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The Soft Side of BRT: Lessons from Five Developing Cities

Contents

Acronyms

AJL	Ahmedabad Janmarg Limited (or Janmarg)
AMC	Ahmedabad Municipal Corporation
AMTS	Ahmedabad Municipal Transport System
BRT	Bus Rapid Transit
CEPT	Center for Environmental Planning and Technology
DKI	Daerah Khusus Ibukota (Jakarta)
DMRC	Delhi Metro Rail Corporation
DTC	Delhi Transport Corporation
FBC	First BRT Co-operative
GIDC	Gujarat Industrial Development Corporation
GNCTD	Government of National Capital Territory of Delhi
HCBS	High Capacity Bus System
INSTRAN	Institute for Transportation Studies
ITDP	Institute for Transportation and Development Policy
ITS	Intelligent Transport Systems
LAMATA	Lagos Metropolitan Area Transport Authority
NURTW	National Union of Road Transport Workers (Nigeria)
RTEAN	Road Transport Employers Association of Nigeria
SSATP	Africa Transport Policy Program

The Soft Side of BRT: Lessons from Five Developing Cities[1]

"Real power in Bolivia often seems to lie with the *transportistas*, the owner-drivers of buses and taxis who ferry people and goods around a big, sparsely populated country…They clashed twice with the country's president and won each time, first over a proposed steep rise in petrol price and second over a ban of imported second-hand cars"

—*The Economist*, June 25, 2011

Introduction

Such is the power of informal bus, mini-bus and shared-ride taxi operators. Because of the sensitivity of populations to transport issues and their impact on everyday life, local incidents involving mismanagement of the sector often receive widespread coverage by the press and other media, sometimes making national news. The number of people directly and indirectly engaged in providing public transport services can be large. For example, in Lagos, there are more than 75,000 minibuses and 200,000 commercial motorcycles, moving far more people than any other transport mode and providing direct employment to more than 500,000 people. Assuming one public transport worker per household, with an average household size of five, means that more than 2.5 million people, or almost 15 percent of the population, rely on the sector to provide their basic needs. The size and importance of the sector gives its workers the power to cripple a local economy,

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[1] The case studies were developed by Anil Baijal (Delhi and Ahmedabad) and Colin Brader (Lagos, Johannesburg, and Jakarta). This report benefitted from "Bus Rapid Transit and Pedestrian Improvements in Jakarta," the final mid-term evaluation report for a project by the United Nations Environment Program and the Global Environment Facility, August 2010. The authors would like to thank a number of reviewers who provided comments on earlier drafts: Vijay Jagannathan, Arturo Ardila Gomez, Baher El-Hifnawi, Georges Bianco Darido, Ke Fang, and Mustapha Benmaamar (The World Bank), Andrew Shepherd (AusAID), Hugh Brown (Adviser, EINRIP Monitoring Unit), David Hawes (Infrastructure Adviser , Indonesia).

such as by calling a strike, perhaps in response to a negatively received government action, thus denying transport to millions. The sheer number of people potentially affected gives transportation workers enormous political power. In turn, politicians have a significant stake in maintaining the status quo, sometimes because of opportunities for their own financial gain; many informal sector vehicles are owned and operated by public officials, who can also use their position for patronage, often in return for financial benefit.

Loosely regulated operators, despite the power they wield, can offer only low-quality service dominated by oversupply on some routes and undersupply on others. Several cities have attempted to improve the organization of the informal transportation sector with a view toward ensuring more balanced supply and demand across all sections of these cities and improvement in the quality of service. Bus Rapid Transit (BRT) systems have been among the most commonly adopted strategies for such reform.

Study objectives and design

This study has been undertaken to document BRT case studies in terms of the political setting; institutions and governance; public involvement and communications; and service, operations, management, and planning as well as the relationship of these aspects to investment performance. It is acknowledged that successful implementation and operation of BRT systems often involves such non-physical aspects as leadership, communications, organizational structure, service planning, and operating practices rather than the design of transitways, stations, terminals, and vehicles. This paper evaluates a sample of BRT systems, focusing on the softer issues that contribute to the systems' successes and their failings.

The study will help decision makers and practitioners, including those contemplating new BRT systems, understand some of the more difficult issues confronted in the challenging environments of developing cities. In examining topics addressed only rarely in the literature, it adds to the current body of knowledge, which has tended to focus on the "hard" engineering aspects of BRT. The study is based on an extensive review of the literature, interviews with stakeholders, and analysis of primary data to document lessons from the BRT experience in Jakarta, Indonesia; Lagos, Nigeria; Johannesburg, South Africa; and Delhi and Ahmedabad, India. The paper spans two continents, Asia and Africa, and deliberately omits case studies from Latin America, as this is a region where BRT applications have been well documented and implemented in similar environments. Cities in other parts of the world have tended to replicate the Latin American model to varying degrees in different political, institutional, and operational environments. The objective is to learn from the variations.

Background information and context for the paper highlight the need to expand the size and improve the quality of conventional road-based public transport systems. A synthesis of the case studies and key findings is followed by detailed case studies in the annex. Each case study is approached as follows:

1. Geographic, Economic, Demographic, and Transport Contexts: What are the key parameters affecting travel and public transport demand?
2. Political, Governance, and Planning Background: What were the planning, decision-making, and institutional frameworks for public transport in general and BRT in particular? What is the BRT planning history?
3. Communications: What communications program was undertaken for BRT and what was its role in planning, implementation, and operation?
4. System Concept, Integration, and Performance: What was implemented? How does BRT relate to the rest of the public transport system, and how is the BRT system working?
5. Operating Arrangements: What are the institutional arrangements for the operation of BRT?
6. Finance: What were the financial arrangements for BRT implementation and its subsequent operation?

Background and context

Almost all cities in the developing world are dealing with rapid urbanization and the need for improvements in standards of living. This has caused growth in urban travel demand, particularly in regard to personal motorized modes of travel. This, in turn, has exacerbated congestion, leading to deterioration in air quality and increasing numbers of accidents, both of which have severely negative health impacts. The significant increase in the use of fossil fuels for transport has negative implications for climate change and creates foreign exchange and national security problems for developing *and* developed countries. In the absence of an adequate increase in roads, congestion compromises the ability of cities to remain competitive and livable. In response, governments are looking at ways to improve public transport. Investments in Bus Rapid Transit are an attempt to provide efficient and effective public transport services, often in places where no formal public transport currently exists.

The most commonly adopted strategies for mitigating these problems have been to improve public and non-motorized transport through a variety of management and operations strategies and infrastructure investments as well as traffic management. The objective of this approach is to reduce personalized vehicle travel by offering more competitive, more sustainable, and less intrusive travel alternatives through improved public and non-motorized transport.

In addition to expanding the size and increasing the quality of their conventional road-based public transport systems, cities are also electing to invest in one or more forms of road and rail-based rapid transit. Rapid transit systems provide reliability, as well as high speed, improved comfort, and convenience to large numbers of travelers. They can also serve as a land development tool for inducing sustainable development patterns.

For the purposes of this paper, rapid transit is defined as a public transport mode that combines the following into a fully integrated, branded system:

- A high-frequency, easy-to-understand service plan designed around corridor travel markets of medium to long trip lengths and high volume
- Attractive, functional, fully accessible stations
- Efficient (e.g., off-board) collection
- High-capacity, attractive, easy-to-board, easy-to-alight, and environmentally friendly vehicles
- Passenger and other intelligent transport systems (ITS), that is, advanced information and communications technologies applications
- Dedicated running ways

Metro rail and light rail (tramways) are common rapid transit investment choices. BRT is becoming increasingly popular in developing cities because it can provide high performance, adequate capacities, and desired levels or quality of service at an affordable cost; it is usually more cost effective than other rail-based alternatives.[2] Pioneered in Curitiba, Brazil, BRT systems are now in use worldwide, including in a large number of Latin American cities as well as in Asia, Europe, North America, and Oceania. The busiest BRT system, in Bogotá, Colombia, services more than 1.4 million trips a day, with line volumes exceeding 40,000 passengers per hour, both of which exceed those of most metro systems. BRT is seen as an appropriate solution to addressing mobility needs in an age of growing income, rising car ownership and use, and constrained fiscal resources.

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[2] BRT has many definitions. The widely referenced *Bus Rapid Transit Planning Guide* (2007) of the Institute for Transportation Development Policy (ITDP) defines BRT as "a high-quality bus-based transit system that delivers fast, comfortable, and cost-effective urban mobility through the provision of segregated right-of-way infrastructure, rapid and frequent operations, and excellence in marketing and customer service" (p. 1).

Although BRT systems have proven successful in most cases, there are some that have not done so well, at least initially. BRT systems can be simpler and less costly than rail-based rapid transit, but they also have unique planning and implementation challenges that if not adequately addressed up front can lead to less than successful outcomes. The introduction of BRT systems often requires transitioning from a loosely organized public transport sector to one that is regulated and controlled. There is also a need to coordinate the activities of the multiple agencies involved in planning, financing, implementing, and operating or regulating various aspects of the public transport system. Oftentimes new functions are introduced over which an institution must be assigned authority. Apart from these issues, another particular challenge is that BRT systems often involve dedicating roadway space previously available to any vehicle for exclusive use by BRT services. Although the majority of people traveling in virtually any developing city corridor do so by public transport, such an action is often perceived as interference with the "rights" of car owners and users, who are an influential societal group.

Despite these challenges, planning and implementation of BRT is too often seen as an engineering problem focused on the provision of segregated BRT transitways, state-of-the-art vehicles, and complex ITS applications. That is, the primary focus is on BRT "hardware" rather than the market and services, which are the most important planning and design criteria, or the critical institutional and governance roles and political and technical advocates necessary to get BRT successfully planned, implemented, and operated.

The public transport systems in Jakarta, Johannesburg, and Lagos share a common need to migrate from a loosely organized bus transport sector to one that is regulated and controlled. The sector is dominated by private, largely informal minibus services because of the deterioration in service coverage and quality or total collapse of the large, formally organized bus companies that previously existed in these cities. Beginning in the 1980s, urban public transport in most developing cities underwent a major transformation, with the private sector assuming a much greater role as operators of minibuses or shared-ride taxis. Delhi and Ahmedabad are exceptions. They continue to be served by large buses operating on prescribed routes with formal stops and overseen by a state-owned enterprise and the private sector in a regulated regime. In fact, in Delhi publicly operated services run alongside privately operated buses of the same size and using the same routes and stops.

The advantages of minibuses are their agility in meeting market needs, ease of acquisition, viability without subsidies, and flexibility of schedules, stopping patterns, and fares and routes. Their disadvantages include, in particular, such negative externalities as congestion, poor safety and security, and environmental impacts. Their numbers are often determined by political expediency (or even corruption) rather than capacity needs and financial viability, making it difficult for operators to provide a minimally acceptable level and quality of service. These problems are unlikely to be addressed by market forces alone, but public regulation is often poorly enforced.

Strong commitments are required for the implementation of a formal BRT system in a city that has only an informal public transport system operating without formal schedules, stops, or fixed fares. A technical commitment is needed to determine what new types of public transport should be of-

fered, and political commitment is a requirement for changing the business model and providing the funds and authority to actually implement the new system.

As noted above, a large proportion of the population in most developing cities depends on the informal public transport sector, buses and minibuses, for transport and employment. Among the high number of people directly affected, the owners and operators of vehicles in the informal sector have significant political power, which could be helpful in affecting change or could become an insurmountable obstacle. The success of BRT in the case study cities with a powerful informal sector is related to how well BRT proponents dealt with the people in it.

Case study synthesis and findings

All of the case study projects can be considered successful in some way.[3] Each delivered improvements in public transport speeds, reliability, and customer satisfaction and increased public transport usage in their respective corridors. They were all cost-effective in terms of the value received versus the relatively modest expenditures. Despite these similarities, some have performed better than others. It is clear from the cases studies that the major causal factors of this variance are the following:

- *Political leadership, planning, and development:* how the projects were developed politically and institutionally
- *Communications:* how the nature of the projects, objectives and potential benefits, and use of them after opening was conveyed to decision makers and the effected general public; how stakeholder concerns and other feedback were communicated to project sponsors
- *Service plans:* the kind of BRT and complementary public transport services offered in the respective corridors
- *Operating arrangements and management:* the institutions and organizations providing BRT and complementary services; how the system and services are managed and regulated
- *Implementation and operating and maintenance finance:* how initial implementation and subsequent operations and maintenance were covered

[3] For details, please see the studies in the annex.

These "soft" subject areas are the focus of the synthesis because the case studies demonstrate that the difference between great success and limited benefits was most often determined by how these issues were addressed rather than the particular hardware used for the system.

Political Leadership, Planning, and Development

The evidence shows that among the projects examined, those that were implemented the fastest—with the least opposition and hence at the lowest cost—had consistently strong support from a politically astute champion. These advocates were complemented by a solid transport organization with superior administrative and technical skills and public transport experience.

The projects in Ahmedabad, Jakarta, and Lagos are closely associated with political leaders who engaged in determined, focused campaigns to generate support among the general public and other political leaders. These champions also helped the often-new organizations implementing BRT overcome opposition from vested interests, which ranged from public officials in charge of competing agencies to private operators of shared-ride taxis and minibuses who were rightly concerned about their livelihoods. Such political leadership allowed the technical teams to do their jobs unhindered by challenges that the political leadership was best equipped to handle. In the most successful cases, technical workers involved in planning had strong public transport experience and took advantage of the knowledge base in the public transport field in general, and BRT specifically, by approaching international consultants along with non-governmental and international development bank technical experts.

The planning history of the projects was somewhat mixed in terms of where BRT fit into a global public transport agenda. Delhi, Jakarta, Johannesburg, and Lagos had multimodal strategic transport plans in which BRT (or busways) was one important component. That BRT moved forward when it did in each city was related to external factors, such as the World Cup scheduled to be held in Johannesburg, and the election or appointment of strong leaders who wanted to make a difference during their tenure in office.

The decision to begin BRT in Ahmedabad was also situational, hinging on the arrival of a strong leader, a new municipal commissioner, who was convinced that something had to be done about public transport. He, in turn, received enthusiastic support from a charismatic and elected chief minister of state who was of a like mind about the need to address transport problems that everyone acknowledged were becoming intolerable.

There had been nascent plans for an Ahmedabad metro system for years, but real progress had not been made. The possibility of providing BRT had also been discussed, but only as a system playing a secondary, "complementary" role to metro's. In the end, however, the decision was made to proceed with the easier and less costly BRT system because of the higher financial requirements of a metro system and the lengthy time horizon of implementing even one metro line. Corridors outside the city's core were selected for BRT service to avoid potential conflict with metro proponents.

Underpinning the leadership in Ahmedabad was a comprehensive technical team housed at the Center for Environmental Planning and Technology, CEPT University, and led by a competent, dynamic director. This staff took charge of planning the project until a special purpose vehicle, the Ahmedabad Janmarg Limited, could take over, completing implementation and contracting and overseeing operations. Without the convergence of the three competent leaderships—the chief minister, commissioner, and CEPT director—it is doubtful that the project could have succeeded.

Similar political leadership made the projects in Jakarta and Lagos possible. Lagos could rely on the competent technical leadership and staff at the Lagos Metropolitan Area Transport Authority (LAMATA), the preeminent transport authority in sub-Saharan Africa. A team of international experts with extensive experience in designing and implementing BRT systems provided technical support. This team of consultants provided support in the preparation of initial designs and service planning as well as assistance to LAMATA through the implementation and operational phases. In contrast, leadership in Johannesburg was also at the city level, through the City Council Transport Committee chairperson, but opposition from the private, informal shared-ride taxi industry was more difficult to overcome than was the case in Lagos.

In Jakarta, the governor provided the political support needed to establish BRT.[4] In fact, the governor declared an emergency so that he could access special funds and directly appoint contractors. He was thus able to skirt the requirement of obtaining the approval of the Daerah Khusus Ibukota (DKI) parliament and could make a deal with bus operators plying Corridor 1.[5] These actions were taken before a new national institutional framework for public service enterprises—Badan Layanan Umum (BLU) TransJakarta—was introduced during 2006–2008. The Institute for Transportation and Development Policy (ITDP), with financing from the United Nations Environment Program, provided technical support in the preparation and implementation phases. ITDP offered DKI the benefit of lessons learned from its experiences worldwide and promoted effective stakeholder communications. Since 2009, an effort has been made to incorporate BLU TransJakarta into a provincial, publicly owned company, which would allow TransJakarta, to employ professionally qualified management and staff rather than remain bound by the rules of the civil service.

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[4] The story of BRT in Jakarta began long before the governor's decision to embrace it. In the early 1990s, the World Bank-supported Jabotabek Urban Development Project (JUDP-1) had financed the engineering design of a median busway along what is now Corridor 1; it also financed a review of public transport network planning and licensing. National and city governments opted, however, to go for quick and cheap bus lanes, which on Jalan Sudirman ran along the service road and conferred no priority for bus operations. The political will did not exist to tackle the licensing of the (nominal) cooperatives that operated small buses in the corridor, and no attempt was made to provide improved bus shelters or to control places for boarding and alighting. To no surprise, the experiment was a dismal failure and was quickly abandoned. This experience accounted in part for the considerable initial skepticism that greeted the governor's plans for BRT in 2003.

