

Introduction

Part I Project Preparation

Part II Operational Design

Part III Physical Design

Part IV Integration

► **Part V Business Plan**

Part VI Evaluation and Implementation

Resources, Annexes, and References



**Bus Rapid Transit
Planning Guide**

June 2007

Part V – Business Plan

CHAPTER 15



Business and institutional structure

CHAPTER 16



Operating costs and fares

CHAPTER 17



Financing

CHAPTER 18



Marketing

15. Business and institutional structure

“Whenever you see a successful business, someone once made a courageous decision.”

—Peter Drucker, educator and writer, 1909–2005

The ultimate sustainability of the proposed BRT system is likely to depend as much on the system’s “software” (the business and regulatory structure) as it is on the “hardware” (buses, stations, busways, and other infrastructure).

Ideally, the institutional structure of a BRT system should (roughly in order of priority):

- Maximise the quality of the service over the long term;
- Minimise the cost of the service over the long term;
- Maximise the level of private sector investment over the long term;
- Maximise the public benefit from the public investment.

In examples around the world, the clever application of well-placed incentives has persuaded operators to concentrate more on customer service and less on battles between competing vehicles. From the BRT projects undertaken to date, there is a growing consensus over the core principles that lead to an effective business model. The principal components of this business model are:

1. Institutional regulatory environment in which privately concessioned firms operate the system with strong public oversight;
2. Achievement of cost sharing within a framework of Public-Private Partnerships (*e.g.*, private sector finances the vehicles);
3. Operator bidding process that encourages competition for the market but limits competition within the market;

4. Operator compensation based upon vehicle-kilometres travelled rather than number of passengers;
5. Independently concessioned fare collection system that distributes revenues in a wholly transparent manner.

Monopoly public bus operators and unregulated private operators both result in well known problems that end up compromising the quality of the public transport service. While circumstances will vary from case to case, there is an emerging consensus that some institutional and business structures work better than others.

Well-designed business structures for BRT systems have tended to seek considerable *competition for the market but limited competition in the market*. This strategic use of competitive motivations means that firms will have to compete aggressively to be allowed to operate. However, once the winning firms have been selected, there will not be competition on the streets to wrestle passengers away from other companies. Thus, firms will have an incentive to provide a high-level of service while simultaneously not generating the negative attributes of reckless driving, speeding, low profit margins, and cutting off other public transport vehicles to gain an advantage known as the “war of the cent”.

This mixed system of public regulation and private operation is increasingly seen as the optimal approach to achieving a competitive and transparent system responsive to user needs. This approach also generally makes it possible to attract private investment into modern vehicles, which is a critical factor in developing countries where public money is scarce.

The topics discussed in this chapter include:

15.1 Transforming existing systems

15.2 Business structure

15.3 Institutional structure

15.4 Operator tendering

15.1 Transforming existing systems

“To open a shop is easy, to keep it open is an art.”
— Chinese proverb

Establishing a good institutional structure for a BRT system is an intensely political process. Ultimately, success or failure depends largely on the political skill of the project sponsor. Management consultants and BRT experts can advise decision makers about their institutional options, but ultimately the decision must be confirmed by the political process.

The first step in developing a viable institutional structure and business plan for a BRT project is to review the existing transit regulatory structure and decision-making process. This may vary considerably from city to city. Which national, provincial and municipal institutions to involve in the establishment of the BRT institutional structure, and which civil society organizations to involve or not involve, is also highly political.

Nevertheless, there are some fairly common issues that all BRT systems face. How this process is handled varies, but there are common approaches for dealing with similar existing institutional structures.

The challenge becomes how to transform an existing market structure into one delivering a cost-effective and high-quality service. Figure 15.1 shows a pictorial view of the challenge within the transformation process.

Most developing cities begin with one of the three basic conditions:

1. Regulated – Public systems;
2. Non Regulated – Private sector systems;
3. Partially Regulated – Mixed systems (public and private roles).

The actual number of business structures is actually far greater than the simple categorisation of public, private, and mixed systems. Different types of contractual arrangements are possible within the framework of mixed systems. Table 15.1 outlines some of the options. Table 15.1 also distinguishes between situations where there is competition *for* the market and situations where there is competition *in* the market. Competition for the

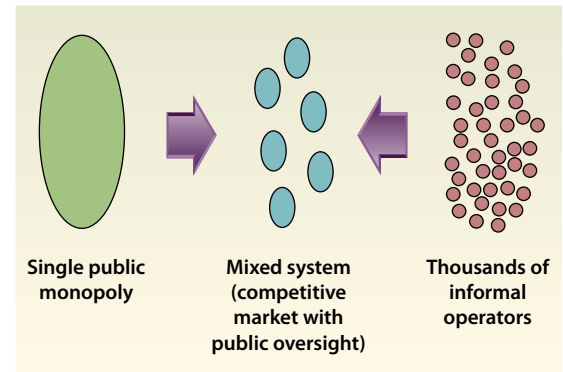


Fig. 15.1
The market transformation process

Source: Adapted from Meakin (2003)

market implies that operators must compete to win the right to operate in a corridor or an area. By contrast, competition in the market implies that a firm will operate simultaneously with other operators in the same corridor or area and will be directly competing for market share.

Some cities are caught in a vicious circle, moving between public and private systems along with intermediary steps of a highly-regulated private oligopoly and a mix of a publicly-operated entity competing with scores of unregulated operators (Figure 15.2). Cities such as Colombo (Sri Lanka) and Santiago (Chile) have moved around the entire spectrum of possibilities without ever finding a workable solution.

The cycle's characteristics, along with the reasons for inevitable collapse of each stage are given in Table 15.2. As the spread of unregulated informal operators creates chaos on the street and poor quality services to the population, officials step in to regulate the industry.

However, oligopolistic tendencies amongst

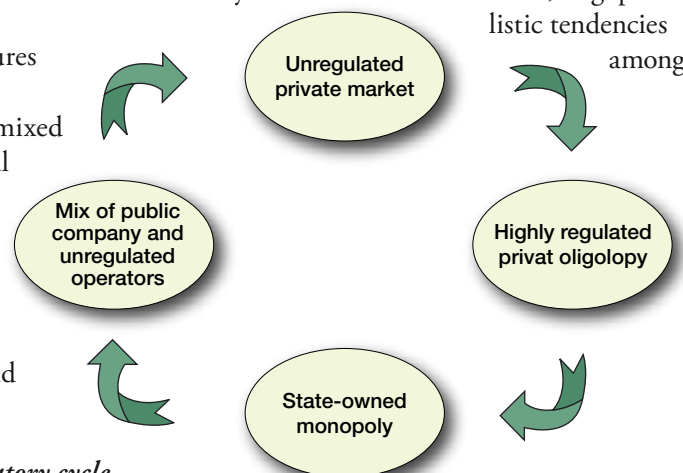


Fig. 15.2
The regulatory cycle

Source: Meakin (2003)

Table 15.1: Contractual options for different market structures

Type	Description	Competition for market	Competition in market
Public monopoly	All system assets and operations are under the control of a public agency.		
Management contracting	System assets remain in control of the public sector but certain operational and management functions are contracted to private firms.	X	
Gross cost service contracting	Private firms compete to operate routes but are paid on the basis of performance and not on the basis of passenger fare revenues.	X	
Net cost service contracting	Private firms compete to operate routes and are paid on the basis of passenger fare revenues.	X	
Franchising (exclusive)	Operator wins contract for exclusive operation of route, and has the ability to innovate; public agency still sets fares and service parameters.	X	
Concessions (exclusive)	Operator wins contract for exclusive operation of route, and full financial, planning, and operational responsibility within parameters set by the public agency.	X	
Franchising (non-exclusive)	Franchising with multiple operators in the same market.	Possible	X
Concessions (non-exclusive)	Concessions with multiple operators in the same market.	Possible	X
Open market	Operators provide services without any restraints or control; routes, schedules, fares, number of operators and vehicles, and levels of quality are left to the private sector.	X	X

Source: Adapted from Meakin (2002a)

Table 15.2: The regulatory cycle

Industry composition	Characteristics	“Solution”
1. Unregulated private operators	Chaotic, aggressive competition, dangerous driving, unstable services, no integration, variable fares.	Comprehensive regulation by Government.
2. Highly regulated private oligopoly	Industry consolidates into large companies producing low levels of competition followed by fare increases; political pressures from increased fares result in lower-quality services or company bankruptcies.	Government nationalisation of firms (because ‘only the state can assure adequate services’).
3. State-owned monopoly	Low cost-effectiveness due to confused corporate objectives (service or profit?); low, sporadic or inappropriate investment; poor services.	Government tolerates ‘illegal’ private operators to meet unfulfilled market demands.
4. Mix of public company and un-regulated operators	Deficits from public company become politically unacceptable resulting in reduced services and increasing paratransit in the market.	Government gets out of business by privatisation or by withdrawal.

Source: Meakin (2003)

the private firms mean that fare increases can be expected. Public pressure to reduce fares forces the firms to either curtail services or face bankruptcy. At this stage, the government decides to intercede in order to restore acceptable services. A public transport company is formed with monopolistic control over the entire market. Unfortunately, without the market incentives of profit and loss, the public company becomes quite inefficient. As public deficits mount, services and quality tend to diminish. Sensing an opportunity, illegal paratransit operators begin to fill the gaps in the public company's service. As the public company spirals into heavier and heavier losses, officials decide to turn the system entirely over to the private sector. Thus, the regulatory cycle comes full circle with a return to the chaos of uncontrolled private operators. One of the principal reasons for BRT's recent success has been its ability for ending this vicious circle.

15.1.1 Creating a BRT system from a public monopoly

"In health care, education, and transportation, government monopolies have proved to be a disaster."

—William Weld, former US governor, 1945–

Publicly-operated transit systems are quite common in developed nations. In many cities of North America and Europe, the public transport agency acts as both the regulator and operator. These public systems usually came into existence upon the collapse of private systems which faced stiff competition from private motor vehicles. In recent years, the trend has been towards contracting out the service through

public service contracts, while the fare revenue is retained by the public authority. Even with public contracting, the inherent lack of profitability of bus operations in many developed cities limits the number of viable options for privatisation. Most of these systems do not cover even their operating costs from farebox revenues, so the services remain subsidised.

Publicly-operated bus systems in the developing world were popular into the 1970s. Public systems still persist in South and East Asia, but are increasingly rare in Africa and Latin America. The historical development of public systems in developing nations stems from a diverse set of reasons. Since passenger demand has traditionally quite high in developing nations, system operations have always been seen as a potentially lucrative business. Thus, in contrast to the subsidised operations in the developed world, public operations in lower-income countries evolved for different reasons.

In some instances, the public sector took over routes and areas that were not sufficiently profitable for the private sector. The public sector thus can provide a role of social equity in under-served areas. Public operations also frequently grew out of dissatisfaction with the poor quality of privately provided service. In Africa for example, it was typical for bus manufacturers from the colonial power to own the municipal bus companies, often providing fairly poor quality service. In turn, public takeover was part of the process of decolonisation. Also, in lower-income countries, indigenous businesses sometimes did not possess the capital to procure buses, so only the state was able to assemble the levels of investment required for vehicle procurement (Figure 15.4).



