Connections
Transport & ICT

Time for a Tailored Approach to South African BRTs

Comparing Johannesburg's Bus Rapid Transit with Its Latin American Siblings

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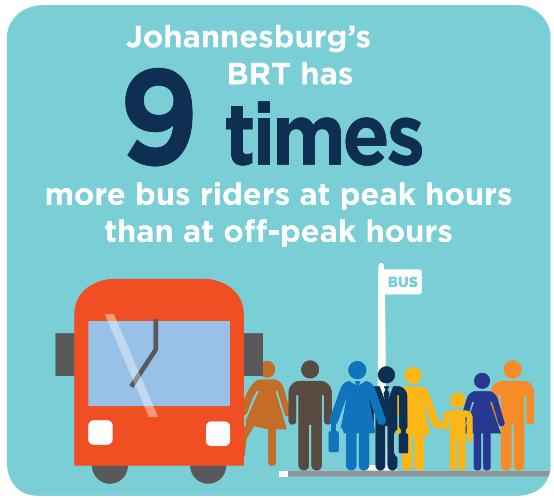
Johannesburg and other cities in South Africa are rolling out integrated rapid public transport networks as part of an overall effort to address significant urban mobility challenges and to increase the use of public transport.

The initial phases of these networks used a traditional Bus Rapid Transit (BRT) trunk and feeder approach, patterned after the successful Latin American systems developed in the 2000s. The Rea Vaya BRT in Johannesburg is South Africa's first such system, with 43.5 km of trunk bus corridors in operation by 2016. But the results in ridership and operating cost recovery from fares were approximately one-third of initial estimates. Urban form and travel demand patterns for transport in South African cities differ greatly from those in Latin America. South Africa's national government, with World Bank support, has been examining these differences to reassess how South African metropolises could interpret and rethink their rapid transit operations, services, and finances.



Tales of Varied Cities

South African metropolises are characterized by very uneven population distribution. The typical urban form is polycentric, with a central business district, high-density low-income townships in the outskirts, and low-density suburbs with single-family detached housing—interspersed with large parcels of land with low-density or scattered development. In contrast, Latin American cities are typically characterized by a much more compact and dense urban form.

Passenger travel demand patterns for South African and Latin American cities also display structural differences. Demand in Johannesburg is characterized by longer and often unidirectional trips and a very large difference between peak and off-peak ridership, or the "peak-to-base" ratio. A typical daily commute distance for a rider in the Rea Vaya system is about 27 km—considerably above the typical distances for large Latin American cities, with Mexico City at 18 km, Bogotá at 12 km, or Lima at 8 km. And the peak-to-base ratio of about 9:1 on the Rea Vaya is disproportionately high compared with Latin American cities, where ratios are typically more moderate—under 3:1 for places such as Bogotá, Bucaramanga, and Santiago.

Structural Differences Affect Operational Indicators

The unique urban form and travel demand patterns of South African metropolises undeniably impact BRT operational performance indicators. The long trips with low passenger turnover require an increase in fleet size and number of operators, but the high peak-to-base ratio leads to low productivity for the fleet and labor during the midday off-peak service. This effect is not limited to BRTs. It applies to any public transport mode connecting townships and city centers in South Africa, including commuter rail, provincial buses, and minibus taxis.

For the Rea Vaya, standard operational indicators such as ridership per km of trunk corridor, passengers per bus-km, and average weekday riders per bus are well below those for its Latin American siblings. Rea Vaya's fare recovery ratio—currently 32 percent—is also far below Latin America's, where ratios typically range above 80 percent[1]. Analysis shows that even if the original forecast of 162 thousand daily passengers for its two initial phases (phases 1A and 1B) had been met—an estimate well above the current 60 thousand—the BRT's fare income would be far below operational costs.

South African National Government and Cities Rethink BRT Operations, Services, and Finances

The impact of structural differences on operational performance of the Rea Vaya and other South African BRTs has triggered South Africa's national government and cities to reconsider assumptions about the design of the next stages of BRT-based transit systems. Selected initial considerations include:

- Operating subsidies. The unique forms of South Africa's metropolises imply that its BRTs will most likely need some degree of operating subsidy, in line with other long-distance public transport services such as commuter rail and provincial buses.
- More focus on "flexibility of buses." In South Africa, the flexibility of buses offered by a BRT solution should be exploited more than their mass-level transit capacity. Services might be tailored to the high peak and low midday demand, and perhaps be complemented with alternative demand-responsive minibus taxi services suited to the low-density environment.
- The initial phase of Rea Vaya, which uses typical BRT infrastructure features designed for large volumes of passengers—such as segregated right of way, payment of fares before boarding, large stations, and little or no vehicle-to-platform gaps—may not always be necessary for BRTs in South Africa.

BRTs will clearly be a key part of South Africa's future public transport networks, but cities must find their own best fit and pursue multimodal, fiscally constrained, sustainable plans. It is time to have a more tailor-made BRT solution as a safe, clean, and affordable option for South African cities.

[1] For comparative purposes, it is important to note the following: In South Africa, the direct bus operating cost payment to operators, as defined by the National Grant Framework, is to cover all costs of contract, including overheads, labor, fuel, tires, and vehicle maintenance. In contrast, in Latin America the payment to operators should also typically cover the scrapping of old fleets and the cost and depreciation of new fleets. Also, BRTs in Latin America were planned to use fare box revenues to cover direct vehicle operating costs and fare collection, occasionally infrastructure (terminals in some cities), and management of the oversight entity. But until now, few Latin American cities have been able to fully cover these additional expenses, leading to the need for operating subsidies.

For more information on this topic:

This connection note shares preliminary findings of the research paper: "Why South African Cities Are Different: Comparing Johannesburg Rea Vaya Bus Rapid Transit System with Its Latin American Siblings" [http://wrld.bg/a0c730bpq2A] by Scorcia and Munoz-Raskin, publication forthcoming. This paper was prepared as a knowledge document under the World Bank Integrated Urban Transport Planning Pillar of the South Africa Urban Knowledge Hub, Urban Technical Assistance, as part of the South Africa National Treasury sponsored Cities Support Program (CSP). This work was funded by the Switzerland State Secretariat for Economic Affairs (SECO) and the support of the South Africa National Treasury and data was provided by the City of Johannesburg Department of Transport (CoJ DoT). The authors would like to express their gratitude to Michael Kihato (CSP, Public Transport Coordinator) and to Lisa Seftel (CoJ DoT, Director) for their valuable comments.

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