[5] Jakarta is a *daerah khusus ibukota,* a special capital city district, with the status of a province.

Communications

At a BRT public meeting in South Africa, the Section World Taxi Association Witsand (SWTAW) members were "upset at being left out of the city's Bus Rapid Transit (BRT) system's planning and negotiations as their routes are earmarked as feeder bus routes for the planned BRT rollout."… It was the first they had heard about it.

—Public meeting in Johannesburg, October 20, 2011

Among the cities examined here, Johannesburg stands as the one that had the greatest difficulty getting its BRT system implemented and successfully operating. On the other hand, Lagos, under similar if not more difficult circumstances, was able to bring its informal sector on board relatively early in the development of its BRT Lite system, resulting in much quicker and less problematic implementation. This range of experience reflects different approaches to stakeholder communications and management.

Stakeholders are defined as organizations or groups that have an interest (positive or negative) in a project and can impact its success. Communications covers all activities related to informing stakeholders and listening to them about the project. Stakeholder management involves using communications to manage expectations. Good stakeholder management and communications help take into consideration stakeholder needs and expectations in design and implementation while informing stakeholders why certain things cannot be done when that is the case. Managing expectations is one way to mitigate inevitable opposition to change.

The significantly different results between Lagos and Johannesburg are one example of the importance of two-way communications, consultation, and stakeholder management. If the case studies here are any indication, similar projects will involve a number of distinct interest groups, each with a different perspective and stake in the public transport system. For the majority of populations in developing cities without access to private transport, the main concern is the affordability, safety, and quality of access that public transport can provide to jobs, education, shopping, recreation, and life's other activities. Any change that increases cost or reduces available options, quality, or level of service would not be easily accepted by this group. By design, any communications strategy should mitigate fears and assure that potential adverse impacts will be minimized.

The concerns are even greater for families that depend on public transport jobs for income and in some cases basic sustenance. In Lagos, for example, minibuses, shared-ride taxis and motorcycle taxis provide direct employment to well more than 500,000 people, who, when dependents are included, constitute roughly 15 percent of the population.

The informal public transport "industry" can be further divided into two or more subgroups, workers and owner-operators, each of which is often represented by a different association or union. Owners of operating franchises and vehicles are another stakeholder group, while labor, driv-

ers, conductors, and mechanics are others with distinct interests. Groups that own and directly provide transport and auxiliary services also have a stake in public transport.

As long as the number of people employed does not change, labor will almost always benefit from the better pay and working conditions that result from BRT's more formal organizational regime; there is, however, a risk that the number of jobs will be reduced. This fear induced by such uncertainty should be addressed through a communications strategy.

From the perspective of bus owners, the introduction of BRT systems often requires transitioning from a loosely regulated (and taxed) arrangement to one that is more tightly organized and controlled by government.[6] This requires a major cultural shift and a change in business models, the broader implications of which cannot be underestimated. The economic power of owner-operators translates into influence because of their ability to buy political favors and, in extreme cases, disrupt the life of a city.

Political alliances are established by incumbent providers with the intent of sustaining their profitable but unregulated monopolies and even extending them. The actual impacts of BRT introduction on existing public transport providers can range from minor reductions or even increases in income to a complete loss of business opportunities. As with labor, this uncertainty creates fear among this stakeholder group. A proper communications strategy should address these fears.

Owners of private vehicles, automobiles, and motorcycles constitute another important stakeholder group. A major concern for them is the loss of road space leading to potentially more intolerable congestion. This group is particularly important in developing cities, because they are usually the wealthiest and most politically influential sector of society even though they are less numerous than public transport users. Many BRT projects will actually free up road space for other traffic even when lanes are dedicate to BRT because of a reduction in the fleet of unregulated minibuses and taxis and better control over their behaviors. Even when this is not the case, the majority of the traveling public, irrespective of the mode of transport, will benefit from BRT projects. Either way, the facts need to be communicated and the concerns reflected in planning and design.

Owners of private vehicles are important stakeholders from another perspective—as a target group of commuters who need to be sold on using BRT instead of their cars and motorcycles. Continuous communications thus has an important role to play in the operational phase of BRT. Private vehicle users need to be persuaded to make the move to BRT, typically by highlighting its convenience, safety, and other positive aspects. Presenting easy-to-understand information on schedules, routes, and fares and differentiating BRT from low-quality informal public transport options can go a long way in securing a shift in personal modes. New BRT systems in developing cities, including Jakarta, have captured up to 20 percent of their riders from private modes.

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[6] The economic crisis of the 1990s and the resulting collapse of state-owned or subsidized private enterprises is what led in some places to the emergence of informal, loosely organized, and privately operated public transport systems.

For the above reasons, Ahmedabad retained its communications section even after the system started operations and continues to release performance statistics to the press on a regular basis. This service is a powerful tool for communicating with commuters who use the system and might encourage others to make the transition. Such a strategy has helped Ahmedabad secure ongoing enhancement of its ridership.

Still another important stakeholder group are the people directly affected by the construction of such infrastructure and facilities as transitways, stations, terminals, and depots. Many of these stakeholders do not actually own the land they occupy, but could still be negatively affected by construction that requires its use for a right of way.

Non-public transport government agencies affected by the enterprise are the final stakeholder group on which communications should focus during BRT planning, implementation, and operation. Examples include owners or operators of the roadways in the respective corridors and the traffic police.

In some places, the traffic police see BRT as creating safety issues—for example, the intrusion of cars, pedestrians, and bikes into high-speed BRT rights of way when a BRT trip requires crossing half an arterial roadway to access median stations. The traffic police are technically best able to address these issues, and no matter what approach is taken, their work enforcement burden is likely to increase. This means that for public entities with a direct stake in the project, more than two-way communication could be needed. A formal, direct role in planning and design decision making may be warranted.

The reality of the different concerns noted above may be vastly different from the perception generated by a specific BRT proposal. Both the perception and the reality need to be addressed for the project to succeed. An inability to understand and resolve these issues to the satisfaction of *all* stakeholders placed the Delhi and Johannesburg projects in jeopardy in their initial years.

In Delhi, inadequate communications led to problems with private vehicle owners and the traffic police. There was and remains the perception that reserved, dedicated median transitways automatically cause congestion and safety problems and that reserving road space for public transport is somehow "undemocratic." Neither view is correct, but improved communications among all stakeholders, particularly the traffic police, could have gone far to mitigate any real problems.

In Johannesburg, the informal minibus and taxi operator stakeholders were concerned about their livelihoods and sustenance. These concerns were more or less successfully addressed in Lagos and Jakarta, but the specifics of how this would be done were never fully explained to the affected stakeholders. Once serious negotiations began, this group of stakeholders and BRT proponents managed to reach an agreement. In both cities, the reality of the impacts of BRT implementation and operation on the variety of stakeholders was far less onerous than initial perceptions.

All of the case studies reveal that early development and implementation of a formal, multimedia communications strategy addressing the spectrum of stakeholders and their concerns are funda-

mental to the success of BRT. The best communications strategies built on the strengths of the situation on the ground and developed a widespread sense of project ownership while managing resistance to change. This enhanced legitimacy by providing stakeholders with a sense that they were being listened to, and it improved the quality of the decisions made because they better reflected the interests of the general public as a whole.

The key questions a communications strategy must address include the following:

- How should stakeholders be managed?
- What communications approaches should be utilized, and how should they be organized and carried out?
- What process should be used to adapt projects to public needs and perceptions that arise during ongoing communications?

Proper management of stakeholders, communications, and public involvement increase the chances of a project's success because they result in improved understanding of issues on the part of proponents and increased buy-in and appreciation among other stakeholders.

The key principles of stakeholder management involve (a) understanding the motives and interests of the multiple organizations and people with some stake in successful implementation; (b) building and maintaining the active support and commitment of stakeholders to adapt the project to their needs and to facilitate delivery of the project; and (c) ongoing, regular engagement with stakeholders to inform, negotiate, receive feedback, and adapt the project accordingly.

Communication Strategies and Approaches in Case Study Cities

The common threads running through each of the five cities when BRT was first proposed are as follows:

- BRT was a new and unfamiliar concept.
- Public transport had a poor image while private transport, both two and four wheeled, was becoming increasingly available.
- Public transport was most often provided by informal and unregulated private operators.
- The safety, security, and quality of public transport services were poor and not attuned to the needs of users.

The lack of exposure to and understanding of any form of mass transit, let alone one as novel as BRT, presented a significant communications challenge. Each city needed to address this problem to overcome opposition and ensure that the proposed project would meet stakeholder expectations and needs. The requirement for good communications in the preparation and implementation of BRT projects was generally recognized, but different approaches—some more successful in navigating among the often-conflicting interests of multiple stakeholder groups than others—were used. Early in the planning and development process, Ahmedabad and Lagos began to understand

and integrate diverse interests, but others, for example, Delhi, had to improve their communications strategy and change their projects in response to strong adverse initial reactions from a variety of stakeholders.

The communications programs in the case study cities had different priorities at the start of the projects. In Lagos, for instance, designing the system around users was an early objective, so focus group surveys were undertaken to establish rider needs so the end product would best meet them. In Jakarta, public apathy resulting from previous grand but unimplemented plans led to a communications strategy designed to excite the public about BRT's benefits. In Johannesburg, however, the early focus revolved around taxi operators, as they were a potentially significant barrier to implementation of the city's Rea Vaya BRT system. All of the cities had to engage the dominant public transport operators, but Johannesburg was less successful in doing so early on.

While Ahmedabad did not have a well-structured communications plan in the initial stages of preparation, its plan evolved as the BRT project took shape, and it gradually helped transform the opinions of the various stakeholders. The design and preparation of a High Capacity Bus System (HCBS) in Delhi lacked a comprehensive communications strategy until after the system was implemented and opposition rose from almost every quarter. The system faced a great deal of criticism from private vehicle owners, political leaders, and the media and other interest groups in its first years. In response, authorities prepared a comprehensive plan for public outreach that gradually led to the system being accepted despite some ongoing major issues.

With varying degrees of success, the common approach across all the systems—in the development and implementation of a BRT communications strategy—was to proceed as follows:

(a) Identify all key stakeholders;

(b) Develop a separate strategy for each stakeholder group and project phase (that is, planning, construction, and operations);

(c) Maximize exposure through a variety of approaches, including the following:

   i. Broad-based workshops, discussions, meetings, and presentations for the general public and certain ethnic and geographically defined communities and specific ones for particular stakeholder groups;

   ii. study tours for select individuals from key stakeholder groups, for example, operator unions, politicians, and so on; and

(d) Use the media to pass central messages relating to BRT to the general public: what it is; what it would be; and how it would impact the city;

(e) Promote BRT with current public transport users through leaflets and other marketing materials; and

(f) Use pervasive, integrated branding to convey system identity and attributes, position BRT in the transport marketplace for potential new public transport users and generate pride among service providers, politicians, and citizens.

Service Plans

The common aspects of the case studies synthesized here are the service and operating plan utilized and the arrangements for operating that service plan. Both reflect the flexibility of BRT as a mass rapid transit mode, which in this case utilizes buses. Buses can be of varying size, from a maximum capacity 80 for a single 12-meter-long vehicle to about 220 passengers for a bi-articulated, 25-meter unit. They can also operate on or off dedicated transitways and do not require extensive unique specialized training to maintain and operate.

While this capacity range has negative operating cost implications in certain high-volume situations, combined with on-transitway and off-transitway capabilities, it provides the flexibility to offer services that directly match origin-destination patterns without requiring undue transferring and indirection of travel.

The BRT system in each case study uses buses and paved transitways adapted for the particular application but similar if not the same as the vehicles, facilities, and infrastructure that were already in use. This means that operating and maintenance activities can be carried out by a variety of actors without necessarily requiring unique, often internationally supplied expertise.

The Johannesburg, Jakarta, Lagos, and Ahmedabad systems operate simple service plans consisting of transitway-only, all-stops routes. Alone among them, Rea Vaya has integrated feeder and complementary networks managed under the BRT special-purpose vehicle, all with common ticketing. Because of relatively low demand, it operates with lower frequency than the other systems. This makes it easier to maintain fixed intervals between bus arrivals, especially because a GPS-driven ITS system can be used to manage operations "on the street."

Ahmedabad has an effective "background bus" operator, the Ahmedabad Municipal Bus Service, with BRT interfaces. Ahmedabad Municipal Transport System (AMTS) also provides dedicated "feeder" services to the BRT system, Janmarg. TransJakarta and Lagos' BRT-Lite, on the other hand, operate more frequent, all-BRT-stops service because of much higher demand. TransJakarta's inability to control dwell times at stops and passage through intersections inevitably leads to bunching and service variability problems. The lack of a GPS-driven control system means there is no way to reestablish headways once vehicles have entered service. TransJakarta also relies on a background minibus system to provide "feeder" connections.

In Jakarta, insufficient service planning in the early stages impacted performance.[7] Some of the key system-performance issues include the following:

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[7] TransJakarta initially operated only within DKI Jakarta, which is about one-third of the Greater Jakarta metropolitan region. TransJakarta was not able to serve the broader region because of inter-jurisdictional challenges and autonomy issues. Attempts are being made to address this issue.

- For a variety of reasons, the number of buses available was insufficient for providing expected or acceptable levels of service, which likely adversely affected public perception. The sight of co-opted road space being only lightly used by infrequent and relatively lightly loaded buses served as a provocation to motorists forced to travel on significantly reduced and heavily congested road space.
- The lack of scheduling control over buses, representative of a system failure, affected BRT performance.
- Poor feeder bus performance undermined the system. A BRT system cannot be effective unless it is supported by an adequate feeder bus system, preferably one with some measure of integrated ticketing. Feeder buses should also offer similar levels of passenger comfort and security as BRT vehicles.

Lagos' BRT-Lite system operates an "independent" service without an integrated, formal "feeder" service (which is not the case in Johannesburg). If people cannot walk at either end of a trip to travel origins, destinations, or both, they are forced to use informal sector taxi or minibus connections. BRT-Lite vehicles are dispatched constantly to meet the high levels of demand experienced at a given terminal and as reported from downstream by mobile phone. As with TransJakarta, there is no control system, and the tight headways operated lead to vehicle bunching.

While operational inefficiencies in Lagos and Jakarta are obvious, it is primarily the high demand that creates strain. Demand is much lower in Johannesburg, so headways are more manageable; the control system, however, will become more important as additional routes are added and demand increases. With the exception of Delhi, all the system fares are collected off-board, with either full or partial validation by inspectors rather than drivers. This is critical for minimizing dwell times and fare evasion. In Delhi, few if any changes were made to the bus network service plan to take advantage of the median transitway. Existing public transport routes simply changed from operating in mixed traffic in all lanes to operating on the exclusive median transit facility.

On the Delhi Transport Corporation (DTC) and privately operated public transport buses, tickets are issued and fares collected manually on-board. For other public vehicles, the fare collection system is governed by the terms of the carriage contract of the operating agreement. This fare collection approach caused some of the difficulties that have plagued the Delhi system. First, all travellers must board through a single door so fares can be paid to a conductor, making for inordinately high dwell times. Second, privately operated public transport buses waiting at busy stops to increase their volume exacerbate dwell times, in particular because there are no passing lanes around them.

Passenger intermodal interchanges are important across all the cities for meeting the whole-journey demands of the traveling public. Unique to Johannesburg among the cities are interchanges among BRT, feeder, and complementary services within single stations. The multi-corridor Jakarta BRT network is more comprehensive than the systems in Delhi, Johannesburg or Lagos, and transfer demands are high, making integration with the rest of the public transport system more complex. Some BRT-BRT and BRT-minibus interchanges cannot be accommodated within a single station or terminal and thus require walking up to 600 meters between services. In Lagos, interchanges be-

tween BRT-Lite buses and minibuses take place primarily at three terminal locations. At each terminus, parking and passenger waiting areas have been set aside for minibuses and taxis providing for onward journeys. These services will be more comprehensively organized under the BRT extensions currently being considered.

Johannesburg and Ahmedabad excluded, the cities were relatively weak in service planning and operations management. Lagos and TransJakarta depend on the informal minibus sector to provide "last kilometer" connectivity without benefit of integrated fares or an integrated network. The lack of integration—that is, leaving the existing operators to function as they always have—results from political rather than technical considerations.

Given the huge volume of passengers being carried in Lagos and, to a certain extent, Jakarta, an argument could be made for leaving at least some of the existing minibuses to ply the respective corridors. The advantages of doing so are to provide public transport options by allowing short trips to be made on minibuses while longer trips can be made on BRT or BRT-Lite. Such an approach would also support differential fares so that lower-income travellers continue to have an alternative to BRT.

The disadvantages of leaving the minibuses as is include the lack of fare, service, and physical integration, often leaving passengers with a less than satisfactory experience. There are also emissions and safety issues. Perhaps the worst problem is the significant congestion that could arise in dedicating existing road space to BRT while leaving a large number of minibuses to continue to operate in the smaller number of general traffic lanes. This would create a political problem for BRT although it carries a disproportionate number of passengers for the road space it consumes. This does not appear to be the case in Lagos, but certainly was an issue in Jakarta, at least initially.