Fig. 15.3
In many North American and European bus systems, the public sector still acts as both the regulator and operator.

Photo by Lloyd Wright.

In most cases, publicly-operated systems are not very efficient. These systems are quite often heavily subsidised, over-staffed, and offering a service that is not highly responsive to customer demands. They also generate private illegal services that response to the quickly growth of the urban areas.

Nevertheless, some important public bus companies continue to exist in some countries, and in many countries some vestiges of the old public system continue to exist. In China and India, for example, some of the public bus authorities are reasonably well managed and do not require many subsidies, while others are badly managed. For example, the city of Bangalore (India) operates a reasonable public transport service without requiring operating subsidies. However, even in these countries a process of transition to private sector contracting is clearly evident. The rate of progress towards privatisation varies greatly between the different cities.

Introducing a BRT system into a city with a remaining powerful public operator in some ways makes BRT a lot easier, but in other ways it may undermine the possibility of more substantive reform. In practice, it has taken several forms. In Mexico City, where a BRT system opened in 2005, some 80 percent of the routes have been given to the single private monopoly operator that dominated the corridor, and the remaining 20 percent went to the public operator that also

Fig. 15.5

Non-BRT public transport services in Mexico City.

Photo by Lloyd Wright.



Fig. 15.4

The operations of a publicly-owned transit service in Dar es Salaam.

Photo by Lloyd Wright.

had routes in the corridor. The continuation of both a private consortium and a public authority creates some level of competition, but is not ideal (Figure 15.5).

In Delhi, there is also a large public operator (Delhi Transport Corporation) and a separate state regulator (STA) of many independent private operators (Figure 15.6). The system has not yet gone into operation, but it is likely that the new facilities will be open to both the private operators and to DTC, perhaps on condition that they upgrade their buses.

In the case of the Kunming BRT system, and the new Beijing BRT system, the public bus operator is simply running the new BRT lines. This situation is similar to the practice of BRT systems in the US and most of Europe, where the public authority simply implements and operates the BRT system also. This arrangement is also not ideal, as the public sector has

Fig. 15.6

Existing bus operations in Delhi.

Photo by Lloyd Wright.



to pay for the vehicle procurement, and all the problems that are typical of public procurement (overpayment, risk of graft, poor maintenance, etc.) are present.

In Johannesburg, the transformation of existing public bus company into the proposed BRT system is being seen as an opportunity to correct certain existing inequities in the market. Currently, the Metrobus company (publicly owned) operates alongside a private bus company and thousands of private minibus taxis (15-seater vans). Both Metrobus and the private operator (a company called Putco) receive state subsidies for providing operations. By contrast, the minibus taxis receive no subsidies. This inequitable treatment is particularly disappointing for the minibus industry since these companies and individuals provided badly needed services during the past Apartheid system. Further, the minibus industry represents a strong source of Black Economic Empowerment (BEE) in the country. Thus, the transformation to a BRT system is seen as a mechanism to put all three operating groups, Metrobus, Putco, and the minibus taxi, onto a level playing field. Figure 15.7 shows a graphical representation of the possible transformation process.

Several other possibilities are being considered in other countries at present but have not yet been implemented. Some other good options are:

- The existing public transport company is given the right to contract out private services on the routes with new BRT lines, and on these lines

becomes the regulatory authority for private operators. This arrangement could be implemented in a phased that will eventually see the system move fully to private entities.

- The public transit company is allowed to compete along with other private operators for the BRT operations under a different regulatory body. This arrangement is not exactly what happened in Mexico City, because there was no competitive bidding for operating the corridor. Instead, the operations were just given over to existing two operators, one of which was a public company.
- The public transit company is privatised through a transparent selling process, and the new firm subsequently competes for market access on equal terms with other private firms.
- The public authority relinquishes operations in the areas with the new BRT system and instead concentrates on other parts of the city.
- Assets of the public company are liquidated and used to capitalize a new BRT authority to help underwrite some of the costs of the new system, such as land costs. This option was considered in Dar es Salaam, largely because the former bus operator had some land that could have been used for depots and terminals, but it is unlikely to proceed because the former operator is encumbered with debt.

Clearly, to undertake any of these options will necessitate a certain degree of political will on the part of political leaders. Public employees and union leaders will likely oppose such drastic changes. Since public companies frequently operate with inefficient levels of employees, the transformed organisation will likely need to reduce staffing numbers. To an extent, staff reductions can be mitigated by transfers to other agencies and by retraining programmes, but the process of change can be difficult for those involved.

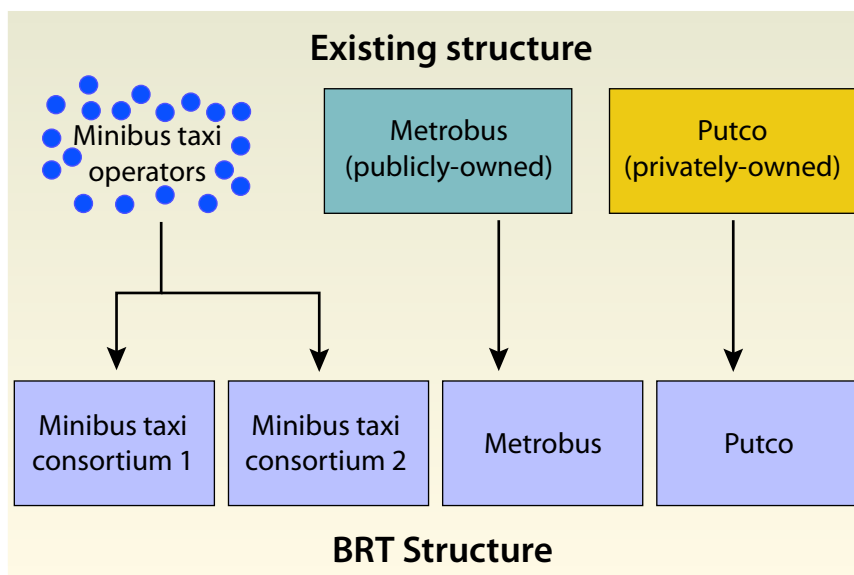
15.1.2 Transforming a weakly regulated, informal private bus industry

“If you don’t create change, change will create you.”

—Anonymous

Historically, the best known BRT systems, including Bogotá, Quito, and Curitiba, were developed from weakly regulated, informal sector-dominated private bus industries. As such,

Fig. 15.7
Illustration of possible industry transformation for the Johannesburg BRT project.



the transition from this type of system is the most well-known and well documented.

In many developing cities, a lack of financial resources and weak technical capacity within government institutions has meant that developing city public transport has been left largely to weakly regulated private operators. The level of government regulation varies widely. Some are completely unregulated. Most at least require a commercial operators license and a commercial vehicle license. Some of these systems require a license to operate within a particular route, and some, such as Dar es Salaam, operate on colour-coded routes. Inevitably, when there is little formal regulation, there is some form of informal regulation which allocates the best routes, best spaces in bus terminals etc. Sometimes these informal regulators are sometimes called “bus enterprises”, sometimes they are “unions” of collectives, sometimes they are “cooperatives”, and quite often they are basically like a mafia. Finding out exactly how these systems are regulated is often not easy, as many times well-placed politicians or military personnel will own several of these vehicles, and owning a few vehicles is a frequent form of a retirement plan for many middle-class families. As such, disrupting the value of these assets can have profound social consequences.

With fierce competition between many struggling small firms and little governmental control, the frequent result has been poor quality services that do little to meet the broader needs of the customer. Private operators will tend not to provide service to smaller neighbourhoods and will operate only at particular hours. Small operators also tend to be run in a relatively inefficient manner. Small vehicles are utilised in places where high-capacity vehicles could be operated at a more efficient level. This inefficiency can lead to higher fare levels than would otherwise be required (Figure 15.8).

An uncontrolled public transport environment can also lead to a serious over-supply of small vehicles. In Lagos (Nigeria) there are currently an estimated 70,000 mini-buses plying the streets. Until recently, over 50,000 mini-buses operated on the streets of Lima (Peru), and prior to TransMilenio, approximately 35,000 buses of various shapes and sizes ran along the streets of



Fig. 15.8

The plethora of many small vehicles providing public transport services in cities such as Manila translates into significant system inefficiencies.

Photo by Lloyd Wright.

Bogotá (Figure 15.9). The large number of small public transport vehicles contributes significantly to congestion and poor air quality. The unwieldy number of operators also represents a regulatory challenge to municipal agencies that lack sufficient resources.

The oversupply of public transport services on trunk corridors undermines their profitability, which makes it difficult for individual operators to invest in more modern vehicles. Most of these buses operate on very narrow profit margins. In addition, the fact that these businesses operate

Fig. 15.9

Prior to the development of the TransMilenio BRT system, Bogotá's public transport services were of a chaotic and low-quality nature.

Photo by Lloyd Wright.





Fig. 15.10
Control of routes within the South Africa minibus taxi industry has at times meant armed violence between different operators.
 Photo by Lloyd Wright.

in the informal sector makes it very difficult for them to get credit from financial institutions for fleet modernisation.

In some instances, each vehicle is owned separately, often by the person who does the driving. In other instances, the public transport vehicle is operated by a driver who leases the vehicle from a separate owner. Since the driver pays a flat fee for access to the vehicle, he or she then has an incentive to drive the vehicle as much as possible during the day in order to maximise fare revenues. Usually these drivers have to pay some sort of mafia for the right to operate a particular route, and sometimes they have to pay off one or more sets of traffic police. Drivers will thus work as much as 16-hour days. Often these vehicles are not insured, and if the passengers are injured they have little recourse to the courts.

When the income of bus drivers is directly related to the number of passengers they pick up, several problematic behaviours emerge as a result of the “battle for the cent.” The drivers have an incentive to drive as rapidly as possible to make as many roundtrips as they can. Further, drivers will cut off other bus operators in order to prevent competitors from capturing customers. Bus drivers will also sometimes stop at random places along the road rather than just at bus stops, in order to capture more passengers. Often they will wait at the beginning of a route until the vehicle fills completely, making the scheduling of trips very unpredictable. In South Africa, sometimes rival gangs of operators have actually used firearms against

each other to establish their control over certain routes, leading to passenger injuries and even death (Figure 15.10).

Not surprisingly, the long hours, high speeds, and aggressive driving lead to extremely hazardous road safety conditions. At the same time, the captive riders have few options other than wait for the day that they can purchase their own private vehicle.

The process of consolidating the thousands of registered and unregistered small operators into a modern BRT system was a process that took several decades in Curitiba, and the result was not entirely satisfactory. In Bogotá, the transition was made all at once with the construction of the BRT system. For a history of the transformation processes in Bogotá and Curitiba, see *Transit Planning in Curitiba and Bogotá: Roles in Interaction, Risk, and Change* by Arturo Ardila-Gomez (Ardila-Gomez, 2004).

Normally, for political purposes, it is advisable to involve at least some of the existing bus and paratransit operators with routes in the corridor into the new system. How they are included, however, matters critically. On the one hand, if they are not included at all, they will resist the system politically. On the other hand, they should not be given veto power over design decisions or contracting decisions.

