Urban Pathways

FACTSHEET on Bus Rapid Transit System 2018

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Brief
Bus Rapid Transit (BRT) systems are high-performance transport solution for urban corridors with a high demand for public transport. BRT is a bus-based alternative to rail systems (metro, light rail or subway systems) that is cheaper and quicker to construct and provides greater operational flexibility. BRT systems are a solution to public transport challenges and are important in managing the complex transport needs of growing cities with large populations.

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BRT mimics a metro system by using high-capacity buses on city streets on dedicated lines that travel along at high average speeds. The concept prioritises public transport on urban roads and provides it at a fraction of the cost of a metro system. Today, over 200 cities around the world have such systems, many with different design features, adding up to a total of 407 corridors, serving nearly 33 million passengers per day, and stretching over 5,250 kilometres.
The features of a full BRT system are:

- Exclusive bus-lanes;
- High-capacity buses, either articulated or bi-articulated;
- Physically closed stations, controlling the entrance and exit of passengers;
- Pre-paid ticketing systems;
- Same-grade entry (no steps to enter the bus);
- Electronic payment collection systems (using smartcards);
- Centralised control systems;
- User-information systems;

Some examples of BRT systems around the globe include the Curtiba BRT system in Brazil; the TransMilenio BRT system in Bogota (Colombia);
the Metrobús BRT system in Mexico City (Mexico); and the Guangzhou BRT (China).

RESULTS

Investing in high-quality public transport systems in developing cities across the world can help meet the growing mobility needs of residents. As most BRT systems use modern rather than conventional city buses, they can clean up local air and reduce greenhouse gas emissions. Fewer mixed traffic lanes can also cut the number of traffic accidents. BRT and bus priority systems have become in recent years an attractive solution because of their relatively low capital costs and short construction times compared to rail transport. As these systems gain popularity, a number of studies and planning guides have appeared, illustrating the different design options available and their impact on the operational performance of the systems, and outlining some of the institutional challenges to their implementation. BRT systems are more effective when designed within an integrated network, and linked to land-use management, thus providing a comprehensive citywide mobility vision.

TECHNICAL AND FINANCIAL CONSIDERATIONS

Practice shows that financially self-sustained BRT systems – where the operational costs and, in some cases, the investment costs are only absorbed by income related to the fare - may result in a service that decreases in quality over the years. In most Latin American and Asian countries, subsidies are very low or non-existent. There are high investments on initial infrastructure costs, funded by government programmes, which happen during the construction. However, the responsibility to cover operational costs is in the hands of private operators.
Therefore, introducing additional improvements and services – such as increasing the frequency of trips to boost capacity; ensuring the transport is reliable and that stations and buses are clean; installing air-conditioning; providing customer service; and maintaining properly the bus fleet - may affect the operational costs and represent financial barriers.
Because of this, there are many discussions on the need to explore subsidy schemes among many of the BRT system operators, especially in Latin American and Asian countries, which do not have such policies.

POLICY/LEGISLATION

Obliging a city to have a Sustainable Urban Mobility Plan (SUMP) has proven to be one of the ideal legal frameworks. By developing a SUMP, cities need to establish clear short-, medium-

and long-term targets, such as encouraging citizens to use more sustainable forms of transport; improving accessibility; reducing greenhouse gases; cutting travel times and congestion on public transport; improving the delivery of services and freight; and identifying transport infrastructure priorities in the near future.

In this case, mass transport corridors such as BRT systems can be part of short-term mobility solutions. With a longterm vision BRT systems, if necessary, can upgrade in the future to higher capacity systems such as rail systems. In terms of the institutional framework, best practices clearly show the need to have a single transport agency within a city that plans, manages and controls the different transport modes.

Overall, cities must accompany public transport initiatives with regulations, programmes and:

- Land-use planning instruments;
- Ecological zoning plans;
- Bus-fleet selection manuals;
- Environmental standards (including fuel efficiency and technology);
- Public transport quality-of-service plans;
- Fare regulations;
- Public transport subsidy schemes;
- Operational regulations.