Based on the experiences in the five cities, service and operations planning appear to be the critical ingredient that was not properly addressed in most of them. This resulted in BRT not offering the best performance possible or the greatest possible net benefits. It also created political issues that could have been avoided.

Operating Arrangements and Management

In all cities there was a need for some type of change in the way public transport services were operated. The changes were least dramatic in Delhi, a fact that led to many of the ensuing problems with the High Capacity Bus System. The HCBS's first stretch, 5.8 kilometres, is a median transitway on which any bus can operate in the corridor. There is no single operator or group of operators dedicated to providing uniquely BRT service on dedicated BRT routes. In the main, the public transport buses plying the corridor belong to DTC and private operators licensed by the Department of Transport of the Government of National Capital Territory of Delhi (GNCTD). In addition to public transport buses, other vehicles are also allowed to travel in the corridor, including school, tourist, and private company buses and vehicles carrying security and emergency service personnel.

In Ahmedabad, the supply, operation, and maintenance of buses for the BRT system, Janmarg, are being handled by Charter Speed Private Limited under the supervision of Ahmedabad Janmarg Limited, a special-purpose entity led by the municipal corporation. Despite a commitment from the Ahmedabad Municipal Corporation to fund operating deficits, thus far revenue from direct fare and advertising has been able to cover all costs of operations, including bus service contractors. The other cities, excluding Lagos, also formed new operating management entities. These organizations are responsible for service planning, procurement of operators, performance monitoring, and oversight for enforcement.

In Lagos, this service operation role was assumed by the existing Lagos Metropolitan Area Transport Authority while actual operations were overseen by a share capital corporation, FBC. Administration of road passenger transport operations in Nigeria falls, by law, under the National Union of Road Transport Workers (NURTW), a national body organized along state lines with each chapter having its own council and related institutional administrative functions. There was no single, private sector outfit capable of operating the BRT-Lite system on its own. As part of the initial design, it was agreed that this scheme would include an operator development function in partnership with NURTW under the private-public financing approach envisaged for mass transit. For the actual operation of BRT-Lite, NURTW established the special-purpose entity 1st BRT Cooperative (FBC), or Lagos NURTW (1st BRT) Cooperative Society Limited. After FBC was formally constituted and empowered, it began making the necessary preparations for the launch of the BRT-Lite service.

Jakarta authorities established BLU TransJakarta to manage and oversee the operation of BRT services, which are themselves operated by a number of contractors. Among them, some are simply corporations formed by minibus operators in the respective corridor, and others submitted preferred bids through competitive procurement.

Except in Delhi, contractors are paid on the basis of gross cost per kilometer. This means that there is no competition for passengers at stops to increase revenue. In Lagos and Jakarta, the dedicated transitway facility is open to more than one public transport operator. Jakarta has inter-corridor service, and Lagos has one operator for express services and one for all-stops local services. In Johannesburg, although having a single operator has simplified contractual issues, more operators will be introduced as additional lines are developed and multiple operators perhaps allowed into a single corridor.

The bottom line is that the best operating arrangement is one in which a public, special-purpose vehicle is responsible for planning, procurement, and monitoring, and perhaps dispatching, of BRT services. In the best case, this entity would have similar authority over *all* public transport services, irrespective of mode, operating in a metropolitan area. Payment on a gross cost basis, with proper performance incentives and penalties, can help avoid the possible negative consequences of having more than one operator in a given corridor. At the same time, having more than one operator in a given corridor provides backup in cases of performance, labor, or contractual problems with one of them and allows the staggering of contract periods.

Finance

In all the cities, such infrastructure and facilities as stations and terminals were financed by government. In Ahmedabad, a part of each of these was financed by three different levels of government—the municipality, the state of Gujarat, and the government of India. In Johannesburg, the South African government financed infrastructure and facilities while the city provided for vehicles. In Jakarta, the province paid for all construction, and vehicles were financed as part of operating contracts or by the government for some lines. Construction of the bus way in Delhi was entirely financed by the local municipality, while infrastructure and station operating and maintenance costs are financed from advertising revenues.

While governments covered infrastructure and facility implementation costs, ongoing operations and maintenance are financed in a variety of ways. TransJakarta and Rea Vaya both require substantial operating subsidies in excess of fares. In Delhi, DTC services, including those using HCBS transitways, are highly subsidized, while private operators must make do out of the fare box. In Lagos and Ahmedabad, fare and other operating revenues cover 100 percent of the cost of operating and maintaining BRT service infrastructure and facilities, including the provision of vehicles and administrative overhead.

The numerous reasons for the variation in terms of operating and maintenance finance across the case studies include the size of the market (and hence the revenue captured), the nature of contracts with private operators, the levels of fares charged, and (in Jakarta, Lagos, and Johannesburg) competition from informal sector operators. Lagos and Ahmedabad demonstrate that it is possible for BRT systems, in different developing city environments, to meet their operating and maintenance costs, and even the cost of vehicle amortization and depreciation, through operating revenues, fare, advertising, and so on.

In Jakarta, BRT obtains financing from a number of sources. TransJakarta, as the operating entity, is funded from ticket sales and a DKI subsidy. The DKI Department of Transport receives funds from the DKI budget for (i) the purchase of buses and design and building of facilities; (ii) purchase and operation of traffic signals and signs; (iii) traffic control personnel; and (iv) maintenance of bridges and ramps. The DKI public works agency also receives funds from the DKI budget for construction and maintenance of bus lanes. The regional regulation police force (Satpol PP) gets funds from the DKI budget for traffic control personnel, and the national traffic police obtain funding from the national budget and other sources. The DKI provides funding for cleaning footbridges and vehicles. Smaller contributions are made by a range of cofinancing partners. TransJakarta does not have control over the resources needed to be performance-oriented and hence cannot make economic and financial decisions on asset management. Fare adjustments are determined by the DKI parliament, which has not increased fares for some years.

Conclusions

BRT, BRT-Lite, and HCBS in Ahmedabad, Delhi, Johannesburg, and Lagos have been in business for a number of years, with the oldest system, TransJakarta, operational since 2004. Each city improved its public transport system through a general, bus-based approach conceived elsewhere and never before tried in that locality. Their techniques varied, with each city adapting to deliver something of value within the respective political, institutional, operating, physical, and financial constraints. Despite these constraints and the critique offered above, each system is delivering significant benefits to residents in excess of its modest costs and impacts. A comparison of key operational and technical data across the five cities is presented in table 2.1, and performance data is provided in table 2.2. The key lessons from this evaluation are as follows:

- Consistently strong, vociferous support from politically astute champions is needed to implement a BRT system. In each city examined, the efforts of public transport advocates were complemented by a solid organization with superior administrative and technical skills and public transport experience. (Ahmedabad, Jakarta, Johannesburg, Lagos)
- Early development and implementation of a formal, multimedia communications strategy addressing the spectrum of stakeholders is fundamental to the success of a BRT system. (Ahmedabad, Jakarta, Lagos)
- Skillful management of stakeholder expectations, two-way communication, and public involvement increase the chances of project success. This results in better understanding of the issues and likely outcomes by proponents as well as increased buy-in and appreciation among other stakeholders. (Ahmedabad)
- BRT can be an attractive, potentially cost-effective rapid transit option anywhere because of
    - high-speed, reliable service
    - usefulness to passengers of all incomes
    - economic potential for developers
    - relatively modest costs, ease of implementation, and operation

- BRT offers a flexible, adaptable solution to address a number of mobility issues:
    - meets the needs of a variety of travel and land-use patterns
    - performs efficiently and effectively even with right-of-way dedication of less than 100 percent (Lagos)
    - consists of easily upgradable elements—e.g., vehicles, running ways, and systems—after the commencement of operations in response to problems or when more investment funds become available (Ahmedabad, Lagos)
    - offers the possibility of relatively short implementation times, e.g., within a single term of political office (Ahmedabad, Jakarta, Johannesburg, Lagos)

- There is no single BRT system prescription:
    - use transportation analysis, planning to develop the most appropriate BRT system package
    - begin with market analysis
    - match markets with comprehensive, integrated public transport service plan, plans and then designs for running ways, vehicles, stations, etc.
- For BRT to be most successful, authorities should focus on the following:
    - level of service, providing the highest quality possible to attract and retain ridership
    - high-quality equipment, infrastructure, and facilities
    - efficient system integration, making the public transport network service of which BRT is a part function as one system in all areas, including running ways, stations, vehicles, fare collection, ITS
    - differentiating BRT from the local bus system and positioning it in the marketplace to compete with personal cars, taxis, and so on
- It is possible for BRT systems in different developing city environments to meet operating and maintenance costs, including the cost of vehicle amortization and depreciation, through operating revenues, fares, and advertising. (Ahmedabad Lagos)

Table 2.1 Comparison of Systems' Operational and Technical Data

	Lagos BRT-Lite	Johannesburg Rea Vaya	Jakarta TransJakarta	Delhi HCBS	Ahmedabad Janmarg
Line openings	March 2008	September 2009 (line 1A)	February 2004 (line 1); February 2009 (line 8)	May 2008	July 2009
Number of corridors	Operational 1, with extensions under construction	Operational, 1; additional line being implemented	Operational 11, trunk routes; 3 feeder routes	Operational, 1; additional 25 planned	Operational, 3; additional 5 planned
Total system length operational, planned	Operational, 22 km; Under construction, 20 km*	Operational, 25.5 km Planned, 300 km*	135 km	Operational, 5.8 km (median) Operational, 8.7 km (curb lanes without enforcement)	Operational, 45 km
Construction cost (per kilometer)	$1.2 million*	$14.2 million**	$1.3 million*	$5 million	$3 million
Percentage of corridor segregated	60	100	90–95	40	100
Number of existing stations	26	30	142	29	67
Type of vehicles	High floor, 11.7 m	Medium floor, 18 meters (trunk) 12 m (feeder)	High floor 11.5 m; some 18 m	Primarily low floor, 12 m; some with A/C; variety of other types and sizes	High floor, 12 m

Sources: Authors' compilations and various others.

* Initial transitways had to be rebuilt.

** All stations have passing lanes.

Table 2.2 Comparison of Systems' Performance Data

	Lagos BRT-Lite	Johannesburg Rea Vaya	Jakarta TransJakarta	Delhi HCBS	Ahmedabad Janmarg
Average daily ridership on system (approx.)	>175,000	45,000	280,000	85,000	132,000
Maximum load point, peak direction, peak hour volume	10,000	3,500	10,000	10,000	2,000
Former mode of BRT passengers	Car, 6%; public transport, 90%	—	Car, 14%; motorcycle, 6%; public transport, 69%	—	Bus, 40%; auto rickshaw, 35%; taxi and auto, 13%
Average revenue speed (km/hr)	20, for all stops local service	>25	>20	18, on median transit way	25
Travel time savings versus previous modes used	29% over length of initial corridor	—	40–50% over length of each corridor	30% over length of median transitway	20–30% over length of each corridor

Sources: Authors' compilations and various others.

— Not available

Annex: Case study summaries

Lagos

Geographic, economic, demographic and transport context

Lagos, located on the Bight of Benin, is Nigeria's largest city, center of commerce and industry, and biggest port. The Lagos metropolitan area has a population variously estimated at between 15 million and 18 million and conservatively projected to grow to more than 25 million by 2025. The city's main commercial and government centers and largest business district are on Lagos Island, which has only five bridges connecting it to the mainland, where most of the population resides.

Lagos is one of a few megacities—with a population in excess of 10 million—without a formally organized public transport system. The legacy system left by the British had collapsed by 1990. Public transport is provided by a large fleet of more than 75,000 minibuses (*danfo*) together with a smaller number of midi-buses (*molue*) and shared-ride taxis (*kabu-kabu*). Motorcycle taxis (*okada*) and auto rickshaws (*keke*) have recently emerged as public transport modes.

The city's road network is inadequate in terms of coverage, capacity, and condition. The relatively high level of car ownership encouraged by unrestricted imports of secondhand cars, and the high level of vehicular traffic enabled by subsidized petrol prices, have lead to extreme congestion. This is exacerbated by the manner in which the informal public transport system operates. The huge, virtually unregulated number of danfos, okada, and other vehicles constantly weave back and forth from median to curb lane and vice versa, seeking customers and looking for breaks in the traffic. They congregate on the street at markets, pedestrian crossings, and other places where they are likely to find willing customers, effectively shutting down a significant share of available road space.

Typical journey times for commuters to Lagos Island from the main residential areas to the north and west of the city on the mainland are in excess of two hours and is longer if there are vehicle breakdowns, accidents, or flooding on the main roads leading to the few bridge crossings.

Political, governance and planning background

There are three significant factors for the success of BRT-Lite in Lagos. The first was and remains a political commitment at the highest levels to doing something about the increasingly dire transportation situation in Lagos. The second is the institution that was created as an instrument to effect change, and the third is the strong communications program while developing and implementing BRT-Lite.

The poor quality of public transport, related pervasive roadway congestion, and environmental degradation led the Lagos State government to identify transport as one of the most pressing issues it faced. The governor, Asiwaju Bola Ahmed Tinubu, directed the development of a multimodal transport system to include rail and water mass-transit investments integrated with a core road passenger transport network. Enhanced bus services to complement the proposed mass-transit railway system were a core component of the plan. It was recognized that in order for this to work, it would be necessary to exercise government regulatory control over informal, private bus operators to introduce order where demand responsiveness had been taken to extremes.

Because of the need for a formal body to implement the interventions and reforms envisioned in the plan, an authority was created and measures to ensure its financial sustainability were introduced, with the strong backing of the governor. The politically insulated Lagos Metropolitan Area Transport Authority (LAMATA) was established in 2003 to coordinate the transport policies, programs, and actions of all the relevant agencies among the various tiers of government as well as to oversee fundamental investments in the transport system. The authority was allocated a modest vehicle registration tax to finance its operations and cover some of its investment expenditures.

The creation of LAMATA and its staffing by contract of highly motivated, educated, and experienced professionals provided the basis for the governor to proceed with an early action agenda to create momentum for the rest of the plan and political support for his other transport initiatives. BRT received the highest priority on the early action agenda.

The governor and his deputy (and later successor) provided strong political leadership and championed the project against strong early opposition by the taxi industry and other government agencies that had lost authority and power with LAMATA's creation. Without political insulation and active support from two successive administrations, it would have been incredibly difficult, if not impossible, for BRT-Lite to have been implemented and then successfully operated.

Regulation of road passenger transport operations in Nigeria falls by law under one of two separate non-governmental organizations—the Road Transport Employers Association of Nigeria (RTEAN) or the National Union of Road Transport Workers (NURTW). Over time, RTEAN, which mainly represented the interests of vehicle and franchise owners, came to dominate the interurban and large-bus sectors, while NURTW, which focused on transport operators, dominated the urban and small-bus sectors.

NURTW is a national body, but it is organized along state lines, with each state having its own council and related administrative functions. The operational level of the union is at its branches, which divide the transport network into zones based on the principal terminals, known locally as vehicle or lorry parks. Routes, or lines, are controlled by the relevant branch or branches, with vehicles paying fees for registration and each terminal departure. Vehicles queue in turn for boarding and only leave the terminal when full (in the direction of predominant travel at peak times). NURTW exercises little control over operations once vehicles leave the terminal, and most services board and alight passengers on demand along the line of travel. The large majority of the small commercial buses that dominate the sector are not actually operated by their owners, but rather by

individual drivers who pay a daily rental fee ("deliver') to the owner for their use. The driver meets all direct operating expenses, such as hiring a conductor, buying fuel, making minor repairs, and paying system access fees (including extortion by enforcement agencies). The owner retains responsibility for maintenance and major repairs and covers fixed costs, such as financing, licensing, and insurance. As such, the relationship is analogous to an operating lease for the use of a vehicle and is standard practice for the sector in Sub-Saharan Africa.

Communications

As noted above, LAMATA utilized an aggressive communications program during the development and implementation of Lagos' BRT-Lite to ensure that all stakeholders were aware of its plans and what the potential benefits might be. The approach to consult as a means of gathering information made a genuine and meaningful contribution to scheme development.

The project was presented as being not simply about BRT-Lite, but also about facilitating movement within the planned corridor. This created public acceptance and pressure that was used to overcome resistance by sceptics within government at "rival" organizations and among the taxi and minibus industry. The program made good use of quality, professionally produced videos, websites, brochures, and even regularly scheduled radio and TV programs.

These modalities have also been used to establish communications with an array of public transport system stakeholders, including taxi and minibus owners and operators, women, non-governmental organizations representing the disabled, religious groups, schoolchildren, and others. Key to stakeholder engagement and widespread marketing was the engagement of NURTW, which had come to the conclusion that it was appropriate for the city to move to a more regulated form of public transport provision. Its many members, however, needed convincing and developing into ambassadors of the new transport mode.