In Bogotá, prior to the BRT system, there were approximately 22,000 private bus operators providing licensed services. There were perhaps another 13,000 buses that were operating without a commercial operating license. Some of these operators owned their own buses, and some owned a few buses and leased them to other people to operate. These private operators were also given the right to operate on a particular route by several “bus enterprises.” These bus enterprises did not own buses. Their only economic function was to allocate the bus routes. There were only a small number of these bus enterprises, and one of these enterprises was much more powerful than the others. The regulatory role of these private bus enterprises was officially recognised by the Department of Transportation, which was the official regulatory agency. In other words, the drivers leased the bus from the owner, the owner paid for the right to operate the bus from the bus enterprise,

and the bus enterprise paid the Department of Transportation for the right to allocate bus routes. These payments were all essentially legally recognised. Nevertheless, the existence of this tiered payment scheme meant that the system was financially inefficient.

When Bogotá was planning TransMilenio, they first created TransMilenio SA as a public corporation (Figure 15.11). The Board of Directors included all of the important branches of the municipal government with responsibilities for urban public transit *except the Department of Transportation*. In the beginning, the Department of Transportation was intentionally excluded from the process because it earned significant revenues from the allocation of bus routes to the bus enterprises, and they thus had an institutional conflict of interest with the new system. Only later, after the system had been designed and established, was the Department of Transportation brought onto the Board of TransMilenio.

By contrast, in Jakarta, when TransJakarta was created, it was put under the control of the Department of Transportation, whose function is the same as that of the Department of Transportation in Bogotá. As a result, there was great reluctance on the part of the Department of Transportation to cut parallel bus routes in the TransJakarta corridor, as the Department lost revenue from each new line allocated. As a result, it is important that the Mayor make a decision about how best to wrest control over route regulation in the BRT corridor from the existing regulatory authority. The best approach depends on political realities.



Fig. 15.11

The city of Bogotá created a new entity, TransMilenio SA, to oversee BRT development in order to avoid the conflicts of interest associated with the existing transport department.

Photo by Lloyd Wright.

TransMilenio SA and their consultants first learned everything about the structure of the existing bus business. This knowledge was critical to handling smooth negotiations while winning the best deal possible for the public.

The Mayor himself met first with the heads of the bus enterprises and told them that the BRT system was going forward with them or without them, and they could either participate in a productive way or they would lose their rights to operate on TransMilenio routes. After this, nobody from the Mayors office met with the private operators until the plans for the institutional structure and the physical designs were already completed.

At the beginning of the project, the planning team must know whether or not it has the power to revoke or change existing route licenses. If private bus operators already have a 15-year concession to operate exclusive bus



Fig. 15.12

Institutional conflicts of interest in Jakarta made assignment of BRT routes somewhat difficult.

Photo courtesy of ITDP.

services along a particular corridor, the private bus operator could tie up the BRT project in the courts for years. In this situation, the government will need to buy out the operator. Normally, however, bus operators are guilty of hundreds of small regulatory violations, and these violations can be used as a “stick” to force the operators to the negotiating table.

When the designs were finished, TransMilenio knew exactly how profitable each route would be, because they knew the costs of bus operations, and they had done detailed traffic modeling of the specific operational design that they were planning. Having this information was critical to negotiating a reasonable price for the bus services.

At that point, a public competitive bid was offered, the details of which are discussed later in this chapter. The bidding rules gave additional points to firms that had experience operating bus services in the corridor. This gave an extra advantage to the bus companies already operating in the corridor. They also required, however, that the companies be formal sector businesses that owned a large number of buses (say 50 as a minimum.) This figure was derived at through negotiation based on how much capital it was thought the various bus enterprises could realistically assemble.

The bidding rules also required that the winning bidder destroy six old buses for every new bus they needed to buy. The requirement to

destroy old buses was partly to take them out of circulation, but it was also partly to force the bus enterprises to pay some money to the bus owners, many of whom were lower middle class people, so that they did not lose an important asset. This requirement meant that the big bus enterprises had to give some ownership of the new companies to the small bus owners (Figure 15.13). In this way, the bidding process itself forced the process of transition from informal sector to modern, formal sector bus operators.

Ultimately, some but not all of the original bus enterprises became operating companies on TransMilenio’s trunk corridors. Some of them did this with international partners, others without them. Most importantly, the biggest and most powerful bus enterprise became also the biggest bus operator.

The senior member of the family that controlled this business was an older man who did not understand what was being proposed, and he was completely against the BRT project, and wanted to fight it. The Mayor, however, sent the younger men, men in their 40s who were looking to become more legitimate business men, to Curitiba to understand the system. From the private bus operators in Curitiba they learned that BRT could be a much more profitable business than normal bus operations, and they were persuaded to participate in the project. Once the most powerful bus enterprise decided to bid to become one of the trunk line operators, the others were virtually forced to participate in the negotiations rather than fight the system.

Making sure that some companies are actually able to bid on the operating contracts is an important job of the management consultant. In some countries, it will be quite easy to find modern private bus operators ready to bid on the operating contracts. In other countries, it may be quite difficult to find any indigenous bus operators that have the sophistication to form themselves into modern corporate entities. In this case, it may be advisable to intervene more in the process.

As was the case with TransMilenio, it may be advisable to encourage local bus companies to partner with international bus operators with experience operating modern bus companies. The municipality may also wish to give

Fig. 15.13
On a wall outside the administrative headquarters, the names of all the operators that came together to form the “Si 99” company in Bogotá. This consortium consists of many local firms as well as an international operator.

Photo by Lloyd Wright.



additional technical support to ensure that all existing operators are able to participate fairly in the concession competition.

By building the business skills of the operators, the municipality will help to bolster individual competitiveness as well as improve the quality of the bidding process. In many instances, the operators may not even fully understand their own cost structure. Since the BRT system will represent a major professionalisation of their business, the operators will need new skills in accounting, negotiations, technological knowledge, and customer service (Figure 15.14).

Assistance can also be given in terms of helping individual operators form consortium groupings. An individual operator is unlikely to have the necessary resources and skills to bid as a single entity. Instead several small operators will likely form a consortium arrangement and bid jointly. Alternatively, a large company or an individual with sufficient financial resources will seek out smaller companies to join as partners. In either case, the smaller operators can be given stockholder status in the new venture. The operator's stake in the new enterprise will depend on the resources that are being contributed to the group. Small operators will likely be able to contribute the following types of assets:

- Points to the bid team as an existing operator;
- Vehicles for use in the system;
- Vehicles for scrapping (if required in bid conditions);
- Drivers and other staff;
- Business knowledge.

The value of the small operator's assets will determine their shareholder status. Operators will be able to "shop" their assets to many different consortiums in order to realise the best deal. Despite the inherently different business environment between BRT and informal operations, the existing operators may possess many valuable attributes. While their older vehicles will not likely be of use on trunk corridors, it is quite possible that good quality standard vehicles can be of use on feeder lines. The older vehicles also offer value in terms of meeting any requirements for scrapping vehicles. Drivers will likely need some re-training in order to achieve new levels of safety and customer service, but their basic skill levels and knowledge of the city streets will assist in the transformation process.



Fig. 15.14
*An industry
capacitation workshop
taking place during
the development of
the Johannesburg
BRT project.*

Photo by Lloyd Wright.

At the end of the bidding process, it is possible that some existing operators will be left out of the new system. The losing bid teams and individuals who did not join a bid team may well take actions to thwart the new BRT system, but they should be encouraged to bid on the next corridors, or on feeder bus service contracts. Inevitably, change involves some losers and some winners, and political pressure, legal challenges, and protest are fairly typical. Thus, the municipality may also wish to conduct a post-bid outreach effort with unsuccessful entities. The promise of future bidding opportunities and further skill training can help mitigate a negative backlash.

15.1.3 Partial versus whole-system re-regulation

In many developing-nation cities that are considering BRT, there exists a massive regulatory vacuum, and improving the regulation of the existing public transport system is as important a priority as building and operating a new BRT system. There is therefore often a desire on the part of Mayors to do both at once.

However, most historical evidence indicates that this is too much to tackle at once. In Curitiba, in the early 1960s, they first changed the entire regulatory structure throughout the city, forcing small private operators to form themselves into consortiums that had control over different parts of the city. Only later did they build the BRT system and institute the trunk and feeder system.

In Bogotá, the Mayor made a critical decision not to reform the entire public transport

regulatory structure at the same time, and instead decided to only regulate it step by step, one BRT corridor at a time. In other words, the corridors not yet slated for BRT were left under the regulatory control of the Department of Transportation, while the new corridors were put entirely under the regulatory control of TransMilenio. TransMilenio banned the old buses from operating directly on the BRT corridors, and this ban was enforced with police powers.

Because both transitions require a dramatic increase in the capacity of governmental bodies, tough negotiations, skilled staff, and political capital, it is generally too much for a single Mayor and his staff to do both at once. In fact, one of the key purposes of BRT is to gradually break down a regulatory log jam.

However, there are advantages to a complete city-wide transformation. The painful process of system conversion happens at once rather than through several difficult transitions. If a progressive Mayor is in place, then it may be a unique opportunity to make such a transition. It may be a policy that will not be later endorsed by subsequent Mayors.

In the case of a whole-system transition, there is still the need to develop the infrastructure over a series of phases. Thus, initially some parts of the system will operate as before while other corridors will be within a physical framework of BRT. However, both types of operation can be successfully brought under the control of a

single business plan. Both types of operation can share a single branding identity and share a common fare collection system. The Transantiago system of Santiago (Chile) has undertaken a whole system transformation in which some parts operate on busways and other parts operate as conventional services. As a mega-city of 6 million, transforming its entire public transport system at one time is not an insignificant task. The result has been a fair amount of confusion and operational problems, with decidedly negative reviews in both the national and international press (Economist, 2007). Thus, while a whole system transformation can ultimately represent a sound strategy, the implementation issues are quite challenging (Figure 15.15).

15.2 Business structure

“Perfection is achieved, not when there is nothing more to add, but when there is nothing left to take away.”

—Antoine de Saint Exupery, writer and aviator, 1900–1944

15.2.1 A model structure

With the success of several Latin American systems, such as Bogotá, Curitiba, Guayaquil, and Pereira, there is a growing consensus over the form a best practice business structure. While each city will likely have its own unique conditions that will ultimately determine the actual form of the business structure, based on the experiences to date, there are many common features that can lead to an effective structure.

In each of these successful cases, there has been the basic formula of *private sector competition within a publicly-controlled system* (Figure 15.16), following a partially regulated model. In the case of Bogotá, the public company, TransMilenio SA, holds overall responsibility for system management and quality control. However, TransMilenio SA itself is only an organisation of less than 100 persons, with oversight for a system in a city of seven million inhabitants.

Private sector concessions are used to deliver all other aspects of the system including fare collection and bus operations. The vehicles and even fare collection equipment are purchased by the private sectors firms. TransMilenio and the municipal government are able to leverage private sector investment and defer a large portion of

Fig. 15.15
The city-wide transformation of the Santiago public transport system has created a great deal of chaos and customer confusion during its initial periods.