Leading institutions that promote BRT systems are commonly agencies responsible for transport planning, such as mobility ministries, transport departments and/or planning institutes. The authority level (federal, state or local) depends on the existing institutional and legal frameworks. It is necessary to coordinate with entities such agencies responsible for the environment, urban development, public space, public works, social and economic development and social communication; the secretary of state (or related agency at the local level); and the financing agency from the planning through to the implementation stages.

Mass transport corridors such as BRT systems can be part of short-term mobility solutions

TRANSFERABILITY

BRT systems, first developed in Latin America, have spread across the world to Asia, Europe and most recently to Africa. Due to the flexibility of the concept (the full features of a BRT system are not needed in each city) it can be easily adapted to different urban contexts; some 200 cities around the world have now introduced bus priority systems. Some European cities have introduced a similar concept, known as Bus with a High Level of Service (BHLS). The technical teams in each city will find that its features are easily adaptable. When this is not completely possible, available planning tools such as guides, manuals or even technical assistance from behalf of experts on transport planning can help.

CASE STUDY: BOGOTÁ'S TRANSMILENIO BRT SYSTEM (COLOMBIA)

Context

In 1995, 56% of daily trips made by citizens in Bogotá – Columbia's capital and a city with around 6.5 million people - were by public transport. The city's public transport fleet consisted of old buses and smaller vehicles (estimated between 21,000 and 30,000 vehicles) which were very polluting, unsafe and provided a chaotic service. The combination of this with private vehicle travel (22%) led to high levels of congestion and bad air quality.

Between 1988 and 1998 the municipality insistently discussed and submitted proposals for a mass transit system - with limited results. In 1998, however, the city began drafting a development plan that included constructing mass transport corridors with specialised infrastructure. The city hoped that through dedicated lanes and stations this would improve connectivity and travel times, and provide better accessibility to cycling and pedestrian infrastructure.

In action

In October 1999, after a series of political battles with members of the council and private operators, Bogotá created TransMilenio S.A., a transport agency. Its task was to plan, manage, coordinate and control the delivery of mass transport and create the TransMilenio BRT system.

The first stage of the TransMilenio system was to construct 41 km of segregated bus lanes, to the cost of $240 million (€212.5 m), or around $5.85 million (€5.18 m) per km. When the first stage was completed, it provided service to around 800,000 passengers per day. Further stages included buying land and public spaces adjacent to the corridor, sidewalks and other improvements, at a cost of about $12.5 million per km (€11.07 m). Private operators paid the costs for the vehicle and fare-collection systems. In the first phase, funding was available through various sources, the largest through local fuel taxes (46%), federal grants (20%), a mix of other local funds (28%) and a loan provided by the World Bank (6%). The third phase was completed in 2015 with the construction of a massive transfer station, which connects three mayor BRT lines, connecting up to 23,000 passengers per hour at

Nowadays, the TransMilenio BRT runs along exclusive bus lanes, with a passing lane along most of the network. The distance between stations ranges from around 500 metres, and access to them differs, such as by crosswalks in dense urban areas and grade-separated pedestrian crossings (by using pedestrian bridges) in more suburban areas. In the downtown area, there is a section of the corridor, a low-speed zone, where buses and pedestrians coexist, proving that the BRT can be flexible according to each city's needs.

Results

Bogotá's BRT has accomplished what no other city bus system has. It carries up to 48,000 passengers per hour in each direction, with an average speed of 26 km/ hr. Thanks to the high quality of the system design, it was completed at a fraction of the cost of a regular rail system. In its 15 years, it has become responsible for 40% of trips in the city and the main form of mobility in Bogotá. It currently serves over 1.9 million trips per day through an extension of 112 km of BRT lines. In 2014, Bogotá incorporated dual services, which comprise of buses with doors on both sides, which allow operation in the confined trunk corridors as well as conventional routes. This addition has been a success as it increases the coverage of the BRT lines without requiring passengers to make transfers, providing a better service for customers.

The target is to building the network, which Bogotá hopes will reach 388 km and serve up to 7 million passengers per day. More recently, the local administration received support from the national government to continue developing this plan, which includes implementing an integrated transport system - a series of public transport solutions within a city, integrated through its infrastructure, operation, and through the fare.

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