A sense of status was created whereby the best *molue* drivers were encouraged to retrain to become BRT "pilots," which would provide them higher status among their peers and the sense that they were part of the transport revolution sweeping across Lagos. It was also the case that more BRT drivers were needed, along with a change in conditions to transform the tense and often violent atmosphere in vehicles and at stops, replacing them with more ordered environments that would include humane service users. This new, synergistic relationship held the potential to develop more respectful drivers, leading to a more compliant population that in turn could produce even more such drivers. Here BRT represented the catalyst of change.

The LAMATA communications program did not cease after project preparation and implementation. Indeed, it continued well beyond the start of operations, with a bi-weekly television program dealing with BRT issues, such as fares and fare collection methods.

BRT-LITE concept, integration and performance

In an attempt to improve the public transport system and regulate the market, the state government decided to introduce BRT on a 20-kilometer corridor along a busy, multilane expressway with service roads. The system is referred to as BRT-Lite because of certain design compromises reflecting a limited budget and a politically motivated short implementation time. The system was inspired by practices from Bogotá, Colombia, and Curitiba, Brazil, that were adapted to suit a Nigerian context and budget and timing constraints.

Service: Physical and operational features

Key service and operational features include the following:

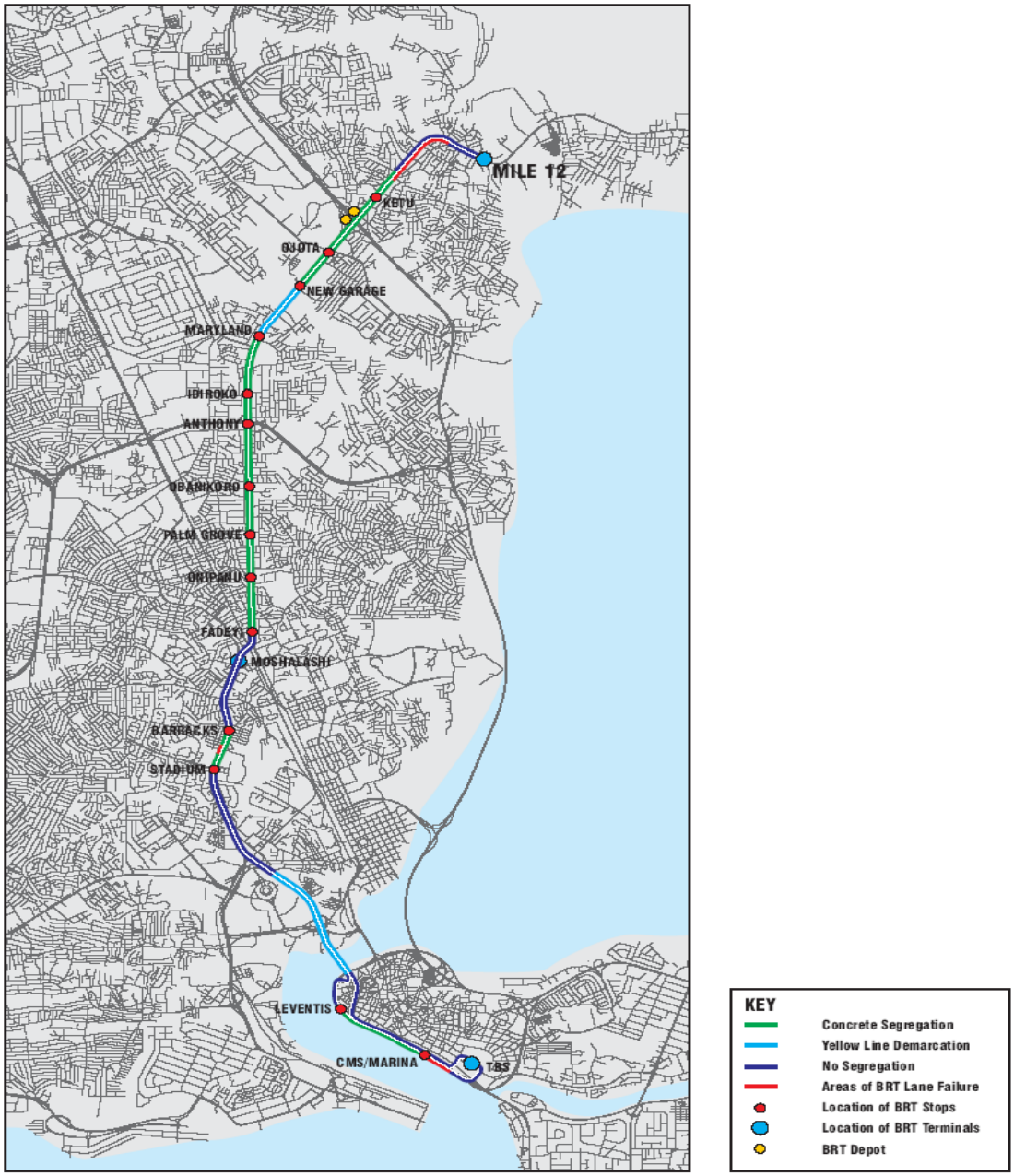
- There is a single trunk, all-stops local service plus several express or skip-stop routes (see map 2A.1). The minibus and other public transport services in the corridor were left as is when BRT-Lite service began operating in March 2008; over time, their service levels decreased as significant numbers of passengers migrated to BRT-Lite.
- Stations are curb-side, low platforms with branded shelters and a fenced area for queuing passengers, who must have their tickets checked before boarding through the front door.
- The vehicles are front-engine buses with a high floor, body-on-truck chassis, and two narrow doors. They are common in developing countries.
- There is a dedicated, physically separate lane on the main part of Ikorodu Road, accounting for 60 percent of the 20-kilometer corridor. The lane is on the outer part of the expressway and is separated from the mixed-traffic service lanes where taxi's ply by an island. The rest of the corridor is either in mixed traffic or on a bus lane delineated by a yellow line and signage.

The initial service plan called for a single, local all-stops line operating in the corridor, with the rest of the public transport system left to operate unimpeded. Because of crowding on the inner portions of the line and intense congestion at the northern Mile Twelve terminal, two service plan changes were made soon after opening. LagBus services from northern suburbs beyond Mile Twelve (e.g., Ikorodu) now provide direct service on the transitway through Mile Twelve instead of being turned back at that terminal, and a shorter, "turn back" BRT-Lite route was introduced to provide more capacity in the inner portions of the corridor.

The initial line was delivered at a very low cost per kilometer compared to BRT projects in other parts of the world and within 24 months, from planning to opening for service in March 2008. An extension and an additional line are under construction.

The high ridership on Lagos BRT-Lite, more than 175,000 passenger trips per day, attests to the system's popularity with the general public. Its support among the informal public transport sector, especially labor, has been unexpectedly good. End-to-end commercial speeds are double those of the minibuses and taxis previously operating in the corridor, with some express services exceeding 25 kilometers per hour.

Map 2A.1 Lagos BRT-Lite, Phase 1



Source: Dayo Mobereola, "Lagos Bus Rapid Transit: Africa's First BRT Scheme," SSATP Discussion Paper no. 9, September 2009.

The system is recovering all costs, excluding the modest infrastructure costs from fares. There are currently some performance issues (e.g., missed trips, ill-maintained vehicles) caused by the taxi union cooperative's lack of managerial experience with large enterprises. These are in the process of being addressed through the hiring of professional managers as well as professional development.

Operating arrangements

At the outset of BRT development, no private company existed in Lagos that was capable of operating the system on its own, nor were there operators among whom this opportunity could be competitively tendered. It was agreed, therefore, that the scheme would include an operator-capacity development function in partnership with NURTW under the private-public financing approach envisaged for mass transit in the Lagos Urban Transport Project financed by the World Bank.

NURTW thus established the special-purpose entity 1st BRT Co-operative (FBC), or Lagos NURTW (1st BRT) Cooperative Society Limited, to operate the BRT-Lite system. While FBC remains a wholly owned subsidiary of the Lagos State Council of NURTW, it is managed at an arm's-length basis, with day-to-day control vested in the 50 or so members who subscribed to equity at its launch. New members may only be admitted to the society by agreement with current members and upon payment of the same equity.

Once FBC was formally constituted and empowered, it began making preparations for the launch of the BRT-Lite service. It focused initially on the creation of a small management team and the recruitment and training of pilots (drivers). The latter represented a particular challenge in that relatively few NURTW members held large-bus licences, and even fewer were qualified to drive such vehicles or had had recent experience doing so. The problem was exacerbated by the required competence of driving smoothly and at a consistent speed within the confines of the BRT-Lite running lanes, which in some places are only 2.8 meters wide.

During this developmental phase, it soon became apparent that NURTW lacked the relevant experience for the operation of a large-scale scheduled bus service. Its sector skills were based in the management of terminals, with vehicle queuing and passenger boarding being their priorities, but little or no control along the transport routes. LAMATA realized that it would have to step in to provide the relevant expertise, so it recruited a senior public transport specialist from one of the country's major private sector bus and coach operators.

In addition to this external advisory function, it was also recognized that a number of the specialized activities of a large commercial passenger transport undertaking would need to be outsourced. First of these was the vehicle maintenance function, for which the vehicle supplier is required to provide full technical support, covering trained personnel and spare parts stockholding. Second was financial management, because the eventual lending bank, recognizing the nature of cash flows during the early years of such a scheme, needed to control its exposure risk. Third was operational management itself, which was outsourced to a specialized business handling 1,600 vehicles and 2,600 drivers across Nigeria and the full range of human resources activities.

Finance

Infrastructure and facilities for the initial BRT-Lite line were financed directly from Lagos State general revenue provided through LAMATA. In turn, LAMATA also controls a dedicated source of funds (road use taxes), which will be used to partially finance future lines.

The financing of vehicles to operate along the BRT corridor proved to be a challenge. Banks were reluctant to participate in the scheme because of past experiences with failed initiatives to encourage fleet investment at the federal and state levels by informal sector owners. No financial institution chose to make good on initial expressions of interest in participating in the scheme.

The vehicle supplier, the Indian company Tata, eventually resolved this matter by offering to accept deferred payment over two years provided that a local bank would underwrite the counterparty risk. Ecobank Nigeria PLC agreed to the arrangement, but it in turn required as collateral personal guarantees from senior officers of NURTW to mitigate the risk exposure. Fortunately the levels set for the guarantees, covering less than 10 percent of the total transaction value, were affordability for those who had to provide them. Once all the financial arrangements had been finalized, the order was confirmed for shipment in the first half of 2007. Delivery was made in two batches, arriving in Lagos in June and September 2007. Tata also financed and managed construction of the bus depot.

BRT-Lite in Lagos continues to operate without public subsidies. In fact, the system made a large enough profit that it was able to fully repay the loans used to purchase the buses ahead of schedule.

Johannesburg

Geographic, economic, demographic and transport contexts

With a population of around 3.2 million, Johannesburg is the largest city in South Africa. Inclusion of its suburbs increases the number of residents to around 7 million. As a result of migration from other parts of the country, Johannesburg's population continues to grow rapidly, placing ever-intensifying demands on the city's economic and social infrastructure. Between 1996 and 2001, the population increased by 22 percent. Although not the country's political capital, Johannesburg is the undisputed financial, communications, and business center as well as a major industrial and surface logistics hub.

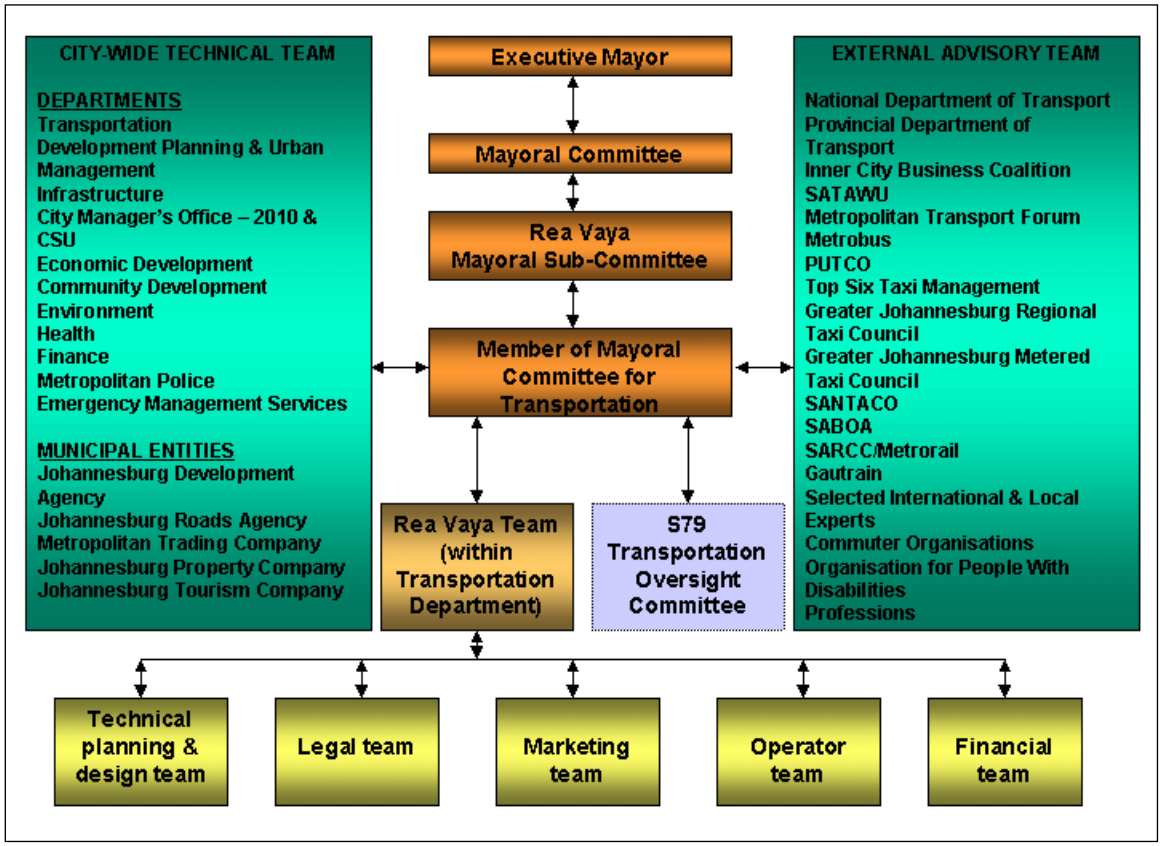
The geography of Johannesburg, although not constrained by water or mountains, was for decades driven by apartheid, a social and political policy that had a significant impact on shaping land use and public transport. The apartheid system, in place between 1948 and 1994, led to spatial planning designed to keep the pool of African workers, residing in townships, far from the commercial, financial, and business core and traditional white residential areas, but close enough to them to provide low-cost labor. This policy led to the majority of black residential, township areas being situated between 25 and 30 kilometers away from the central business district, leading to significant transport challenges for blacks.

The lack of public investment in transport for black, Asian, and "colored" workers coupled with the extreme separation of home and workplace led to the growth of an informal taxi-minibus transport sector without state control or support. The ability to readily meet a dire need without oversight led to a system that provided the best financial return to owners and operators while providing users with a generally poor level of service, high and unstable fares, and poorly maintained and dangerous vehicles driven by drivers of questionable skill. The ability to make money with low levels of investment quickly led to an oversupply of transport vehicles and drivers and intensified competition between rival suppliers. With livelihoods and money at stake, violence ensued, further marginalizing the users. In addition to supplying critical mobility and employment, the minibus industry was perhaps the only significant entrepreneurial outlet available to non-whites.

Political, governance and planning background

South Africa has three tiers of government. The national government, in addition to determining overall national policy, controls funding for transport schemes implemented at the local level. Regional government (in this case Gauteng Province) coordinates policy in the province, and local government (here for the city of Johannesburg) oversees local planning (which is reviewed by the provincial and national governments), local policy (in support of national policy), and implementation. The city of Johannesburg was therefore the implementation authority for Rea Vaya, providing expertise and coordinating among stakeholders to meet national policy aspirations. Figure 2A.1 shows the institutional structure for Johannesburg's Rea Vaya.

Figure 2A.1 Institutional Structuring for Johannesburg's Rea Vaya Planning and Implementation



Source: Colin Brader, "Documentation of BRT Experience: Lagos, Johannesburg and Jakarta," final report, World Bank, February 2011.

A dedicated Rea Vaya team for planning and implementation, located in the city's Transportation Department, was established and mandated to report to the executive director of transportation, operating under a member of the Mayoral Committee for Transportation (figure 2A.1). The Rea Vaya team sits within the Transportation Department. After implementation, Johannesburg's BRT was run by the Rea Vaya Business Unit, which is responsible for operational control and system

management, including bus operations, ticketing, revenue management, station management, and system maintenance, inspection, and enforcement.

In 2006 transport was given its own portfolio within the city government with responsibility for multimodal transport planning and regulation within the city boundary. The suburban and commuter railroad system falls within the purview of the South African National Railway.

Communications

The Rea Vaya communications program consisted of three phases and different types of approaches. The initial phase focused on building support for the program among the minibus and taxi industry owners and operators, who were considered the most important stakeholder group to coopt. Efforts to obtain their buy-in included study tours to South America, workshops, and discussions with the two major unions representing the industry in Johannesburg. These were intended to educate this sector about BRT and what it could mean financially and in other ways for industry labor and owners. The city hired a technical expert to work with the industry throughout the planning and implementation phase.