Photo by Lloyd Wright.





Fig. 15.16
The TransMilenio business structure features a public company overseeing quality control and contract management with an array of privately concessioned firms.
Image courtesy of TransMilenio SA

the financial risks while retaining overall control on the shape of the system.

The *independent concession for fare collection* helps ensure the system's revenues are properly controlled and administered. If anyone with a vested interest were to be handling the revenues, then there will always be suspicions amongst the different stakeholders. An independent fare collection process means that none of the vehicle operators have any relationship to handling the fares. Further, through the use of real-time sharing of fare information, all parties have an open and transparent view on revenues. In TransMilenio, fare data is streamed simultaneously to all relevant parties, creating an environment of confidence in the system.

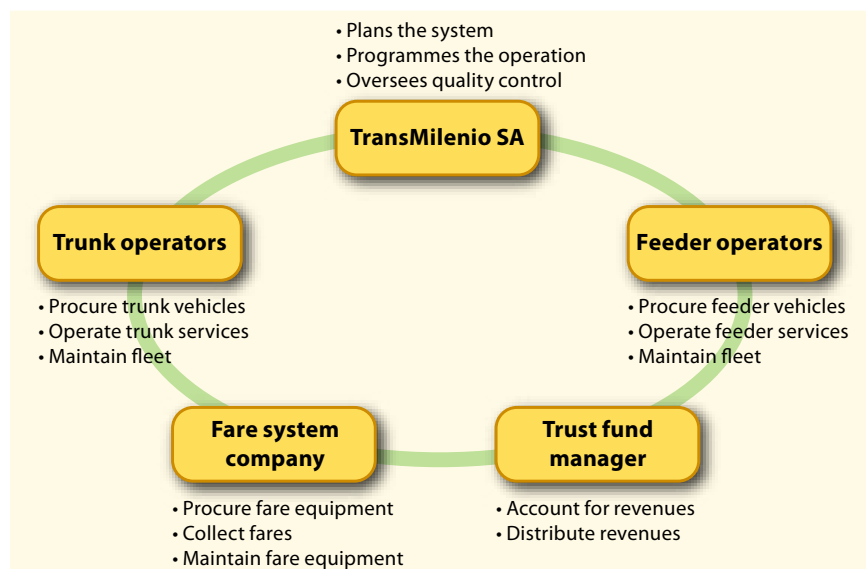
Generally, each trunk corridor will host 2 to 4 different operators. To the customer, the services all look the same. The tight product delivery specifications ensure that the look and feel of each vehicle is quite similar, regardless of which operating company is managing the vehicle. Even though there are several operators, none have an incentive to operate in an overly-competitive manner on the street. Each operator is making its revenues from the vehicle-kilometres travelled rather than from the number of passengers collected.

The feeder services can be particularly important in terms of finding a place for many existing operators in the new system. These contracts are tendered separately from the trunk operations.

Figure 15.17 provides more detail on the roles and responsibilities of different actors within the TransMilenio system of Bogotá.

The differentiation and clarity of the roles and the proper check and balances allow the various

Fig. 15.17
The roles and responsibilities of different actors within the TransMilenio business model.
Image courtesy of Jarko Vlasak



pieces of the system to function well together. Only the roles requiring a public role, such as contract management and quality control, are left to the public sector. The business model maximises the financial leverage and entrepreneurial nature of the private sector in order to provide a customer-oriented product.

15.2.2 Financing responsibilities

Implied within the proposed business structure is a combination of investment responsibilities between the private and public sectors. In general, the infrastructure for these systems is publicly financed, in the same manner that all other municipal road infrastructure is developed. A separate public works agency issues the tender documents to competitive bidding for the infrastructure components (busways, stations, terminals, depots, etc.). The construction work is conducted entirely by the private sector. Thus, almost all possible aspects of systems such as Bogotá's TransMilenio are contracted or concessioned to private sector entities with public agency oversight.

In most developing-nation applications to date, a BRT system should be able to cover its ongoing operating costs and the cost of maintaining the rolling stock from fare revenues. The tendency for BRT systems to cover operational costs through fare incomes is one of the fundamental benefits of BRT over alternative public transport systems. In many instances fare revenues will also fully or partially cover vehicle procurement. Thus, these systems represent a form of a Public-Private Partnership (PPP) structure based upon the private sector's investment in the vehicles. To date, however, no BRT system has been able to also cover the cost of building and maintaining the new infrastructure. Chapter 17 (*Financing*) provides greater detail on financing infrastructure development.

As a result, decision makers should decide from the beginning to design the BRT system to be financially self-sustaining within an effective regulatory framework. This decision should drive the technical design process, rather than the other way around. The administrative and organisational structure of the system will have profound implications for the system's efficiency, the quality of service, and the system's cost over the long term.

Investing public money in improving the bus system, by creating dedicated lanes, special stations, and other amenities that define a BRT system, creates the unique opportunity to achieve profitable operations over the long term. As a result, it creates a unique opportunity to renegotiate the relationship between the private operators and the public. By taking public transport vehicles out of congestion and improving their capacity and speed, BRT systems can dramatically increase the profitability of the public transport system and end a downward spiral of declining public transport use and declining quality of service.

While most experts agree that this regulatory structure is generally optimal even for non-BRT bus services, historically, a BRT project creates a unique political opportunity to implement a regulatory reform agenda that otherwise has tended to prove difficult to implement. Effective regulatory and business structures are often quite difficult to achieve. Public operators may be unwilling to surrender their market and their administrative "turf". Private operators may be resistant of any changes, especially when they are unaccustomed to any governmental oversight or taxation. The capacity and political power of public institutions may be too limited to effectively regulate.

15.3 Institutional structure

"In the infancy of societies, the chiefs of state shape its institutions; later the institutions shape the chiefs of state."

—Charles de Montesquieu, politician and philosopher, 1689–1755

A new public transport system represents a fresh opportunity to establish an effective institutional structure for the entire transport sector. The new BRT system should probably not be turned over to the same institutional actors that have been providing sub-standard public transport services for decades. For this reason, many cities, such as Bogotá, have opted to create an entirely new institutional structure with new staffing.

Nevertheless, there exists a broad range of options to place from relatively focused specialised agencies to large transport departments that oversee all forms of public and private transport (Table 15.3). Further, these institutions can be either highly autonomous from the local

government or closely controlled by elected officials and civil servants. The responsible level of government for a transit system is often local in nature, but the system can also be controlled in some instances by provincial governments or even national ministries. Finally, the institutional oversight of a BRT system can be implemented through an existing agency or through a newly created organisation.

In general, transport institutions can have a range of responsibilities, including:

- Policy-making and setting standards;
- Regulation;
- Planning and design;
- Project implementation;
- Operational management;
- Financial management;
- Contracting and concessions;
- Regulation;
- Administration;
- Marketing.

At some level, each of these activities will need to be addressed by the organisation with responsibilities over the system. However, whether the entity is organised as a single institution or several different institutions depends greatly upon local political circumstances.

A single transport institution avoids many of the inter-organisational conflicts that can otherwise occur. Rather than risking battles over each organisation's turf, a single institution removes much of this conflict. An organisation such as Transport for London (TfL) has a wide range of coordinating activities across the entire London metropolitan area. Prior to TfL's creation in 2002, transport was largely the responsibility of London's many local boroughs. Unfortunately, such an arrangement did little to foster coherent plans for systems that crossed borough boundaries. Although TfL contracts private firms for infrastructure development and operations, the public organisation maintains a wide range of responsibilities, including the following areas:

- London bus system (Figure 15.18);
- Underground system (Figure 15.19);
- Light rail lines;
- Walking and cycling (Figure 15.20);
- Congestion charging;
- Taxi regulation;
- Traffic management;

Table 15.3: Institutional options

Type of institution	Description
Transport department	Large entity with a wide range of regulatory and management responsibilities; typically reports directly to city political officials
Transport authority	Organisation with wide oversight on all public transport activities; frequently given autonomous status through a board of directors
Public company	A specially created company that is owned and managed by the local government
Specialised transport agency	Smaller organisation with a focused mandate; typically reports directly to city political officials
Non-governmental organisation	Independent outside organisation that is given the responsibility of managing the public transport system

- Maintaining major roadways;
- River services (Figure 15.21).

Internally, TfL organises around different divisions such as “street management” and “London buses”, but overall, TfL is a single entity. In a similar fashion, the Land Transport Authority of Singapore holds a wide array of transport responsibilities all within a single organisation (Meakin, 2002b). London and Singapore also provide examples of the advantages of transport planning across an entire metropolitan area. In other urban conglomerations that consist of multiple municipalities it is often difficult to achieve a coordinated public transport plan if each municipal government has its own planning processes. The single entity approach also enables London and Singapore to address car restraint measures, public transport, and traffic management activities in an integrated planning process and in a unified bureaucracy. However, a single transport institution does bring its own challenges. Large organisations can be more complex and more difficult to manage. With a range of priorities, a large institution may not have the same focus on BRT as a more specialised agency. In some instances, large organisations are also less responsive to market demands.

By contrast, in cities such as Bogotá and Curitiba, the BRT systems are overseen by smaller, fairly specialised organisations. In such instances, different aspects of BRT development and operation can reside in different organisations. In Curitiba, the planning and development of the transport master plan resides with the Institute of Urban Research and Planning

Fig. 15.18, 15.19, 15.20, and 15.21

In London, Transport for London (TfL) has a full range of responsibilities across multiple modes, which allows for whole system planning and integration.

Top right photo courtesy of iStockphoto
Other photos by Lloyd Wright



of Curitiba (IPPUC). Another organisation, Urbanisation of Curitiba (URBS), is responsible for the actual implementation and management of the BRT system.

Bogotá created a new entity, TransMilenio SA, to oversee the development and operation of its BRT system. TransMilenio SA was formed as a “public company” which reports to the city’s mayor through a board of directors. Other more traditional governmental departments also play a significant role in Bogotá’s BRT system, but the new public company has taken a lead in terms of ensuring efficiency and an entrepreneurial approach. TransMilenio’s board consists of ten directors who are derived from a cross-sectional representation of interested parties. The city’s Mayor or a representative of the Mayor acts as the board’s chairperson. Included in the board are non-governmental organisations and citizens groups who are able to better provide a customer perspective. The current TransMilenio board even includes an opera singer (she is the head of a Bogotá City Office). Many of the related agencies, such as the transport regulator and the public works

agency, also are represented on the board in order to assure coordination between all governmental organisations. In summary, the groups and individuals included in the TransMilenio board of directors are:

- Mayor of Bogotá;
- Secretariat of Transit and Transport (transport regulator);
- Institute for Urban Development (IDU);
- Civil society representative (from academia or elsewhere);
- Civil society representative (from transport or environmental NGO);
- Municipal Department of Planning;
- National Department of Planning;
- Municipal Secretariat of Finance.

Board meetings are also attended by the General Manager and Assistant General Manager of TransMilenio SA. The staff do not have a vote but are there to answer questions that may arise. The Board of Directors is also served by financial and accounting specialists who can evaluate financial audits of the system.

