government have clear guidelines to promote walking, cycling, and public transport. Cities such as Pune are already heading down the right path with investment in BRT.

Though these are good signs, more needs to be done. Beyond working on isolated projects, Pune would have to develop a comprehensive plan that would require investing Rs 250 billion by 2031 on about 250 kilometers of NMT infrastructure, a high-quality bus system with 6,000 buses, and a cycle sharing system with 15,000 cycles. Investment in walking and cycling remain critical to achieving this sustainable, smart future, and some cities are taking the lead. The cities of Coimbatore, Chennai, Gurgaon, and now Delhi are holding car-free days. Chennai is investing in high-quality footpaths where none existed before. It remains to be seen which city will be the leader in establishing cycle share as a viable transport mode.

The Smart Cities Challenge will see an investment of around one trillion rupees (including central, state, and city contributions) over the next five years to develop best practices in the urban sector. Assuming that a quarter of this amount will be spent on transportation initiatives, the top hundred cities still need twenty times as much investment in urban transportation over the next fifteen years to achieve their Sustainable Smart Future. The challenge, in part, is underinvestment in the urban transport sector. But a greater challenge is to redirect the funds into the right kind of infrastructure—not car oriented but people oriented.

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