Special efforts were made to reach out to the riding public in general and to the disabled community in particular to get their input and obtain their support in the face of expected opposition from the taxi and minibus unions. Although there was promotion of Rea Vaya and consultations ahead of the system's launch, financial constraints prevented the project team from spending large amounts on communications and promotion strategies. In light of this funding issue, the Rea Vaya team, and of particular importance, the system's political champions, courted local media to provide as much positive exposure as possible.

During the construction phase, although two key minibus stakeholder groups agreed to cooperate with Rea Vaya, significant numbers of minibus taxi operators continued to oppose the system. The opposing operators became increasingly militant, holding strikes and protesting against the proposed system. The Rea Vaya team continued to talk to and negotiate with the affected taxi operators while also carrying out workshops and road shows for them.

Another communications strategy involved the creation and promotion of the Rea Vaya brand through a logo and distinctive coloring to be used throughout the system and in outreach materials. The branding effort was creative and consistent and helped to build system identity. Each station was also designed to feature original and identifiable artwork in addition to Rea Vaya branding.

During the current, operating phase, a variety of strategies are being funded through a communications budget to maintain and build support for Rea Vaya. Facebook and Twitter accounts set up during construction continue to report on the system and update users on a regular basis. A marketing company has been hired to promote the system more widely through such activities as holding press conferences and radio interviews, placing newspaper advertisements, issuing press releases, producing and distributing pamphlets, posters, and other marketing materials to passengers and

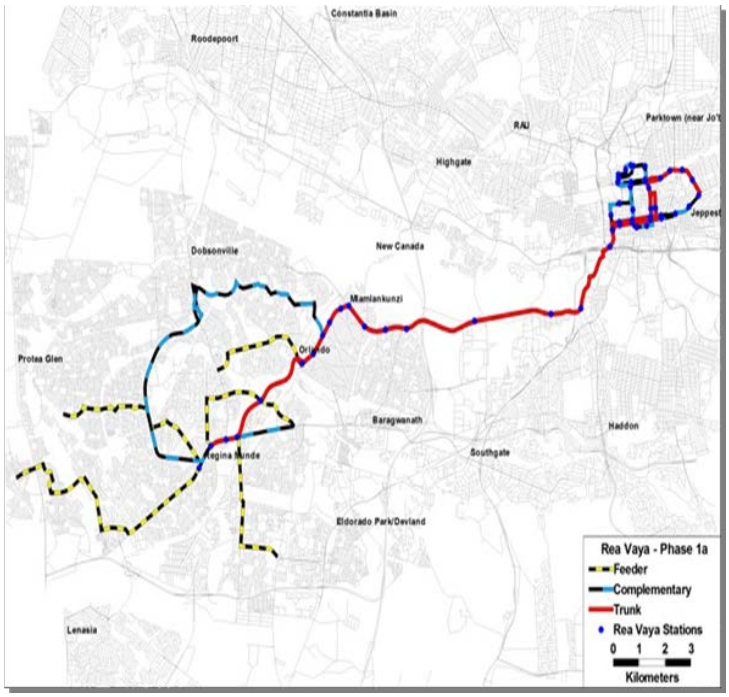
community members and in stations. Theater productions in schools and community venues have also been held to encourage the use of Rea Vaya and spread information about it.

The marketing team encouraged departments in the city government to mention Rea Vaya when promoting Johannesburg and their services, such as including Rea Vaya stations in the "You Make Joburg Great" outreach campaigns sponsored by the city's marketing department. The marketing team monitors the local print and electronic media on a daily basis, and the office of the Mayoral Committee and project manager are kept informed of matters of urgent reputational import so that swift corrective action can be taken when needed.

Rea Vaya concept, integration and performance

Rea Vaya is being developed in phases (maps 2A.2 and 2A.3). Phase 1A consisted of the 25.5-kilometer dedicated roadway from Thokoza Park, in Soweto, to Ellis Park, on the east side of the Johannesburg central business district. The contract for Phase 1A construction was signed in September 2007, with full service scheduled to commence in September 2009.

Map 2A.2 Johannesburg Rea Vaya, Phase 1A



Source: Colin Brader, "Documentation of BRT Experience: Lagos, Johannesburg and Jakarta," final report, World Bank, February 2011.

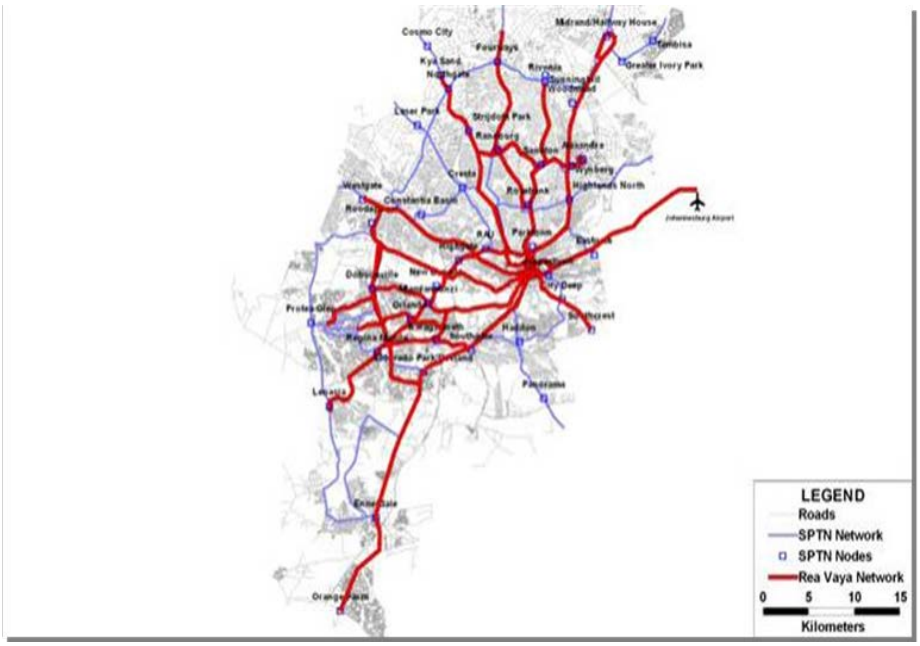
Rea Vaya encompasses three types of services within its respective corridors. First, in the initial phase, a single trunk BRT route operated as a dedicated transitway. Second, two "complementary" routes operated primarily on major arterials but also utilize dedicated transitways or lanes for part

of their trajectory, effectively extending the reach of BRT beyond the dedicated running ways. Third, routes known as "feeders," of which there are five, operated virtually entirely on arterial streets, servicing lower density areas. Parallel minibus and shared-ride taxi services were reduced in Rea Vaya's initial trunk corridor and hundreds of vehicles scrapped per the city's agreement with the respective taxi unions that set up the Rea Vaya operation companies.

The system's physical and operational features include the following:

- Forty-one high-floor, 18.5-meter articulated buses ply the BRT trunk route that runs entirely on an exclusive transitway. They have three righthand-side doors to speed boarding and alighting at busy, high-platform transitway stations.
- The 95 12-meter buses on complementary and feeder routes have doors on both sides. This allows passenger boarding and alighting without steps through right-side doors at high-platform median stations on dedicated transitways and via steps at curbside stops on other roads where they operate in mixed traffic. One of the left-side doors on the 12-meter buses servicing curbside stops has a lift allowing access by the disabled.

Map 2A.3 Johannesburg Rea Vaya System Plan



Source: Colin Brader, "Documentation of BRT Experience: Lagos, Johannesburg and Jakarta," final report, World Bank, February 2011.

- Fully accessible, enclosed median stations have controlled entry/exit, are modular in design, are decorated with local artwork, naturally ventilated, electric sliding doors to vehicle entry/exit, high staffing levels with real time information.
- Station platforms and bus floors are at the same height (900 millimeters) to facilitate level boarding. Station docking is facilitated by a yellow line on carriageways that should be aligned with a yellow dashboard marking. Feeder services use median stations at terminals to facilitate efficient, cross-platform passenger interchanges.
- All fares are paid before boarding the bus. Paper ticketing is being replaced by smart cards.
- Traffic signals are used to give priority at junctions, these will eventually be linked to the urban traffic control system;
- There is a centralized control center with CCTV monitoring on board vehicles and in stations. Headways are monitored, and there is direct voice communication between station staff and drivers.
- Buses operate at high frequencies—every three minutes at peak hours and every twenty minutes during off-peak hours). To ensure high capacity in the future, the trunk route has passing lanes for express buses, and multiple stopping bays at stations.

After a variety of interruptions, including strikes, total daily ridership on the first phase of Rea Vaya was averaging 45,000 around summer 2011.

Operating arrangements

Johannesburg planned its BRT system in preparation for South Africa's hosting of the Confederations Cup in June 2009, not as part of a comprehensive strategic-planning effort per se. Significant infrastructure was built and vehicles were purchased, but frustrations over finalization of the busway, stations, and agreement with the taxi and minibus industry meant that the services were not ready in time for the cup. South Africa was also slated to host the FIFA Soccer World Cup during June–July 2010, and Johannesburg was the location of two of the stadiums to be used in the tournament. Rea Vaya was a crucial part of the transport plan for the event, so its implementation and operation became a national priority.

Negotiations with the various taxi unions in the run up to the World Cup were contentious and sometimes violent. A pervasive belief ran through the taxi industry that implementation of BRT, in general, especially in the initial central Johannesburg-to-Soweto corridor, would adversely affect the livelihoods of countless black entrepreneurs. The perception of negative impacts on the existing taxi industry and labor was a particularly difficult issue given the legacy of the apartheid system, under which the taxi industry was one of the few business sectors that blacks could enter.

Immediately before the World Cup began, the taxi industry made an attempt to tie up the city to prevent Rea Vaya from becoming operational. Operators parked tens of thousands of taxis on major roadways in central Johannesburg for days, until the government threatened to confiscate them.

Random violence accompanied the opening of Rea Vaya in the fall of 2009 and included a number of shootings at drivers and other staff, leaving one person dead. By the time of the World Cup, the violence had subsided, but ridership before and after the games, under 45,000 daily trips, was a modest figure given the magnitude of the investment. This figure reflects in part the continuing, parallel minibus service.

Rea Vaya was originally operated by Clidet, a private bus company contracted by the city because of the difficulty in reaching an agreement on forming a new company with the taxi operators. After several years of negotiations, Rea Vaya is now operated under a 12-year contract by PioTrans, a share capital company comprised of the owners of nine former taxi-operating companies. These 316 private sector shareholders are from the Greater Johannesburg Taxi Council and have organized into nine taxi-operator investor companies and one trust. PioTrans has a 66.7 percent stake in Rea Vaya, with the city of Johannesburg and other stakeholders owning the remaining 33.3 percent.

Of note, there was a seven-week strike in fall 2011 by Rea Vaya drivers seeking the same pay and work rules as employees of the city-owned MetroBus.

Finance

Funding for the capital expenditure of Phase 1A was provided by the South African national government, primarily through a Public Transport Infrastructure and Systems (PTIS) grant to the city. This covered the construction of the dedicated transitway, road reconstruction, and stations along the route in addition to transitional operating costs. In addition, grant funding provided for employment of support staff and consultancy contracts with the German Development Cooperation and the United Nations Development Programme (Global Environment Fund).

Vehicles were purchased by the city and provided to the operator at no cost in the absence of a special-purpose entity with financial resources or the ability to finance them out of fares. The annual cost of operating Rea Vaya services is currently about R 150 million. This covers PioTrans payments; vehicle maintenance contracts; fuel bills; compensation payments to operators; Metro Trading Company's contract (for managing stations); office employees, station ambassadors, cashiers, and cleaners; the Traffic Management Technologies contract (for secure fare collection); and station security staff.

Fare revenues from Year 1 totalled R 50 million and in Year 2 are forecast to be R 70 million to 80 million, or about 50 percent of total operating and maintenance costs, excluding depreciation or amortization. The shortfall in fare box revenues is a result of patronage being lower than originally forecast. Because of this unanticipated shortfall in revenue, system operation is subsidized by the city of Johannesburg.

Jakarta

Geographic, economic, demographic and transport contexts

Jakarta is the capital of Indonesia and that country's most populous city. Crossed by many rivers and canals, this port city is located on the northwest coast of Java. It has approximately 9.6 million residents, with a population density of 14,464 per square kilometer. The population of the region, including in Jabotabek, the suburban areas surrounding Jakarta, is around 26.6 million, with the 2010 census showing a growth trend.

An estimated 17 million trips are made each day in Jakarta City, of which only 53 are by public transport. Prior to TransJakarta, the BRT system, public transport services and vehicles were considered to be of low quality by the general public, and the services offered were inadequate.

The high number of private vehicles on Jakarta's roads caused serious congestion issues throughout the city. Before the implementation of BRT, economic losses from traffic congestion were estimated to be Rp 12.8 trillion a year (value of time, fuel costs, health costs, etc.), roughly the equivalent of $1.4 billion. By 2020 the cost of congestion is expected to rise to Rp 65 trillion a year ($7.3 billion).

Political, governance and planning background

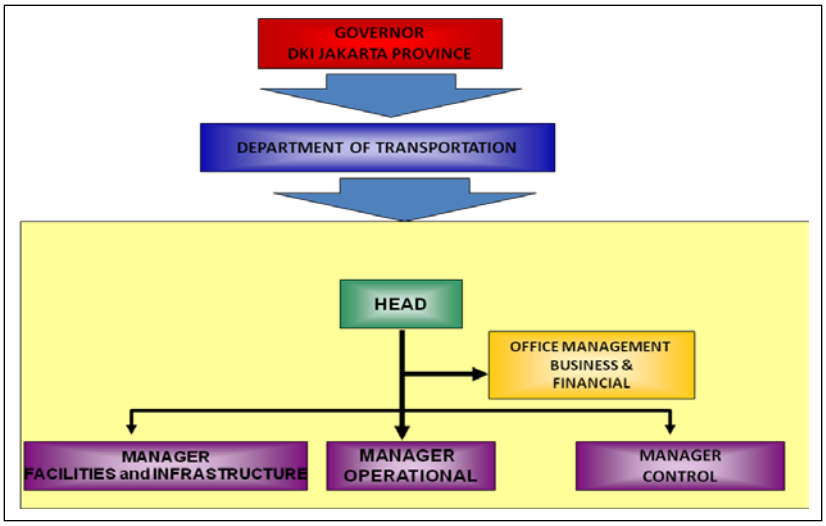
Jakarta is not officially a city, but a province with special status as the capital of Indonesia. It has a governor, instead of a mayor, and is divided into several subregions, each with its own administrative system. The province's official name is Daerah Khusus Ibukota Jakarta (DKI Jakarta), or Special Capital City District of Jakarta. The city of Jakarta sits within a three-tier political system. As a result, the national government provides an overarching framework for transport policy. The Jakarta provincial government has responsibility for the development and implementation of transport strategy for the whole city, while actual implementation and operation are the city's responsibility. Thus, development of transport strategy, including implementation of the Transportation Master Plan, is the responsibility of the Department of Transportation, which reports directly to the governor of DKI Jakarta.

BRT Origins

Preliminary planning for the Jakarta BRT system began in 2001 and was given a major boost when in May 2003 the governor, Sutiyoso, visited Bogotá, Colombia, and Curitiba, Brazil, where he was

impressed by those cities' BRT systems.[8] Following his visit, the governor instructed his staff to complete the design for Jakarta's BRT system and implement the first corridor. In February 2004, the TransJakarta Busway began revenue operations along a 12.9-kilometer corridor from Blok M, in south Jakarta, to the Stasium Kota railway station, in north Jakarta. The corridor passes through the city center, Jalan Thamrin, and along two of the city's most congested roads, Jalan Sudirman and Jalan Gaja Mada. The busway was constructed in an unprecedented nine months at a cost of about $2 million per kilometer.

Figure 2A.2Institutional Structure for TransJakarta



Source: Colin Brader, "Documentation of BRT Experience: Lagos, Johannesburg and Jakarta," final report, World Bank, February 2011.

Following the success of the BRT in the first corridor, two additional corridors were planned and designed. They officially opened on January 15, 2006, and had become fully operational by April 2006. Corridors 2 and 3 link Pulo Gadung, in east Jakarta, with Harmoni, central Jakarta, and link Kalideres, in west Jakarta, with Harmoni, respectively. Four more corridors were officially added to the busway network on January 27, 2007, and were fully operational by April that year. Corridor 8,

[8] The BRT story in Jakarta, however, began long before the governor's decision to embrace it. In the early 1990s, the World Bank's first Jabotabek Urban Development Project (JUDP-1) financed the engineering design of a median busway along what is now Corridor 1; it also financed a complementary review of public transport network planning and licensing. National and city governments then opted, however, to go for quick and cheap bus lane, which on Jalan Sudirman ran along the service road and conferred absolutely no priority to bus operations. There was no political will to tackle licensing of the (nominal) cooperatives that operated small buses in the corridor, and no attempt was made to provide improved bus shelters or to control places for boarding and alighting. Of no surprise, the experiment was a dismal failure and was quickly abandoned. This would in part account for the considerable initial skepticism that greeted the governor's BRT plans in 2003.