TransMilenio SA focuses upon mostly on the operational and contracting aspects of

managing the BRT system. The organisation is also involved in planning and financial aspects of the system but in coordination with other agencies. Specifically, the city's Institute for Urban Development (IDU) holds responsibility on delivering the system's infrastructure. In many cities, this responsibility is given to a "public works" department. Bogotá also has a Secretariat of Transit and Transport (STT), which plays a regulatory role in the overall bus transit system. STT continues to regulate and license the conventional bus services that still operate in many parts of the city. Figure 15.22 provides a schematic of the different institutional entities with a role in the Bogotá transport sector.

Smaller, specialised agencies can be more efficient and more customer responsive than larger organisations. TransMilenio SA is able to manage a BRT system that currently serves nearly one million passenger trips per day with a staff of less than 100 persons.

Despite the relative efficiency of a small public company like TransMilenio, such specialised entities do bring with them other challenges. TransMilenio SA has interfaced well with the city's transport regulator and public works department, but in other cities, conflicts between such organisations can stifle progress on transit initiatives. Disagreements and "turf" conflicts can over-ride other shared values between agencies. Further, when problems arise, each organisation can blame the other without anyone taking responsibility. A problem with material failures on the concrete busways in Bogotá demonstrated the ease in which responsibility can be denied amongst a complex group of actors (Figure 15.23).

However, Bogotá's introduction of a new organisation, TransMilenio SA, provided a crucial catalyst to innovation. Trying to implement a radically different public transport product through an existing entity can be difficult. Entrenched mindsets and vested interests can stifle the creativity required to develop a bold new approach such as BRT. Further, the blame for the current chaotic public transport services in many cities is not just due to the existing private operators. The existing institutions and agencies share some of the responsibility for the poor quality of services.

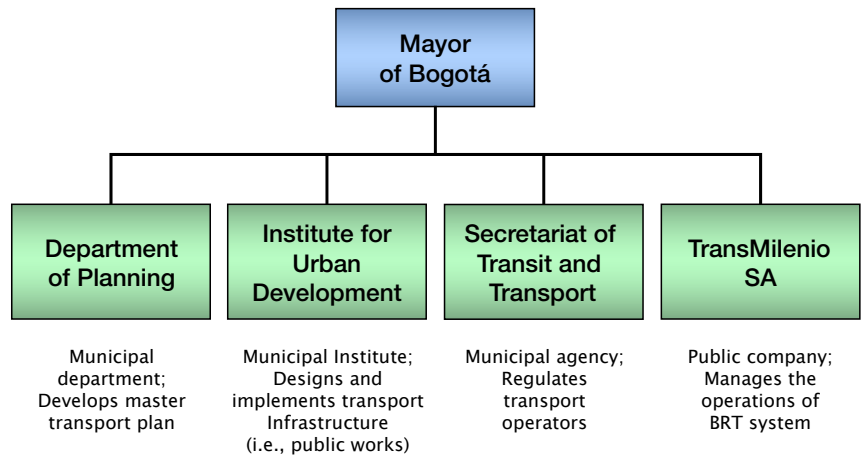


Fig. 15.22
Transport institutions in Bogotá

Thus, by bringing together an entirely new team with a fresh perspective, Bogotá created something quite special. Bogotá specifically sought personnel who had no previous contact with the existing public transport agencies. The average age of the initial TransMilenio staff team was under 30 years, and over 95 percent of the staff had never worked for an urban public transport authority or a private transit operator. For much of the team, TransMilenio represented the person's first professional position after graduating from university. And yet, this "inexperienced" team developed the world's premiere BRT system. It is perhaps because the team was not ingrained to established practices that TransMilenio demonstrated such refreshing innovation. Experience was provided to TransMilenio, but mostly through the relationship with outside consultants.

Guayaquil also created a new entity to oversee its new Metrovía system. However, due to the local legal system, it was decided that a non-profit structure would be a better fit than a

Fig. 15.23
When a design flaw resulted in material failures on the Bogotá busways, several of the involved stakeholder agencies and individuals resorted to blaming one another.

Photo by Carlos Pardo.



public company. In practical terms, the Guayaquil and Bogotá model are not that different. Guayaquil's non-governmental organisation includes a range of representatives on its board, including the Mayor of the city. Like Bogotá, the constitution of the organisation gives it quality-control and oversight responsibilities on the system. At the same time, the NGO status gives the organisation some independence which makes it somewhat removed from outright political considerations.

For other cities, the development of a new institutional entity may also be necessary in order to avoid established agencies that have a reputation for inefficiency and corruption. It would be unlikely to be able to create a major new initiative in such an environment. Further, given the legal and political difficulties in re-shaping existing agencies and replacing civil service staff, changing the existing agency structure and mindset may not be realistic within the confines of a relatively short political term.

London, Bogotá, and Guayaquil possess widely different institutional arrangements to oversee their public transport services. While TfL is a broad-based organisation with multiple roles and TransMilenio is a smaller, more focused public company, both organisations have achieved considerable success. The lessons from

London, Bogotá, and Guayaquil show that while the form of the institutional structure is highly dependent on local circumstances, bus priority measures can succeed in a variety of institutional forms when innovation and competitiveness are introduced.

15.4 Operator tendering

"The essence of competitiveness is liberated when we make people believe that what they think and do is important – and then get out of their way while they do it."

—Jack Welch, former CEO of General Electric, 1935–

Having made the basic decisions regarding which government agency will be responsible for regulating and managing the BRT system, and which elements of operations are to be managed by private firms, planners can begin to prepare the structure of the operating contracts.

The business structure of the new BRT system will ultimately be defined by operating contracts. These can either create an environment of efficiency and transparency or lead to misplaced incentives and even corruption. The "public" side of an effective public-private partnership will play a pivotal role in developing and maintaining a competitive transit environment. However, there is no one answer to an effective business structure since the existing agencies, historical precedents, geographical coverage of the system, and the local political dynamics will all shape the likely outcome

The nature of the operating contracts will have a powerful influence on many factors that are critical to the system's impact on public welfare. Three elements of best practice operating contracts will be discussed in this section:

- Developing a fair and transparent process;
- Ensuring sufficient competition for the market;
- Quality incentive contracting;
- Time-limited contracting.

15.4.1 Elements of successful contracting

"A verbal contract isn't worth the paper it's written on."

—Samuel Goldwyn, movie producer, 1882–1974

The right set of financial incentives can encourage contractors and concessioned firms to



Fig. 15.24
Guayaquil's Metrovía system is overseen by a non-governmental organisation (NGO).

Photo by Lloyd Wright.

operate a BRT system at the highest levels of quality and performance. The wrong set of incentives will cause operators to compete against each other in a manner that risks financial sustainability and customer safety. The success of BRT systems such as Bogotá, Curitiba, and Guayaquil owe much to achieving an incentive structure that is a win for the operators, a win for the municipality, and most importantly, a win for the customer.

Bogotá gained much from the Curitiba experience and extracted many of the positive incentives. These well-designed business structures systems have tended to seek considerable *competition for the market but limited competition in the market*. This strategic use of competitive motivations means that firms will have to compete aggressively to be allowed to operate. However, once the winning firms have been selected, there will not be competition on the streets to wrestle passengers away from other companies.

The principal mechanism for controlling competition in the market is to pay operators by the vehicle-kilometres of service and not by the number of passengers picked up. Thus, firms will have an incentive to provide a high-level of service while simultaneously not generating the negative attributes of reckless driving, speeding, low profit margins, and cutting off other transit vehicles to gain an advantage.

Some competition in the market can also be achieved by permitting multiple concession contracts along the same corridor, as will be discussed. Having multiple operators in each corridor is important not only because it allows for competition but also because it makes it possible for the system regulator to shift operations in response to changes in demand without changing the operating contracts.

One of the most important innovations of TransMilenio was the shift from route concessions to operating contracts based on a minimum number of vehicle kilometres over the life of the contract. In Curitiba, each operator controls a particular part of the city, like a slice of a pie. In TransMilenio operators have contracts that are not fixed to a particular corridor. Operators are guaranteed a certain minimum number of vehicle kilometres over the life of their operating contracts, but the contracts do

not specifically in which corridor these kilometres will be allocated. This flexibility gives TransMilenio the possibility of re-allocating buses from one corridor to another corridor without changing the operating contracts. As it is very hard to know in advance how many passengers a new BRT corridor is going to have, and how this demand may change over time with the addition of new corridors, this system flexibility becomes increasingly important to overall operational efficiency as the systems expand. Annex 5 provides an outline of a Phase II contract for TransMilenio trunk operators.

The importance of optimising the efficiency of operations is making some system planners consider contracting out control of the operations to private firms with an incentive to maximise the overall efficiency of the system's operations. Even TransMilenio it is said could improve the profitability of its operations by roughly 8 per cent optimising the operational programming.

Allowing for multiple operators in a BRT corridor generally requires a transparent revenue distribution process along with an incentive system based on kilometres travelled rather than passenger numbers.

Bogotá also made other adjustments to the Curitiba model, such as not limiting the kilometres paid to the revenues collected. New systems will have to review both experiences in order to adopt a set of incentives that better fit the specific needs and challenges. As with any business, the market forces will always try to find ways to take advantages of potential holes on the business scheme.

For a “closed” type BRT system, incentive mechanisms can be erected in at least two distinct areas. First, an incentive bidding scheme can be established to determine which operators should be allowed to gain access to the system. Second, once the operators are in place, “quality incentive contracting” can be utilised to ensure that the firms are properly motivated to achieve high levels of service.

A successful incentives process will likely evoke the following qualities:

- Transparency;
- Clarity;
- Simplicity;
- Efficiency;

- Integrity;
- Risk.

Transparency and clarity refer to the development of a contracting and concessions process that is open and fair to all. The bidding processes should be well-advertised to attract as many participants as possible. There should be no perception that any one participant has any inherent advantage over another. The rules and process should be clear and specific enough that misunderstandings are minimised. Dates for submission of bidding documents should be chosen to give a fair opportunity for all.

Incentives work best when the opportunities for “gaming” the system are minimised. Ideally, the right incentives will directly lead to competitive behaviour in a positive environment. Simplicity in the structure of the incentive scheme can thus contribute to an environment of contractual clarity. However, simplicity does not mean that contracts and concessions documents will lack the needed legal rigour. Rather, the documents should not be so overly complex that misunderstandings occur or that opportunities for gaming arise.

Contracts need to give incentives to both private operators and system regulators to reduce the cost of their operations and maximise operational efficiency. Some contract structures, like route concessions, will significantly compromise the ability of the system regulator or transport authority to optimise the efficiency of public transport services.

The integrity of the competitive process implies that the contracts will be honoured and respected. For instance, a change of political leadership should not suddenly mean that contracts are forcibly negated or re-negotiated. Maintaining the process’ integrity does not entirely mean that the contracts are completely inflexible.

Opportunities for re-negotiation can be explicitly included in the contractual language. However, any such re-negotiation, stemming perhaps from extraordinary circumstances, should involve open and fair procedures.

Risk is an important part of ensuring operators and contractors are properly focused upon providing a quality service. The element of risk implies that if operators fail to perform, there will be financial penalties and/or even removal from the system. Without risk, the leveraging ability of the municipality to control system performance is greatly compromised.

15.4.2 Spectrum of competitiveness

“The ability to learn faster than your competitors may be the only sustainable competitive advantage.”

—Arie de Geus, businessman and educator, 1930–

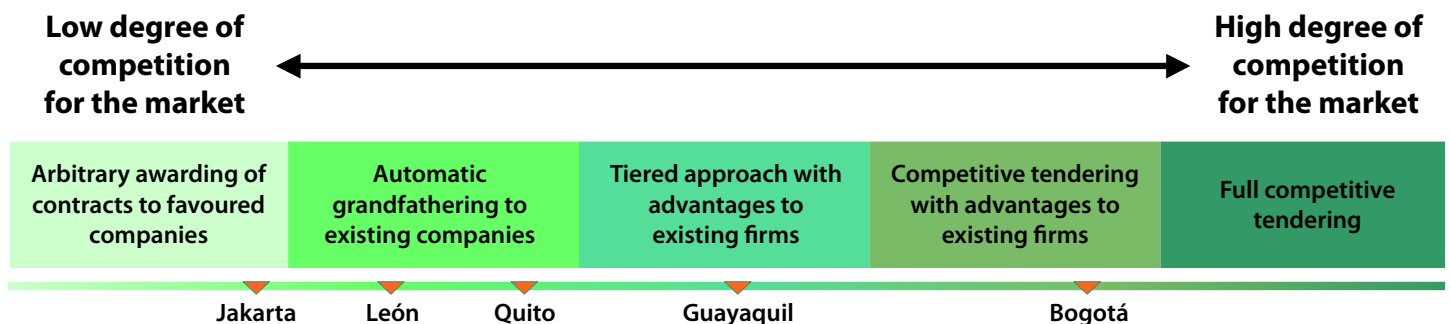
The actual tendering options generally range from the grandfathering of existing firms to full competitive tendering with any interested companies (Figure 15.25). Most existing systems today fall between these two extremes.

Of the systems developed to date, Bogotá has introduced perhaps the greatest degree of competitive forces within its operator tendering process. Nevertheless, as will be discussed later, there are still significant advantages given to existing firms.

While full competitive tendering is almost always a desirable option, political realities can mean that some compromise may be necessary. Existing companies may be unprepared for the new realities of a fully competitive market. The ensuing loss of employment and business assets can create social hardships as well as translate into political difficulties.

For example, the existing mini-bus industry in South Africa has done much to promote Black Economic Empowerment (BEE) in the country

Fig. 15.25
Spectrum of competitiveness for operator contracting



and has served a key historical role in providing transport services to marginalised communities. Immediately exposing this industry to the fierceness of new competitive realities would create much hardship for those who have long worked in the industry.

Thus, even the most competitively designed concession systems, such as Bogotá, introduce some degree of support to the existing operators. Guayaquil has found a bit of middle ground by providing for both a degree of certainty to existing operators while also bringing in elements of competition. Guayaquil's Metrovía system has been developed around a tiered approach to operator contracting. The Metrovía oversight organisation set certain standards that any concession agreement must reach. Existing operators in the city were given first right to participate in the concession. If the operators did not accept this opportunity, then the second tier of opportunity would be extended to firms operating within the Province. If the system was still not fully subscribed after the second tier, then the operating contracts would be opened up to all national and international firms in the final tier. Given the impending presence of other firms entering their market, the existing operators agreed to terms with the city and thus filled the operating quota for the project's first phase.

In other cases, though, when the political resolve behind a system is relatively weak, then the process can be designed to be overly generous to existing operators. This situation in turn erodes the cost efficiency and quality of the service. Cities such as Jakarta, Quito, and León have largely either made arbitrary contractual awards to a few selected firms or simply have given full grandfathering rights to existing companies.

On Quito's Ecovía corridor, the existing operators formed a joint consortium (called TRANASOC) and were given exclusive rights to provide services for a ten-year period. The operators were also essentially given free financing on the new articulated vehicles since the municipality purchased the vehicles with public funds.

In Quito, the operators were to repay the municipality for the vehicles using revenues collected from the system. Unfortunately, fare collection was done directly by the operators so the municipality actually has little knowledge on actual passenger counts and revenues. Quite worryingly, the operators' repayment of the articulated vehicles was tied to profit guarantees related to the number of passengers. Clearly, the operators had a strong incentive to underestimate passenger and revenue numbers in order to minimise any repayment of the vehicles. In the end, the city simply sold the vehicles to the operator at a greatly reduced price.

León's BRT structure is likewise skewed towards rewarding existing operators rather than overall efficiency. Like Quito, existing operators formed a monopoly consortium, in this case called the "Coordinadora de Transporte." The municipality acquiesced to the consortium's demands for full monopolistic rights of operation. The consortium's operating rights to the system also does not have a termination date, implying a monopoly in perpetuity. However, on the positive side, the consortium did invest directly in new vehicles.

In León, the consortium operates both the trunk corridors and the feeder services. However, the distribution of revenues is handled differently for each route type. Fares are not independently collected but rather handled



Fig. 15.26 and 15.27
In both the case of the Quito Ecovía line (left photo) and the León system (right photo), the ceding of system control to the operators meant sacrificing a certain quality standard.

Left photo by Lloyd Wright
Right photo by Eric Ferreira

directly by the consortium. Even though the system has an integrated ticketing system and a single fare, fares collected by the feeder buses are kept by the feeder bus operators. The income of the feeder operators is thus based on the number of passengers. The fares collected on the trunk corridors are deposited into a fund established by the consortium. Funds are reportedly distributed to trunk operators on a basis of number of kilometres travelled. However, since the payment system is not transparent, the exact nature of the revenue distribution scheme is unclear to the municipality and the public.

Besides the non-transparency and lack of competitiveness within the system, the market design also has negative consequences for quality of service. Since the feeder operators only keep the fares that they collect, they only have an incentive to serve customers during the morning commute. On the return trip in the afternoon, the trunk line operators are collecting the revenues. Not surprisingly, then, the feeder companies provide very little service, and thus make the trip home a relatively unpleasant and difficult experience for the customer. The City is trying to fix the problem by creating a compensating fund. However, the only influence that the City and the State have over the regulation of the system is through a Technical Committee of the “Coordinadora de Transporte.”

Given the predictable results of manipulation and inefficiency, why do municipalities choose uncompetitive structures such as those in Quito, Leon, and Jakarta? Principally, the reason is a lack of political will. Municipal officials are not willing to entertain the possibility that some existing operators could lose their operational rights along a particular corridor. The resulting upheaval from disgruntled operators could have political consequences.

However, the choice between appeasing existing operators and creating a competitive environment is a false one. It is possible to design a system that gives an adequate opportunity to the existing operators without compromising the overall competitive structure.

15.4.3 Elements of a competitive bidding process

A competitive bidding process ensures that firms offering the best quality and most cost-

effective services are invited to participate in the new BRT system. A bidding process can also do much to shape the long-term sustainability of the system. Competition is not just reserved for trunk line operators as other aspects of a BRT system can also benefit, including feeder services, fare collection systems, control centre management, and infrastructure maintenance.

A bidding process sets the expectations for the private entities interested to be part of the system and establishes the terms and conditions that will define the relationship among the different actors. This section outlines the competitive bidding processes undertaken in Bogotá, both during the system’s Phase I and the subsequent lessons learned and adapted for the Phase II bidding. This section focuses on four areas of competitive tendering:

1. Trunk corridor bidding;
2. Feeder services bidding;
3. Quality incentive contract;
4. Duration of the concession.

15.4.3.1 Trunk corridor bidding

The bidding process developed by Bogotá’s TransMilenio stands out as one of the best examples of providing a competitive structure directed at both quality and low cost. In reality, Bogotá used its incentive structure to achieve a variety of objectives:

- Cost-effectiveness;
- Investment soundness;
- Risk allocation;
- Environmental quality;
- Opportunities for existing operators;
- Local manufacturing of vehicles;
- International experience and partnerships.

Bogotá’s competitive bidding process provided the incentives to completely modernise its public transport system by encouraging modern vehicles, wider company ownership, and sector reforms. The principle mechanism in Bogotá was the use of a points system to quantify the strength of bidding firms. By carefully selecting the categories and weightings within the points system, TransMilenio shaped the nature of the ultimate product. Table 15.4 provides a summary of the bidding categories and weightings.

The points system was used in a way that rewarded inclusion of the existing operators, but the design also provided an impetus to

consolidate small operators into more manageable groupings. TransMilenio established eligibility criteria that mandated a certain minimum working capital and firms to be legally incorporated as formal businesses. These requirements prompted small operators to seek out partners and to professionalise their business. Bid categories such as the equity contribution of previous operators and the experience level on a particular corridor gave value to the inclusion of the existing operators. However, the participation of the existing operators was not assured, as was the case in Quito and León. This uncertainty provided the necessary risk to drive a more competitive offering.

In the Phase I bidding of TransMilenio, 96% of all the local transport companies (62 out of 66 companies) acquired stock in the four consortiums that were awarded trunk line concessions

(Hidalgo, 2003). Thus, even within a competitive bidding process, the existing operators were able to compete extremely well. The bidding process favoured firms with experience in public transport provision, but it did not exclude any interested party.

The “economic capacity” category refers to the ability of the company to provide a minimum equity level as an initial investment. The minimum equity level is equal to 14 percent of the total value of the buses being offered to the system. The minimum owner’s equity is defined in equation 15.1.

Equation 15.1 Calculation of minimum owner’s equity

$$\text{Minimum Owner's Equity} = \text{NMV} \times \text{US\$200,000} \times 14\%$$

Table 15.4: Points system for bidding on TransMilenio trunk line operations

Factor†	Description	Eligibility	Points	
			Minimum*	Maximum**
Legal capacity	Bidding firm holds the appropriate credentials to submit a proposal	X	-	-
Economic capacity	Bidding firm holds the minimum amount of net owner’s equity to submit a proposal	X	-	-
Experience in operation	Passenger public transport fleet in operation		30	140
	Specific experience providing passenger services in Colombia		50	250
	International experience on mass transit projects		0	50
Economic proposal	Offer price per kilometre to operate the service		0	350
Proposal to the city	Right of exploitation of the concession			
	Valuation of the share given to TransMilenio SA from the revenue of the concessionaire ⁽¹⁾		21	50
	Valuation of the number of buses to be scrapped by the concessionaire ⁽²⁾		14	50
Composition of equity structure	Share of company’s stock held by former small bus operators		32	200
Environmental performance	Level of air emissions and noise; disposal plan for liquid and solid wastes ⁽¹⁾		0	200
Fleet offered	Size of fleet	X		
	Manufacture origin of the fleet		0	50

Total (1350 points possible)

† If the proposal meets all the requirements, then the proposal will be categorised as ELIGIBLE.

* If the proposal is below any given minimal value, then the proposal will be categorised as NOT ELIGIBLE.

** If the proposal does not meet the established range, then the proposal will be categorised as NOT ELIGIBLE.

(1) Not present on first phase

(2) Fixed number on first phase

Where,

NMV = Maximum number of buses offered to the system

The value of US\$200,000 was the approximate cost of an articulated bus in Phase I of TransMilenio, based on the specifications required by TransMilenio SA.