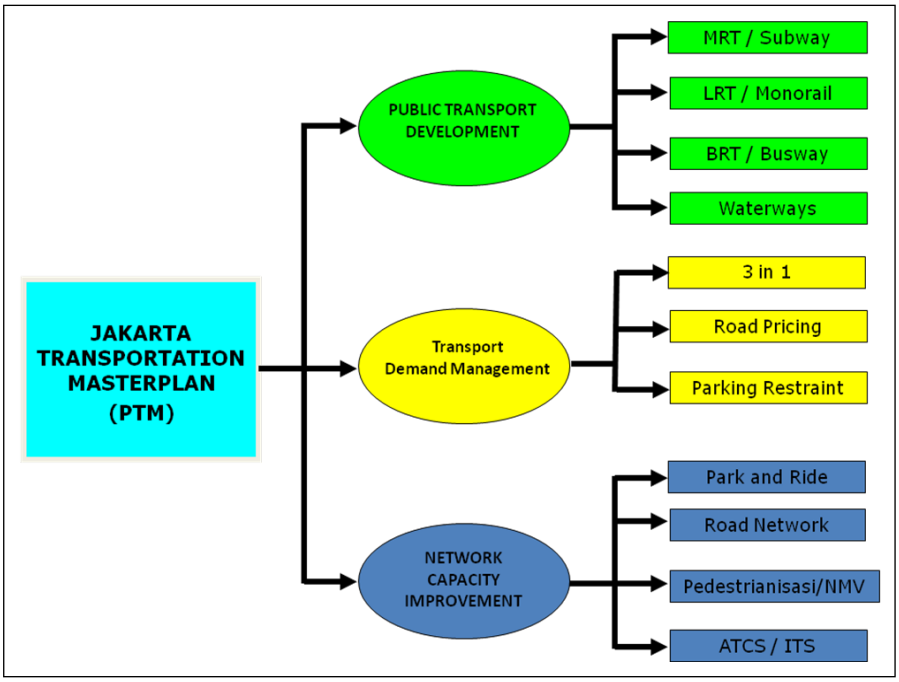
which links Lebuk Bulus, south Jakarta, to Harmoni and passes through Pondok Indah, a relatively exclusive suburb of the city, was introduced in 2008. [9] Two more corridors, numbers 9 and 10, were constructed in 2008 but are still not operational because of legal constraints and a lack of buses.

TransJakarta Institutional Structure

A system development and delivery entity—Badan Layanan Umum (BLU) TransJakarta Busway, a public service entity—was established in 2006 by a decree of the governor and located within the Department of Transportation (figure 2A.2).

TransJakarta plans and manages the BRT network, and as such, has significant control over service levels in the current phase. The provincial government, however, designs and builds stations, whose operations and maintenance are the responsibility of TransJakarta, and constructs and maintains the busway network. Although TransJakarta sits within the provincial government, the separation between it and the provincial government's infrastructure maintenance division is susceptible to creating a reduced service standard through delays in response to maintenance needs.

Figure 2A.3 Jakarta Transport Master Plan



Source: Colin Brader, "Documentation of BRT Experience: Lagos, Johannesburg and Jakarta," final report, World Bank, February 2011.

Note: NMV = non-motorized vehicle; ATCS/ITS = area-wide traffic control system/intelligent transport system.

[9] From "Bus Rapid Transit and Pedestrian Improvements in Jakarta," final mid-term evaluation report.

The Jakarta Transportation Master Plan (PTM), produced in 2004, serves as the basis from which urban transport policy within the Jabotabek region is developed. The PTM asserts that emphasis "should be placed on sustainable economic development towards creation of better life in the region as well as for Indonesia's national growth," and that in order to do this, domestic and foreign investment is essential. It then recognizes, however, that "inefficiency of the region's transportation system such as poor accessibility to the Tanjung Priok port among other things has made the region less attractive for investors," thus necessitating the creation of an efficient and reliable trunk transport system.

The Jakarta PTM set out three key strategies (see figure 2A.3). As part of this plan, BRT was targeted to make a significant contribution to public transport development. The concept for TransJakarta was therefore modified with plans for 14 corridors to be implemented by 2015. As noted, TransJakarta had been conceptualized in December 2001 by Governor Sutiyoso, a powerful and charismatic provincial leader who had been advocating a mass public transport system for almost a decade. Sutiyoso recognized that BRT could serve the transit needs of Jakarta residents more quickly and at less expense than a metro system. BRT was presented to the Jakarta public as a fast, safe, efficient, humane and comfortable public transportation with international standards. Later Sutiyoso would offer, "I have no fear. I am brave enough to decide and to make it happen. That is why I managed to construct seven busway (BRT) corridors in three years."[10]

The development of BRT inevitably involved disruption, thus stimulating negative responses by those people using the corridors where construction was taking place and businesses that fronted the future BRT corridors. This led to conflict between the national and provincial governments, with the national minister for transport calling for the postponement of the building of Corridor 1. Sutiyoso reacted by intensifying the construction program, moving the opening date forward by one month. His commitment was rewarded with plaudits after the opening of the first line and almost instant recognition by the traveling public of the benefits of the system.

After Sutiyoso left office in 2007, the BRT development program was downgraded in priority, with the now-shelved monorail project and still-active Mass Rapid Transit (MRT) receiving more attention than BRT Lines 9 and 10 and the development of a BRT control system. Sutiyoso continues to be active in advocating enhancements to the BRT network.

Communications

When Sutiyoso first proposed to implement BRT in Jakarta in 2001, it was an entirely new concept for Indonesia. Public transport had a generally poor image, while such private transport modes as motorcycles and cars were becoming increasingly popular despite creating chronic congestion problems. The implementation of BRT therefore required a comprehensive communications strat-

[10] "Bus Rapid Transit and Pedestrian Improvement in Jakarta," final report, mid-term evaluation, UNEP/GEF Project GF/4010-07-01, July 2012.

egy to ensure that potential users, and non-users, understood its value to counter whatever negative publicity might arise from it slight impacts. The communications strategy proceeded in three stages: design and pre-delivery, initial operation, and current operation.

Design and Pre-Delivery

Communications were particularly important during the pre-delivery phase because the Jakarta general public was rather skeptical when the system was proposed. Apathetic citizens believed the idea to be a political stunt, and while they did not oppose BRT in principle, past experience suggested that this would be yet another major project initiated with great fanfare, built at great cost, and destined to fail or remain unfinished.

To reassure the public that the proposals put forward were serious and would be delivered, Governor Sutiyoso put forward a clear implementation plan based on intense public consultation. The principal method of communication was through service advertisements on television. Initially television stations had little interest in promoting BRT, but the provincial government employed the services of the Visi Anak Bangsa Foundation, a non-profit organization that had several high-profile employees and specializes in corporate communications and improving trust in government. This led to creative approaches to communicating and publicizing the project, and in turn, sparked television stations to give it more airtime, providing even more publicity for the BRT proposal.

The public service adverts created by Visi Anak Bangsa were run on several national TV stations, generating positive initial reactions. The adverts changed the public perception toward the system and its construction and led to a greater level of acceptance. In addition to TV adverts, extensive public consultation was carried out at the Jakarta International Expo, which is held every year between May and July and is visited by millions of people. The provincial government used the opportunity to distribute brochures and flyers about BRT and provide examples of the buses to be used. The government also enlisted the help and support of several NGOs to help communicate the benefits of BRT through print and electronic media.

There was a determined approach to follow the TransMilenio model in developing the TransJakarta brand. This included the development of a brand logo that was (and is still) used system-wide—at stations, on the side of buses, on employee uniforms, on all publicity materials, on electronic portals, and anywhere the public comes into contact with the system.

Initial Operation

The first two years of TransJakarta's operation brought a significant change in the communications strategy. The provincial government, having experienced an extremely positive public reaction to Corridor 1, felt that there was little need to communicate its plans and their potential impact when constructing additional corridors. The prevailing sentiment was that BRT was a concept that Jakartans and visitors already understood and supported, so further explanation was unnecessary.

During this same period, the management of TransJakarta changed, with Badan Pengeloa TransJakarta (BP TransJakarta) being created to manage the BRT system. While this process was communicated through the media, BP TransJakarta had decided that it needed to ensure that public relations remained positive to facilitate further development of corridors. To build a positive public image, BP TransJakarta recruited a media expert to serve as public relations manager, whose key role would be to build a positive image for BRT and strong links with journalists. This strategy was considered highly successful given the predominantly positive media coverage of TransJakarta.

A website was developed to disseminate service information and serve as the primary electronic information source for users. Users were invited to express their ideas and complaints about the service online and via text messaging; TransJakarta emphasized transparency in its handling of complaints. Extensive public and employee consultations and feedback were pursued to better understand how services could be improved for users on Corridor 1 and future routes. A series of focus groups were carried out following the implementation of Corridor 1 and revealed the key issues to be high temperatures in stations, the cleanliness of stations, crowding on buses, and difficult vehicle boarding and alighting

Suara TransJakarta, a community of around 1,100 TransJakarta users, was set up to holds regular meetings with the TransJakarta board to inform them of ideas for possible service improvements. The information gained through these public consultation exercises was (and continues to be) used to make improvements to future corridors.

Current Operation

In December 2006, BP TransJakarta changed its status to a public service entity under the name of Badan Layanan Umum TransJakarta, which led to the organization becoming a technical implementation unit of the provincial Department of Transportation. This development also produced changes in communications strategy.

Since then, public communication has been more reactive, focusing on handling complaints that reach it instead of being proactive as previously. There has been no concerted communication strategy since 2006, and there is no longer a public relations manager. Public opinion shifted slightly as media coverage of the TransJakarta system became less positive.

The system's website, however, has continued to be developed, with the addition of Twitter and Facebook as portals for disseminating information and getting feedback from users. TransJakarta has also become a corporate and social responsibility partner of Coca-Cola for promoting "greener and cleaner transportation."

Transjakarta concept, performance and integration

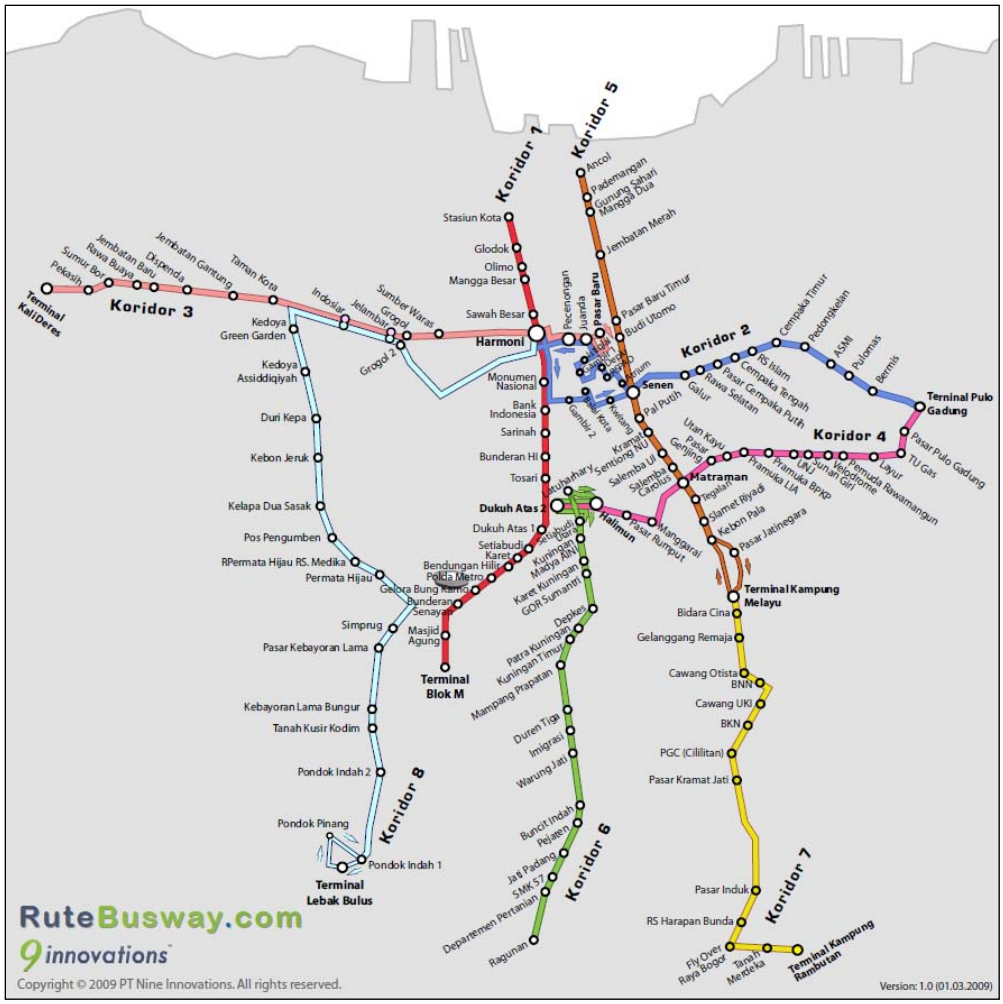
As noted above, the concept for TransJakarta was developed with plans for 15 corridors to be implemented by 2015. Corridor 1 consists of 12.9 kilometers of mostly segregated bus lanes with 20 stations at an average distance of 650 meters (map 2A.4). Peak-hour frequencies are around 1 mi-

nute, while off-peak frequencies run 2 to 3 minutes. Additional corridors were introduced in subsequent years, with the eighth corridor being implemented and opened in February 2009. Two more corridors became operational by early 2011.

The physical and operational features of TransJakarta are as follows:

- The buses, high floor 11.5 meters and some 18 meters long and articulated operate in exclusive trunk lanes, mostly in the median. The buses are a mix of one-door and two-door models. Those with one door stop at the station at two locations—one to allow passengers to alight and one to allow passengers to board. Those with doors on both sides allow for occasional bilateral station entry and exit.

Map 2A.4 TransJakarta Network



Johannesburg *Source:* Colin Brader, "Documentation of BRT Experience: Lagos, and Jakarta," final report, World Bank, February 2011.

- The station platform and the bus floor are at the same height, 1.1 meters, to facilitate level boarding.
- Enclosed median stations have controlled entry and exit, and each station is individually designed to fit the available space. They are naturally ventilated with fans and have electronic sliding doors to vehicle entry and exit and high staffing levels.
- Median stations have covered pedestrian overpasses for access. Ramps are at a 9 percent gradient to allow for wheelchair access.
- Interchange stations are linked via covered overpasses to allow transfer within the enclosed station environment.
- All fares are paid before entering the station environment. The current system uses tokens, cards, and paper tickets, but will be replaced in due course with smart cards.
- Station docking is facilitated by a Stop sign beyond the station that drivers can use for alignment.
- Buses do not have priority at junctions, with signal cycle times of up to four minutes. There is no segregation at intersections, but painted surfaces denote busways.
- Buses are dispatched at each terminus and at present are not controlled by a central control center, but it is hoped that this will be introduced in due course.
- Buses operate at high frequencies on all corridors during the peak (1 to 4 minutes) and off-peak (2 to 5 minutes).

TransJakarta began operations in January 2004 with Corridor 1, from Blok M to Kota, running north-south across the central business district. Map 2A.4 shows corridor 1 in the context of the current network. For the first two weeks of operation, TransJakarta ran free of charge to allow users to get acquainted with the system. The service began operating commercially in February 2004, and during 2004 carried 15,926,000 passengers. Patronage increased in the second year of operation, with 20,799,000 passengers using Corridor 1 in 2005. In 2009, users made 82 million trips, or almost 300,000 daily.

Journey time savings on TransJakarta have been significant since the system's introduction. Work carried out by the Institute for Transportation Studies (INSTRAN) revealed that on some corridors, journey times were more than halved when compared to other modes of public transport using mixed traffic lanes. The effects of TransJakarta on journey times within Corridors 1, 2, and 3 are illustrated in table 2A.1.

The previous transport mode of TransJakarta users included private vehicles and public transport. Surveys undertaken by INSTRAN following the implementation of TransJakarta show that 14 percent of users previously used private cars, and 6 percent used private motorcycles before switching to TransJakarta. Sixty-nine percent transferred from other forms of public transport, including air-conditioned (32 percent) and non-air-conditioned buses (35 percent).

There is no service or fare integration with the rest of the Jakarta public transport system, although a number of off-street intermodal passenger interchange terminals have been built to facilitate bus-BRT transfers.

Operating arrangements

As of 2011, there were six different operators providing services on the TransJakarta network. Four of these operators are consortia of existing operators that were set up to take advantage of the compensation offered by TransJakarta for reforming public transport services along particular corridors. They were given no-competition contracts for the initial seven-year period of operation. Two of the operating companies were existing private organizations that won the opportunity to operate through an open, competitive tendering process, obtaining an seven-year operating licence. By 2014, all operating contracts will be competitively tendered.