“Experience in operation” refers to the bidding firm’s direct experience in providing public transport services. The experience can be in Bogotá, the greater metropolitan area, or in another Colombian city where vehicles of more than ten passengers are utilised. Companies are also awarded for partnering with international transport providers. For example, the principal transport operator in Paris, RATP (Régie Autonome des Transports Parisiens), is a partner with one of the TransMilenio operating firms. The idea is to encourage a sharing of knowledge that will improve the performance of the local operators.

The “economic proposal” is perhaps the most important bid category in terms of creating incentives for system that is cost-effective in operation and affordable to the majority of the population. The bid process ensures that firms closely analyse their cost structures to be as competitive as possible.

The salaries, office space, and other costs of the public company, TransMilenio SA, are not funded through municipal payments. Instead, the public company receives a portion of the system revenues. Thus, in the bidding process, the

interested private firms must state what percentage of operating revenues will be given to TransMilenio SA. On the initial phase, this amount was initially fixed and then was later increased after several negotiations with the operators.

In order to help eliminate the more polluting vehicles from the city, the private firms also bid on the number of old vehicles that they are willing to destroy. The older vehicles are to be physically scrapped so that these vehicles do not simply move to another municipality. In some instances, the private operators will be able to scrap their own vehicles. In other cases, it will be more economical to “buy” older vehicles from others. The idea is to find the lowest cost vehicles to destroy. Since the lowest-cost vehicles also tend to be the oldest and most polluting, the incentive works well in achieving its goal of reducing the over-supply of outdated vehicles. The vehicle scrapping process is quite formal. The older vehicles must be taken to a designated scrapping facility where a legal certification is awarded once the vehicle is destroyed. The process is designed to avoid any corruption or any “leakage” of vehicles to other cities.

The bidding firm’s “equity share” held by small operators is a key incentive to encourage the participation of existing operators. This bid category essentially gives value to these small operators and their existing resources. The bidding firm receives more points for the higher number of shares owned by small bus operators. During the negotiations between the bidding firms and the small operators, the existing assets of buses, drivers, and capital held by the small companies will likely determine their equity stake.

The “environmental performance” of the bid refers to the rated air emissions and noise levels expected from the provided vehicle technologies as well as the expected handling of any solid and liquid waste products. In the case of Bogotá, the initial minimum standard for tailpipe emissions is Euro II standards. With time, this requirement will increase to Euro IV. However, firms offering Euro III technology or higher can gain additional bid points for doing so. The bidding process thus offers an in-built incentive to not only meet minimal standards, but encourages firms to go much higher. In turn, this incentive creates a dynamic environment to push vehicle

Fig. 15.28
As part of the competitive tendering process, companies compete to destroy the greatest number of older vehicles.

Photo courtesy of TransMilenio SA



manufacturers to provide improved products. Prior to TransMilenio, Euro II technology was difficult to obtain in Latin America since the manufacturers produced such vehicles predominantly for the European, North American, and Japanese markets. Now, with the incentives from TransMilenio, some manufacturers in Latin America are even producing Euro III vehicles.

The bidding process also encourages the vehicle manufacturers to develop fabrication plants in Colombia. Local fabrication of vehicles is awarded additional points. This item is not a requirement, but does bring benefit to bidding firms that can secure local fabrication. Thus, the bidding process does not require local manufacturing in a draconian manner. Instead, the positive reinforcement of bidding points helps to instill a market-based outcome. To date, much to the credit of TransMilenio's existence, two major international bus manufacturers have established production sites in Colombia. Marco Polo in conjunction with two local firms has built a fabrication plant in Bogotá (Figure 15.29) while Mercedes has built a plant in the Colombian city of Pereira.

Bogotá's competitive bidding process has been successful in selecting operators who are most capable of delivering a high-quality product. Table 15.5 summarises some of the characteristics from the successful bids for Phase II trunk lines of TransMilenio.

The successful bids in Table 15.5 indicate different strategies by each firm. Interestingly, all firms entered the same price level and the same sharing of revenues to TransMilenio. The selection of these values is not due to collusion or coincidence. Instead, these values are the median of the allowed range. The column "vehicles to scrap" indicates the number of older vehicles that each



company is willing to destroy for each new articulated vehicle introduced. Thus, for example, the company "Connexion Mobil" will destroy 8.9 older vehicles for every new articulated vehicle that the firm purchases. With a total of 100 new vehicles being introduced, Connexion Mobil will thus destroy 890 older buses. The final columns set out the amount of participation each firm has given to existing small operators.

The second phase incorporated many additional requirements for the operators, but these additions did not discourage interest or reduce the value of the bids. The initial bidding process had many uncertainties and risks that did not hold with the second.

15.4.3.2 Feeder service bidding

Bogotá manages a similar bidding process for feeder services. Table 15.6 is a summary of results from TransMilenio Phase II bids for the feeder routes. Due to reasons of practicality, a single feeder company operates in a given zone of the city. A total of eight zones are demarcated

Fig. 15.29

Due to the incentive structure in the TransMilenio bidding process, bus manufacturers have been encouraged to develop local manufacturing sites.

Photo by Lloyd Wright

Table 15.5: Successful bids for Phase II trunk lines of TransMilenio

Company name	Fleet size	Emissions	Price / km (Colombian pesos)	Revenues* to TransMilenio (%)	Vehicles to scrap	Participation of existing operators	
						Owners	% of equity
TransMasivo SA	130	Euro III	3,774	3.53%	7.0	452	20.22
Sí – 02 SA	105	Euro II	3,774	3.53%	7.5	658	21.62
Connexión Mobil	100	Euro II	3,774	3.53%	8.9	740	29.39

Source: TransMilenio SA

* The "Revenues to TransMilenio" column represents the amount of revenues that the bidding firms are willing to give to the public company (TransMilenio SA) in order to manage the system.

for the feeder services in Bogotá (Figure 15.30). Six of these zones were open to bidding during the tendering process presented in Table 15.6.

The results of the Phase II bidding for feeder services in Bogotá indicate the great capacity of competitive bidding to achieve particular results. Specifically, the number of existing operators forming partnerships is quite impressive. As many as 1,333 small owners are participating in a single firm within the Phase II bids for feeder services. It is unlikely any sort of mandatory grouping could have derived such a large consortium. The power of the market in conjunction with a well-designed bid process can provide significant motivation to achieve desired results.

The duration of the concession contract has also played a pivotal role in influencing the results of Bogotá's bid process. A long concession period increases the value of the contract and thus increases the quality and quantity of the bids. However, if the concession period is too long, then the municipality's flexibility with future changes becomes limited. Further, a long concession period can have a negative effect on com-

petition since it creates a long-term oligopoly for the successful firms. In the case of Bogotá, the duration of the concessions match the estimated useful life of the new vehicles. Each successful firm thus receives a concession for ten years.

The ten-year concession period (based on Kilometres) also applies to the feeder services. During Phase I of TransMilenio, the feeder operators only received a concession for a period of four years. The trunk operators still had a ten-year concession during Phase I. The longer concession in Phase II for the feeder companies reflects increased expectations for these firms in terms of vehicle technology and service quality. By giving a longer concession period, the operators are able to purchase new vehicles and amortise the vehicles over the course of the contract.

15.4.3.3 Quality incentive contracts (QICs)

"The whole duty of government is to prevent crime and to preserve contracts."

—Lord Melbourne, former UK Prime Minister,
1779–1848

The competitive bidding process ensures that the most able and most cost-effective companies will participate in the BRT system. Likewise, though, it is important to develop the right incentives to ensure continued high-quality service in the system's operation. A "quality incentive contract" is an effective mechanism to encourage operators to deliver excellence in service. In essence, a quality incentive contract stipulates how an operator's performance is tied to its financial compensation. If an operator fails to perform properly in certain aspects of its service, then the firm will incur penalties or deductions in its payments. Likewise, a firm that exceeds service expectations can actually be rewarded with additional payments.



Fig. 15.30
Distribution of feeder zones in Bogotá
Source: TransMilenio SA

Table 15.6: Successful bids for Phase II feeder services of TransMilenio

Zone	Company	Price / km (Col. pesos)	Price / passenger	Emissions Technology	Vehicles to scrap	Number of owners
Norte	Alnorte Fase 2	0.0	263.0	Euro III	3	240
Suba	Alcapital Fase 2	0.0	260.0	Euro III	3	457
Calle 80	TAO	0.0	295.3	Euro III	3	1141
Americas	ETMA	279.6	292.0	Euro III	3	807
Sur	Si – 03	0.0	332.2	Euro III	3	1,333
Usme	Citimovil	0.0	347.1	Euro III (35%)	3	997

Source: TransMilenio SA

Once again, Bogotá provides an excellent example of how quality incentive contracting can be used to motivate operator performance. However, many cities other cities, such as London and Hong Kong, also make use of quality incentive contracts in their bus operations. In the case of Bogotá's TransMilenio system, poor

performing operators can experience revenue reductions of up to 10 percent of the operator's monthly income. Further, in extreme cases, an operator can even lose the concession for consistently unacceptable services.

Since TransMilenio operators are paid based upon the number of kilometres travelled,

Table 15.7: Penalty system within TransMilenio's quality incentive contracting

Area	Type of infraction	Penalty
Maintenance / vehicle deficiencies	Alteration of / damage to the vehicle interior or exterior: Unauthorized advertisements, non-functional signal lights, unclean bus, or damaged seating.	50 kilometres
	Failure to follow pre-determined schedules for maintenance, repair, or inspection.	50 kilometres
	Non-functional doors or worn tires.	100 kilometres
	Alteration of or damage to the GPS system or the radio communication system.	250 kilometres
Customer service / operations	Stopping at a different station than the assigned station or not stopping at an assigned station	25 kilometres
	Stopping for a longer period than requested	25 kilometres
	Blocking an intersection	25 kilometres
	Use of stereos, driver's cellular or walkman devices.	50 kilometres
	Parking bus in an unauthorised location	60 kilometres
	Changing route without authorisation	60 kilometres
	Delaying system operation without a valid reason	60 kilometres
	Over-passing another bus with the same route without authorisation	60 kilometres
	Operating during unauthorised hours	175 kilometres
	Permitting the boarding or alighting of passengers in places other than stations.	250 kilometres
Consistency of driver performance	Performance difference between best operator and other operators, < 20%	0 kilometres
	Performance difference between best operator and other operators, 20% - 25%	30 kilometres
	Performance difference between best operator and other operators, 25% - 30%	75 kilometres
	Performance difference between best operator and other operators, > 30%	120 kilometres
Administrative / institutional	Failure to send reports required by TransMilenio	50 kilometres
	Impeding the work of inspectors from TransMilenio SA	50 kilometres
	Hiding information or providing incorrect information	50 kilometres
	Inappropriate administrative or accounting procedures	100 kilometres
	Abuse of power in relations with staff	100 kilometres
Environmental	Fuel / oil leaks and spillages	25 kilometres
	Noise and air pollutant levels above the levels stipulated in the bid contract.	50 kilometres
	Mishandling of hazardous materials	50 kilometres
Security	Any security violations not in compliance with contractual obligations	100 kilometres for each day in violation

Source: TransMilenio SA

penalties for poor performance are imposed by reducing the number of kilometres assigned to the operator. The basis for fines and penalties are explicitly set out in the initial contract. Areas covered in the quality incentive contract include maintenance practices, customer service, driver safety, administrative practices, and environmental performance. Table 15.7 summarises the types of infractions and their associated penalties.