Table 2A.1 Sample Journey Time Reductions before and after Implementation of the First Three TransJakarta Corridors

Route	Journey length pre-BRT	Journey length on BRT	Reduction in journey time
Blok M–Kota	1 hour 37 min.	45 min.	54%
Kota–Blok M	1 hour 37 min.	45 min.	54%
Pulo Gadung–Harmoni	1 hour 27 min.	40 min.	54%
Harmoni– Pulo Gadung	1 hour 02 min.	35 min.	44%
Kalideres–Harmoni	1 hour 41 min.	55 min.	46%
Harmoni-Kalideres	1 hour 20 min.	45 min.	44%

Source: Colin Brader, "Documentation of BRT Experience: Lagos, Johannesburg and Jakarta," final report, World Bank, February 2011.

The informal sector minibus operators still ply all TransJakarta corridors unimpeded.

Finance

The various elements of the TransJakarta network were and are funded by different bodies. First, BLU TransJakarta is funded by the provincial government. BLU TransJakarta manages the BRT network, but does not have financial control over the funding of infrastructure. The public works

department of the provincial government funded the construction and maintenance of BRT running lanes.

The road traffic management team within the provincial Department of Transportation funded the bus stations and pedestrian footbridges. Once constructed, the responsibility for managing and maintaining the stations and bridges falls to BLU TransJakarta.

In Jakarta, the BRT operations are financed from a number of sources. TransJakarta, as the operating entity, is funded through ticket sales and DKI subsidy. The DKI Department of Transportation receives funds from the DKI budget for (i) the purchase of buses and design and building of facilities; (ii) purchase and operation of traffic signals and signs; (iii) traffic control personnel; and (iv) maintenance of bridges and ramps. The DKI public works department also obtains funds from the DKI budget for construction and maintenance of bus lanes. The regional regulation police force (Satpol PP) obtains funds from the DKI budget for traffic control personnel, and the national traffic police gets funds from the national budget and other sources. The DKI provides funding for cleaning footbridges and vehicles. Smaller contributions are made by a range of cofinancing partners. TransJakarta does not have control over the resources needed to be performance-oriented and hence cannot make economic and financial decisions on asset management. Fare increase depends on the provincial parliament, which has not increased fares for some years.

Fares currently cover about 60 percent of short-term avoidable costs compared to 90 percent in 2005. The operating and maintenance subsidy is funded by the Jakarta provincial government to support BLU TransJakarta. Cost recovery is expected to improve as a higher proportion of operations are competitively procured instead of being given to existing operators at a negotiated price.

The financing of the fleet differs depending on the corridor. The buses that operate along Corridors 1, 9, and 10 are funded by the provincial government, with operators tasked with simply operating services. All buses on the remaining corridors are funded by the operators themselves and reimbursed for this outlay through the operating per-kilometre payment provided by BLU TransJakarta. It is the intention of TransJakarta that bus investment is carried out by the government to reduce operational cost and subsidy.

Ahmedabad

Geographic, economic, demographic and transport contexts

Ahmedabad, a city of about 4.5 million inhabitants spread over an area of 466 square kilometers, is the center of commerce and industry in Gujarat, one of India's most prosperous states. Ahmedabad accounts for 14 percent of total investments in all the stock exchanges in India and 20 percent of Gujarat's GDP. It is the location of 22 percent of all the factories in the state and provides work and residence for 18 percent of Gujarat's factory workers. Because of the strategic advantages of the proximity of Ahmedabad, the commercial capital, to Gandhinagar, a new purpose-built political capital, there is great potential for regional development, which a regional land use and transport plan (being developed) will address.

The core of the contemporary city of Ahmedabad is the walled city founded in 1411 A.D. on the eastern bank of the Sabarmati River. The growth patterns of Ahmedabad were determined by its emergence as a major industrial center. The city has a well-developed road network, with 5 ring roads, 17 radials, and 11 bridges across the river to ensure connectivity. The functionally structured road system has helped the city to maintain a vibrant, mixed land use character throughout, with a large central business district in and around the historic core, a ring of industrial estates created by the Gujarat Industrial Development Corporation (GIDC) on the periphery of the city, and a fairly even mix of different land uses between the core and the periphery.

As a result, the average trip length in Ahmedabad is less than 5 kilometers, which is less than half the distance traveled by a commuter in Delhi. Despite heavy reliance on two-wheelers (35 percent of the total trips per day) and non-motorized modes of transport (about 19 percent of the trips), close to 1 million passengers were carried per day by the Ahmedabad Municipal Transport System (AMTS) in 2008.

Political, governance and planning background

In Ahmedabad, the Gujarat state government's powers and authority pertaining to the establishment of an urban transport facility. The state government, under the chief minister, is fully empowered under the constitution to take all decisions and have them implemented. Almost all the line functions and agencies required for rolling out a project also fall under the command and control of the state government. The Ahmedabad Municipal Corporation (AMC) is one of the few city administrations in India authorized to operate a public transport system.

In 2003, the Gujarat government was considering the construction of a metro rail between Ahmedabad and Gandhinagar. Absent a comprehensive strategic transport plan, the feasibility study prepared by the Delhi Metro Rail Corporation (DMRC) estimated the cost of constructing 43 kilometers at about $1 billion, with the money to be raised from land equity. It was evident that the metro would entail extremely high costs, on account of land as well as financial resources, which the state government and city administration were not prepared to meet. Thus, the state proposed BRT was in 2003 as an alternative to a rail-based metro system. Subsequently, in 2004, a local planning institute invited the former mayor of Bogotá, Colombia, Enrique Penelosa, to make a presentation on BRT before the state government. In 2005 the state government initiated a feasibility study of BRT for Ahmedabad.

A local planning institute, the Center for Environmental Planning and Technology, CEPT University, was engaged by the state to carry out the feasibility study. In 2006, the Ministry of Urban Development approved construction of the first phase, 12 kilometers, of the BRT system. The ministry also committed to financing follow-on phases, adding 58 additional kilometers to the system.

At this stage, the system had the full support of senior policy makers at the city level; implementation and management of the project was to be undertaken by city authorities. The transport vision for Ahmedabad was represented in the slogan "Accessible Ahmedabad" and aimed at redesigning the city structure and transport systems toward greater accessibility, efficient mobility, and lower carbon emissions.

The BRT plan consisted of the development of 217 kilometers of BRT corridors in three phases. The corridors selected as part of Phase 1 were mainly rings in Ahmedabad that were not the highest demand corridors where a metro would go. BRT corridors where implementation was thought to be more difficult would be included in subsequent phases. The idea was to develop BRT on these critical links in phase 2 so that optimal utilization of the system could be achieved. The strategy was to showcase the mode and then leverage the gains in building other corridors.

Four institutional principles guided development of BRT in Ahmedabad:

- project ownership by the city government;[11]
- local operations control;
- partnership with local institutions; and
- use of the private sector.

With these principals in mind, the Ahmedabad Municipal Corporation set up a wholly owned special-purpose vehicle, the Ahmedabad Janmarg Limited (AJL), to promote, implement, operate, and maintain the BRT system for the city, albeit under AMC's control.

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[11] The ownership, implementation, and operation of the Ahmedabad BRT is the direct responsibility of the city government. This is legally enabled because AMTS has operated bus services in the city since the 1950s.

Although CEPT and the government of Gujarat jointly developed the Ahmedabad BRT concept—and the project received institutional guidance, leadership, and support from time to time from the Department of Urban Development, the state government, the Gujrat Infrastructure Development Board, Gujrat Industrial Development Corporation, and Ahmedabad Urban Development Authority, and AMC—the real "anchor" was Narendra Modi the powerful chief minister of Gujarat. Modi, a well-known national figure, provided leadership, unstinted support, and resources and guidance to the Ahmedabad BRT project. He believed that BRT would be the ideal solution for meeting the daily mobility needs of the common person in Gujarat. Small wonder, therefore, he christened the project Janmarg—or "people's way." The Ahmedabad Municipal Corporation and CEPT staff supported the chief minister in giving shape to his vision. Planning and implementation of the Ahmedabad system are handled by AMC, while all matters of operations and maintenance are the responsibility of Janmarg. CEPT provided the technical support.

Communications

Although there was no formal communications program plan developed early on for the Ahmedabad BRT, there were serious, communications activities, which had with very positive effects. Among them were the following:

- outreach activities, i.e., stakeholders consultations, meetings, and workshops;
- seminars during planning, construction, and into operation;
- document sharing, presentations, an open website, and newsletters; and
- sponsorship of visits by key officials and the media to cities with BRT systems.

Other activities involved showcasing the system, such as by developing and displaying prototypes and offering free, trial rides over an extended period of time; creating a brand identity and promoting it; and being responsive to feedback from the media and citizens. All of these activities served to communicate to all stakeholders, from elected and appointed officers to the general public, what BRT was and what it could do.

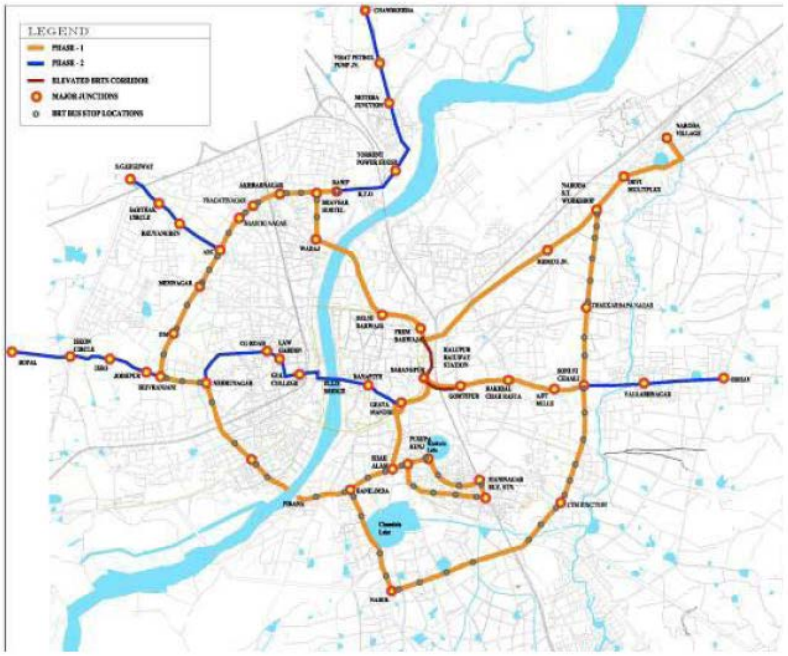
Of these efforts, two classes of activities stand out as having been particularly successful. The first was branding, including the adoption of an evocative brand name and identity first proposed by the elected chief minister. The name, Janmarg, was an instant hit and set the tone for the entire communications and branding program that followed. The Janmarg brand was pervasive throughout the entire system, from station icons to vehicle livery and anything graphic. Other branding measures included standardized uniforms for staff and distribution of brochures, booklets, and newsletters and the system. The second important activity was the "showcasing" of the system. Displays of the prototypes and free trials made it easy for people to become familiar with the system and how to use it. This allowed many problems to be solved before customers had to pay for their transport.

Janmarg concept, performance and integration

The key physical and operational features of the Ahmedabad BRT are as follows:

- The total planned length of Janmarg corridors is 217 kilometers, to be constructed in three phases.
- Phase 1 covers 53 kilometers, of which 45 kilometers has been completed as of April 2012 (see map 2A.5).
- The bus lane is a closed system, with trunk routes along the central median, with 51 stops.
- The vehicle is high-floor (900-mm) bus (Euro III diesel) with a capacity of 80 passengers.
- The fare collection system of electronic paper ticketing is off-board.
- All fixed infrastructure—e.g., roads, lanes, bus stops, terminals, depots—are owned and operated by AMC.
- Bus frequency is 2 to 4 minutes during the peak and 6 to 8 minutes off peak, with a commercial speed of 25 kilometers per hour in the BRT corridor.
- Fares are graduated by distance, with an average fare of US10 cents for a 6-kilometer trip.

Map 2A.5 Ahmedabad BRT, Phase 1



Feeder services are provided by AMTS bus routes that intersect BRT stations and terminals. Plans are being implemented to integrate AMTS and BRTS fares using an Integrated circuit card fare collection system. Extensions of the system will serve intercity bus and rail terminals.

As of March 2012, approximately 132,000 trips were made daily on the BRT system. Previously more than 20 percent of these trips would have been made in or on two-, three-, or four-wheeled private vehicles, and about 50 percent if shared-ride auto rickshaws are included. Public transport speeds have gone from 12 kilometers per hour (previous local bus services) to about 25 kilometers per hour for BRT. Significant new land development projects have been launched in areas within walking distance of BRT stations, and many more are under consideration.

Operating arrangements

The supply, operations, and maintenance of buses for Janmarg is being provided by Charter Speed Private Limited under the supervision of Ahmedabad Janmarg Limited, which sets fares and service policies under municipal direction. Charter Speed Private Limited has a gross cost contract for a period of seven years and includes buses and drivers of specifications prescribed by AJL. Some of the important features of the service agreement are as follows:

- The initial contract was for 70 buses for seven years.
- Traffic risk has been retained by the municipal body.
- Bus providers are paid on a per-kilometer basis with a minimum annual guarantee of 200 kilometers per day per bus at the rate of Rs 34 per bus kilometer.
- Penalties have been prescribed for non-performance in regard to availability, punctuality, and cleanliness of buses and their maintenance.
- Payment to the contractor is done in two parts: per bus through a fixed installment every month and running cost paid per kilometer. The latter rate was fixed based on a formula indexed to fuel cost and inflation.
- Minimum guarantee for payment on annual basis
- Service quality is closely monitored

The Ahmedabad Municipal Corporation built a bus depot with workshop for the operator's exclusive use during the contract period. All maintenance equipment was procured by the operator.

Selection of the bus provider took place through a transparent, two-stage bidding process. The qualifying criteria were fixed at ownership of 40 buses or 200 taxis (which was included because not many bus operators had enough experience in buses alone). An Rs 30 million turnover criterion was also pplied in order to restrict participation of contractors of adequate financial standing.

Housekeeping services for stations were competitively procured on a monthly fee basis with two-year contracts. The scope of work includes cleaning and maintaining the BRT stations and other facilities.

Finance

The 88-kilometer BRT network, consisting of two phases of construction, was sanctioned for Rs 9814.5 million ($210 million). The agreed-upon funding allocation was the government of India, 35 percent; government of Gujarat, 15 percent; and Ahmedabad Municipal Corporation, 50 percent. Although the AMC is committed to funding operating deficits, there has been sufficient enough direct fare and advertising revenue to cover all costs of Janmarg, including bus service contractors, maintenance of stations and other facilities and infrastructure, security personnel, and administrative overhead. The buses are provided by the contractor with the cost recovered from the gross cost contract rate.

Delhi

It should be noted that strictly speaking, Delhi does not have a BRT system or even the first phase of one. Under the moniker of a High Capacity Bus System (HCBS), the Delhi public transport system has a short section of a median busway and some unenforced curb bus lanes in operation. Neither constitutes BRT, as is generally known, but both have been included to show how leadership and institutional and other issues have prevented what exists from being as successful as it could be.

Geographic, economic, demographic and transport contexts

The city of Delhi, the national capital and the seat of the federal government of India, is spread over an area of 1,500 square kilometers and has a population of more than 15 million. There is industry in the suburbs and corporate headquarters spread throughout the city, but Delhi is primarily a government, administrative, and education center. The lack of natural growth barriers and a height limitation in the central of the city has resulted in Delhi being poly-nucleated, spread across a wide area with several activity hubs.

The current Master Plan envisages a city structure of three central business districts and a polycentric distribution of residential development focused around "district centers" that serve as commercial hubs. The concentric and polycentric nature of development has hindered progress in a structured manner, leading to spatial imbalances and anomalies in the use of road space. The Master Plan also designates specific land uses for all sites in Delhi. This segregated land use forces citizens to travel long distances between their residential areas and places involving other aspects of daily life, such as work, education, health care, entertainment, and social and commercial activities.

Though a significant share of land in Delhi is devoted to roads and streets, the city has only a few trunk roads that function as spinal corridors, making it difficult to address traffic problems. Delhi has, by far, the highest number of motor vehicles than any other city in the country. The total number of registered vehicles was 6 million in 2010.

Political, governance and planning background

The idea of an improved transport system for Delhi had been in the planning stage since 1995, when the idea of a High Capacity Bus System first surfaced. In its State of the Environment Report of 2001, the Central Pollution Control Board of India had argued that there was an urgent need to

address the quickly growing number of road traffic injuries, fatalities, and pollution in the city. In that same year, an international workshop was organized by the Delhi Transport Corporation (DTC), a public sector undertaking of the Government of National Capital Territory of Delhi (GNCTD), and Infrastructure Development Finance Company, a private company, to generate discussion on the subject among international experts and stakeholders.

The vision for something like BRT—buses operating on busways and dedicated lanes—in Delhi was later promoted in the study "Integrated Transport and Traffic Management: Future Directions," commissioned by the GNCTD and the federal Ministry of Environment in 2001. The study suggested the following:

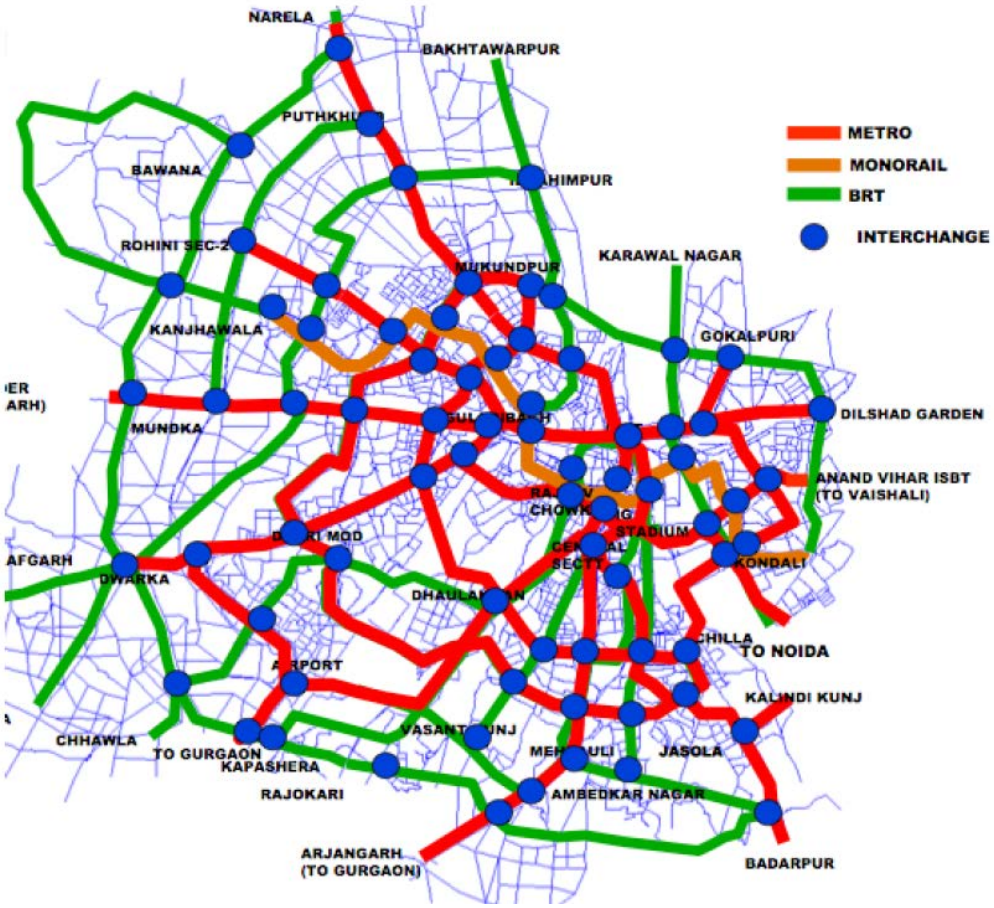
- urban transport infrastructure that encompasses a well-programmed and integrated walk, bicycle, and public transit system;
- a financial and institutional framework that leverages public-private funds and enables implementation and sustained operation of the envisioned urban transport infrastructure; and
- introduction of low-floor buses and phased construction of exclusive busways.

In 2003 GNCTD set up a Committee on Sustainable Transport, chaired by the chief secretary of Delhi, which recommended preparation of a detailed feasibility report and plans for implementing an HCBS in Delhi on five selected corridors. Two corridors were identified for a pilot project; it was then agreed to implement BRT on only part of the corridor from Dr. Ambedkar Nagar to the Inter-State Bus Terminus (ISBT) in the pilot phase.

The idea of implementing a High Capacity Bus System gained momentum during 2005–2006. Ministry of Urban Development signaled its acceptance of the idea following evaluation of the proposed designs for a Delhi rapid bus system concept and discussion at a workshop in December 2005 comprised of senior government officials and international experts. The proposed first phase was part of an ambitious, comprehensive public transport network 583 kilometers in length and comprising 148 kilometers of metro, 40 kilometers of monorail, and 395 kilometers of rapid bus lines (see map 2A.6).

Construction of the bus network was planned to be completed in several phases. The first consisted of a 14.5-kilometer section from Delhi Gate to Ambedkar Nagar (map 2A.7). This corridor was divided into two sections, the first from Ambedkar Nagar to Moolchand Hospital (5.8 kilometers) and the second section from Moolchand to Delhi Gate (8.7 kilometers). Construction of the first segment commenced in September 2006, and the corridor became operational in April 2008. The second section of the pilot corridor was completed but is not limited exclusively to buses. Instead, mixed traffic has been allowed on this section of the road because of strong public protests against the first 5.8-kilometer section of median transitway.

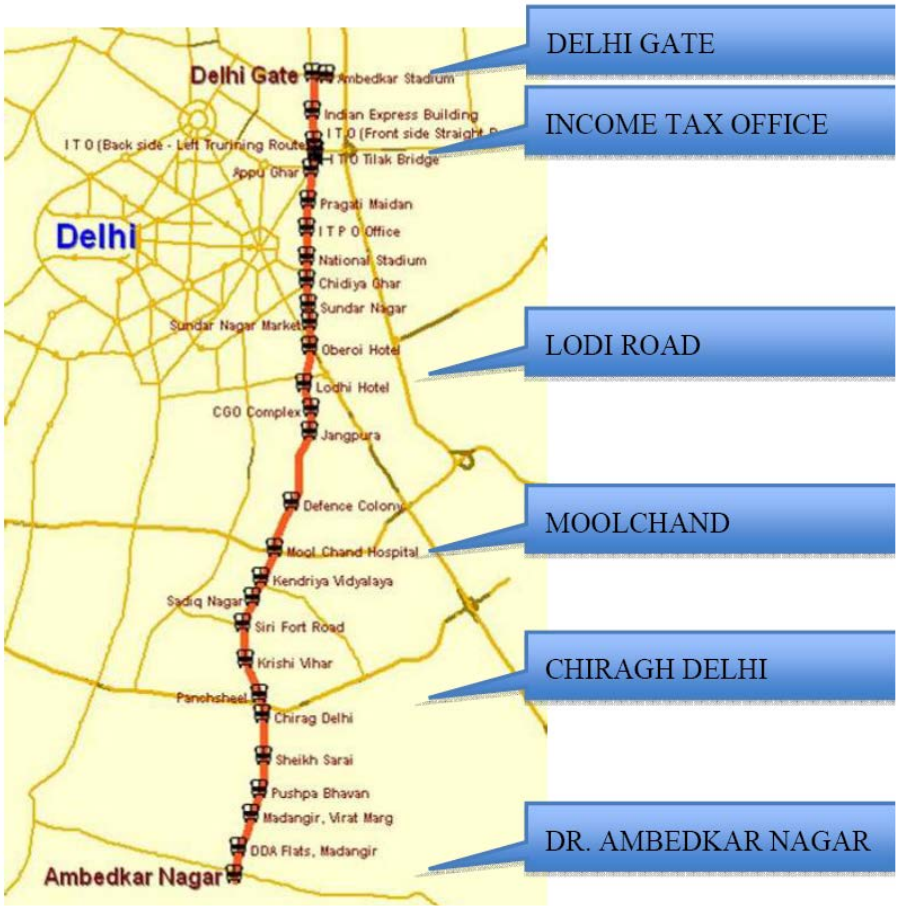
Map 2A.6 Delhi Bus Rapid Transit Plan



Source: Colin Brader, "Documentation of BRT Experience: Lagos, Johannesburg and Jakarta," final report, World Bank, February 2011.

Delhi, as the National Capital Territory, enjoys a special status under the Indian constitution. It is neither a full-fledged state nor a centrally administered Union Territory. It has an elected council and chief minister, but it enjoys only limited powers compared to state governments. The elected government of Delhi, for instance, is responsible for the planning, implementation, and operation of an HCBS, but the Delhi Police (including the Delhi Traffic Police)—the key agency for enforcing discipline on the corridor, maintenance of law and order, and advising on and resolving traffic and engineering issues at and around the corridor—is under the control of the national government.

Map 2A.7Delhi Pilot HCBS Corridor



Source: Delhi Integrated Multi-Modal Transit System, 2010.

This can cause serious problems of coordination at the operational level, as witnessed in the reluctance of Delhi Police to enforce discipline among various users of the initial HCBS corridor in its early stages, because they had reservations about dedicated busways.

Delhi faces another administrative issue in the form of the multiplicity of authorities planning and providing basic urban infrastructure and services. Institutions and agencies of the Union government, GNCTD, and local bodies are providing the same services—be it in physical infrastructure, like construction of roads, and shelter for the poor and needy or in social infrastructure, like health care, education, and child welfare, or in meeting other daily needs. These functions overlap, and sometimes two or more agencies end up working at cross-purposes; for example, different stretches of Delhi city roads could be owned by the Union government (Public Works Department), the

Delhi Development Authority (DDA), GNCTD, and any one of three urban bodies—the Municipal Corporation of Delhi, New Delhi Municipal Committee, or Cantonment Board. A plethora of authorities with overlapping jurisdictions constrains the decision-making ability of GNCTD and cre-

ates operational problems in securing effective coordination between various agencies. It is significant that one of the key factors responsible for the selection of the pilot corridor in Delhi was single agency ownership of the road on which the corridor was to be constructed.

Chief Minister Sheila Dikshit, the chief secretary, and the transport commissioner of the GNCTD became primary advocates for rapid bus program. In 2004, GNCTD appointed Rail India Technical and Economic Services (RITES) as project management consultants and the Indian Institute of Technology's Transportation Research and Injury Prevention Program (TRIPP) as technical and conceptual advisors. RITES prepared a feasibility study and a detailed project report while TRIPP drafted detailed engineering design and specifications.

In 2006 the Delhi Integrated Multi-Modal Transit System (DIMTS) was set up and appointed advisor and consultant for operation and management of the HCBS. Later it was also given responsibility for planning and implementation of the rest of the plan for the city of Delhi. None of the involved groups had previous BRT experience.

Communications

Communications with stakeholders and consultations with them were held in phases, with a gap of about three years or so in between, during which little or no communication with the community occurred. The first phase of communication almost coincided with planning of the project and was primarily handled by TRIPP. This was followed by a lull of about two or three years. The second phase of stakeholder consultation began around the time the project was about to become operational. During this phase, communication with the community was designed and handled largely by DIMTS, supported by the GNCTD Department of Transport.

TRIPP had begun work on road reengineering design for the project in 2004. During the process, it made a number of presentations to officials at the transport department, road-owning, planning, and regulatory agencies, elected members of the Delhi Assembly and Municipal Corporation, and representatives of the Residents' Welfare Associations (RWA) of the developments adjacent to the bus corridor.

The result of these communications efforts was fairly favorable reporting in the media. During and after initial operation of the median busway, however, there was a torrent of criticism and public outcry from all quarters, including private vehicle owners, political leaders, opinion makers, and others. It seemed as if a massive campaign had been launched by the electronic and print media against the system even before it began running. The blame for long vehicle queues and traffic violations was also laid at the door of the BRT.

Critics charged that all segments of road users would be negatively affected by the project, including private vehicle owners, bus commuters, pedestrians, cyclists, schoolchildren, and seniors. Opposition political parties, RWAs, and others pressured the government to scrap the project. There were

also judicial interventions against some features of the HCBS, and at one stage the project authorities did not know how to proceed.

To deal with this situation, DIMTS, which had by then taken over the role of services provider and corridor manager, prepared a comprehensive plan for public outreach to explain the system and its advantages to stakeholders and to improve its image and community acceptability. The program's target groups consisted of private and public transport operators, the management of Delhi Metro, private vehicle owners, cyclists, pedestrians, Delhi Traffic Police, media, and non-governmental and community-based organizations.

- For implementation of its communication strategy, DIMTS did not hire a professional agency. Instead, it decided to use key resources within the company to create external awareness about BRT. Its communications strategy included the following:
- Familiarization sessions for private bus operators covering operational aspects, such as rules and regulations of plying the corridor, signage, safety, and so on. Feedback received from the session was used to rectify some operational problems in the construction of road infrastructure facilities.
- Special efforts to target children as a special outreach group because they are more open to new ideas and can communicate to parents effectively. Awareness campaigns were held in schools, directed at students, teachers, parents, school transport authorities, and bus drivers
- ycle rallies to showcase the dedicated cycle tracks built along with the newly laid corridor. The idea of these rallies was to promote non-motorized transport as the healthy and environmentally friendly option of mobility.
- New communication tools to relate to younger generations. A blog on BRT was created to discuss various issues related to the project. Information on the Delhi HCBS was uploaded to various websites, like Wikipedia, Slide Share, and so on. Efforts were also made to address the queries of the general public and residential welfare organizations on a one-to-one basis.
- An "equal road rights" campaign launched jointly with a few NGOs. The idea was to send the message to anti-HCBS lobbies that each citizen has the same right to use public roads, a common property resource of the society.
- Stakeholder meeting with bus operators and joint programs with various national and international agencies to reach out to the public. On September 19, 2010, in collaboration with Youth for Public Transport, DIMTS organized a flash mob.
- Printed materials targeting different stakeholders. The services of road marshals were utilized to distribute this material at corridor stations.

In short, during the construction stage, not much communication had taken place between project authorities and stakeholders. DIMTS did not exist during the planning stage of the project. By the

time DIMTS began the second communications effort, TRIPP had nearly completed its engineering design consultancy.

HCBS concept, integration and performance

The first stretch of the 14.4-kilometer HCBS corridor consists of a 5.8-kilometer median transitway (busway). This is a short section of exclusive transitway for buses. There are no other BRT features, thus it is not technically considered BRT. The second section, 8.7 kilometers, has dedicated but unenforced bus lanes along the curb. The GNCTD Public Works Department owns the road, while bus lanes and stops are owned by DIMTS. The bus terminals and depots belong to DTC. Other features of the system include the following:

- There are 66 stations in the median and 32 stops on the side lanes of the constructed 14.5 kilometers, very close stop spacing. The bus stops are easily accessible, with open approaches on either side. Disabled persons, women, children, and aged persons can easily access the bus stations but not the buses, whose floors do not match the height of the station platforms. This renders the service inaccessible to the disabled.
- There are separate cycle tracks on either side of the roadway over the entire 14.4 kilometers.
- There are no special fares for transitway routes, and as is the case for the rest of the bus system, there is no fare integration with the metro system. Tickets are issued manually and fares collected on-board DTC and privately operated buses.
- The public transport buses plying the corridor belong to DTC and private operators licensed by the GNCTD Department of Transport.
- In addition to public transport buses, other vehicles, such as school buses and security and emergency services vehicles, also operate in the busway.

No significant changes in either Delhi DTC or privately operated services were made as part of the HCBS project.

Private buses inevitably spend significant amounts of time at stops to maximize their loads, and therefore revenue, and there is no way to pass around them. This and the large number of buses and distinct routes create long queues of buses at stops. Cycle lengths at traffic signals in the transitway corridor, manually enforced by traffic wardens, can exceed 12 minutes, creating incentives for jaywalking by pedestrians and causing bus bunching and general traffic congestion. DTC had procured some ultra-low-floor buses and some air-conditioned buses for use throughout Delhi at the time the BRT corridor was being implemented, but neither type of vehicle was uniquely configured nor branded for operations in the corridor.

Peak bus passenger flows in the corridor exceed 12,000 per hour at the maximum load point. Little or no modal shift from private motorized modes to public transport has been observed, but the number of bicycle users has increased dramatically due to the exclusive, protected bike paths that

are part of the project. At the maximum flow point, bike exceed 1,200 per hour, the highest such volume in the world outside China.

A survey by the World Resources Institute EMBARQ found that bus operating speeds in the 5.8-kilometer dedicated transitway corridor had increased from 12 to 18 kilometers per hour, but the Institute of Transport and Development Policy found the increase to be below 10 percent because of intersection and station delays.

An independent survey carried out by a television channel showed that although 65 percent of car users objected to HCBS's "infringement of 'their' road space," 75 percent of bus riders found it to be a huge improvement. Another survey carried out by the Centre for Science and Environment found that 73 percent of car owners in the corridor wanted the BRT to continue, and 25 percent of car and two-wheeler users were willing to shift to BRT if the buses were air-conditioned and better integrated with the Metro.

Operating arrangements

There is no single operator or group of operators dedicated to providing bus service in the HCBS corridors. Bus services in the busway and bus lane corridors are the responsibility of the Delhi Transport Corporation and the private operators plying the respective corridors. DIMTS' responsibilities include traffic management, BRT bus operations, public relations, enforcement, recovery of disabled vehicles, and station security and cleaning. DIMTS subcontracts various aspects of HCBS operations and maintenance to private parties, while maintaining overall supervision and quality control. DIMTS has engaged third-party service providers to serve as road marshals to direct traffic and enforce traffic rules, security guards at bus stations, and wreckers to remove disabled vehicles from the transitway.

Finance

The cost of infrastructure for the 14.5-kilometer Delhi High Capacity Bus System Phase 1 was Rs 2150 million. The GNCTD Department of Transport financed the entire amount. Operating subsidies, including the amortization and depreciation costs of vehicles, are either borne by the GNCTD through the Delhi Transport Corporation or by the private operators plying in the corridor.