In some instances where public safety is compromised, TransMilenio SA will also directly impose penalties upon the drivers in addition to fining the operating company. Thus, violations such as driving at excessive speeds or disobeying traffic signals can result in driver suspensions or termination of employment (Table 15.8).

The public company, TransMilenio SA, is responsible for monitoring and evaluating compliance with contractual norms. Inspections occur both randomly and within periodic schedules. Some violations can also be detected through the GPS system. Control centre staff can record average speeds and vehicle movements, and thus staff can determine when speeding or other vehicle violations occur.

Ninety percent of the fines and penalties are collected into the “Fines and Benefits Fund” while the remainder is retained by TransMilenio SA. The “Fines and Benefits Fund” is then periodically distributed to the highest-performing operator. Thus, the scheme provides a double incentive to avoid poor performance by first penalising poor quality service and then rewarding excellence. In addition, since the penalised operators also forfeit a certain number of kilometres serviced, the well-performing operators also gain by receiving increased service allocations.

Penalised operators do have some recourse to contest unwarranted fines. If the operators feel that the penalties have been imposed unfairly, an appeal can be presented during the weekly meetings that take place between the operators and TransMilenio SA. If the other operators and TransMilenio SA concur that the fines were unwarranted, then the amount of the fine is returned.

When applied fairly, a system of quality incentive contracts provides a powerful tool in motivating high-quality service from operators. By selecting the appropriate measures and

Table 15.8: Penalties for driver infractions

Action	Penalty to driver	Penalty to operating company
Lack of driver's license or bus registration document	Suspension (next day)	100 kilometres
Failure to provide first aid	One day suspension	100 kilometres
Refusal to provide customer with information	One day suspension	100 kilometres
Accident between two TransMilenio buses	Penalty depends upon investigation	100 kilometres
Running red light	Immediate suspension	100 kilometres
Backing up while on a trunk line	One day suspension	50 kilometres
Possession of a firearm	Immediate suspension	100 kilometres
Disobeying police instructions	One day suspension	200 kilometres
Driving while under the influence of alcohol or other prohibited substances	Immediate suspension	200 kilometres
Accident resulting from an irresponsible action	One day suspension	200 kilometres
Improper approach to station platform	Three times in a single day results in a one day suspension	50 kilometres
Excess velocity	One day suspension	100 kilometres
Encroachment onto pedestrian crossing		100 kilometres
Mechanical problems that are not resolved in less than one hour		50 kilometres
Verbal or physical aggression to passengers	Immediate suspension	100 kilometres
Conducting fare collection on board vehicle	Immediate suspension	200 kilometres
Disobeying instructions from Control Centre or traffic authorities	Immediate suspension	100 kilometres

Source: TransMilenio SA

following-up with a rigorous inspection regime, operators will be given the right level of incentives to remain focused on providing a quality product.

15.4.3.4 Duration of concession contracts

The duration of the concession contract affects the potential profitability of the service for the operating company and also the financial risk exposure of the government vis a vis the operator. Normally, the life of the contract needs to be sufficient to allow the private investors to recapture their investment. If the vehicles being procured can only be used on the BRT corridors, and the private operators are being expected to pay the full cost of the vehicles, then it is likely that the length of the contract will need to be roughly as long as the productive life of the vehicle. If the government is buying the vehicles or subsidising the vehicles, or the vehicles can easily be reused on other corridors, the government can probably attract the needed investment with shorter contracts.

Obviously it is in the interest of the government to keep the contracts as short as possible, and it is in the interest of the investor to get a contract as long as possible. Longer concession periods will thus tend to increase both profitability and investment levels. However, longer-term concessions have the negative effect of reducing the public sector's flexibility and control over the future direction of the system. Very long-term concessions can result in monopolistic behaviour that ultimately reduces system quality. Thus, the optimum duration for a concession contract will be such that it provides sufficient time for a profitable operation but does not impair future flexibility and competitiveness.

In Bogotá, in Phase I, the concession period was ten years or 850,000 vehicle kilometres, whichever came first. In Phase II, there was no fixed concession period. Instead, the terms were stated as 850,000 vehicles kilometres within a maximum period of 15 years. Generally the life of the contract is set at roughly the same length as the expected life of the new transit vehicles. By allowing the operators to fully amortise the vehicles over the life of the period of the concession contract, the lowest cost structure is achieved. A shorter period would place

additional risk on the operators who may not have use for the under-utilised vehicles if they were not successful with a future concession. A longer period would either mean that new vehicles would need to be purchased within the concession, or that pressure would be placed on the city to permit operation of older vehicles.

Since operators are paid by the vehicle kilometre, there is also going to be an issue over who regulates the total number of vehicle kilometres that the operators will serve in a given day.

Operating contracts also generally provide some sort of minimum guaranteed number of vehicle kilometres. If the BRT authority (TransMilenio) can reduce the operator's vehicle kilometres per day to zero, then the operators are fully exposed to demand risk. It is unlikely that an investor will be willing to invest if they are completely exposed to demand risk. If they are guaranteed a high number of vehicle kilometres per day that ensures they will make a profit, then they are not exposed to any demand risk. TransMilenio contracts guarantee a minimum number of vehicle kilometres over the life of the contract or else allow for the contract to be extended in time. In this way, the vehicle operators are exposed to short term demand risk but are guaranteed that eventually they will be able to recoup the cost of their investment.

In the newly contracted operations of Ahmedabad (India), by contrast, the private operators are guaranteed a daily minimum number of vehicle kilometres. This minimum number of vehicle kilometres turns out to be more than is actually needed, and the public transport authority is thus bearing most of the demand risk and losing money. In each case, it is up to the public transport authority to negotiate the best deal possible for the public while still attracting the needed private investment.

The optimum concession length will vary by local circumstances and the project's specific cost analysis. Acceptable vehicle ages and amortisation rates will vary. However, the over-riding principal is to select a contract duration that maximises competitiveness and cost effectiveness.

16. Operating costs and fares

“Everything should be made as simple as possible, but not simpler.”

—Robert Olson, writer, 1920–

The business structure of the BRT system should do what it can to ensure long term high-quality service to its passengers. BRT systems are vulnerable to being used for political purposes other than providing high-quality service to its passengers. A profitable system might see its resources reallocated to other purposes. Procurement decisions can be made for political rather than technical reasons. Even the exclusive use of the road right-of-way is vulnerable to being revoked by new political administrations. A good business structure backed by enforceable contracts can play a critical role in protecting good quality BRT service over the long term.

Because BRT usually aims to create a “market”, the business model for the BRT system as a whole must be developed, and this business case has to be built up from the business case of the separate components of the system: the trunk operations, feeder bus operations, fare systems, and possibly security services as well. The development of the system’s business model will require some initial analysis of projected operating costs and projected revenues. This analysis will help identify the conditions in which operating companies can reach profitable (and thus sustainable) revenue levels. The calculation of operating costs and projected revenues will also allow initial estimates of the fare levels that will allow the system to cover its operating costs.

The more profitable the new BRT system is, the more independent it can be financially from political influence, and the easier it will be to ensure long term high quality service for the passengers. The more elements of the system that can be paid for out of fare revenues, the less of a financial burden the system will be on the general taxpayers, and the less the riders will find their public transport service compromised by political objectives other than good quality public service.

One of the key purposes of the business plan for the system as a whole will be to estimate the overall profitability of the system. Knowing how profitable the planned BRT system will be in

advance is a critical first step in defining which elements of the system can be financed in a sustainable manner from the fare box revenue, and which elements of the system need to be paid for by government investment.

This analysis should be done prior to the final determination of the business structure, and before finalising the bus technology selection. To put it simply, a more profitable system can afford better vehicles. The first section of this chapter provides guidance for estimating the system’s operational costs. Operational costs include both operating costs and operations-related investments, such as the vehicle procurement. The second section provides guidance on estimating the system’s projected revenues.

With this information, it is a good idea to re-appraise the proposed operational model and vehicle procurement, to see if the system cannot be made more profitable. Once this is done, it will be possible to make a determination which elements of the system can be financed by the fare revenues, and which will need to be paid for by the government to make the system sustainable.

Once this basic structure is outlined, the chapter reviews how the fare revenue can best be collected and distributed.

Once the basic business structure has been optimised, the way in which the operating contracts with the private sector are negotiated and written will have long term implications for the quality of service. The second part of this chapter therefore provides guidance on the negotiation of operating contracts and the contents of these contracts.

This chapter is therefore structured as follows:

- 16.1 Operating costs
- 16.2 Fare levels
- 16.3 Revenue distribution
- 16.4 Fare policy
- 16.5 Fare system options
- 16.6 Reappraisal of operating costs

16.1 Operating costs

“The sovereign has the duty of erecting and maintaining certain public works and certain public institutions, which it can never be for the interest of any individual, or small number of individuals, to erect and maintain because the profit could never repay the expense to any individual or small number of individuals through it may frequently do much more than repay it to a great society.” (Wealth of Nations)

—Adam Smith, economist, 1723–1790

This Planning Guide recommends that infrastructure remain the financial responsibility of the government, while private investors take responsibility for the vehicle investment and other operational investments.

However, even if this broad definition of the respective public and private roles for the BRT system’s business structure are generally accepted, there are many tasks involved in managing and operating a BRT system. It is not always inherently clear which of these roles should be paid for by public funds and which should be paid for from fare revenue. Furthermore, it is not always clear what elements of the system should be treated as part of the initial capital investment paid for by the taxpayers, and what elements of the system should be depreciated and treated as ongoing operating expenses paid for by the fare box revenue. Finally, it is not inherently clear what part of the ongoing administrative costs of the public regulatory authority should be paid for by government revenues, and what part of administrative costs should be paid for by fare revenues.

This determination will largely depend on how profitable the system is. Since some systems are going to be more profitable than others,

financial responsibility for some elements of the BRT system will have to be strategically moved between the private investors and the government until the system can be made financially sustainable.

BRT operations involve two types of costs: operational investments and ongoing operational costs (Figure 16.1).

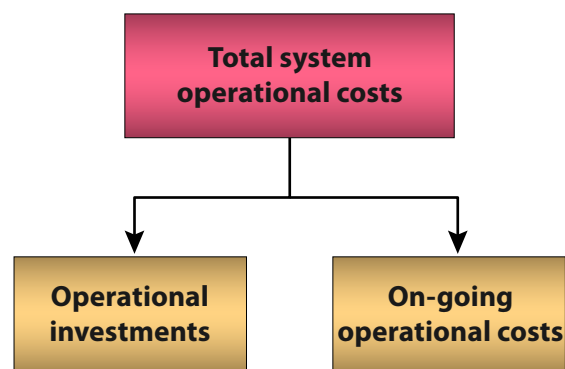


Fig. 16.1
Schematic of the types of operational costs.

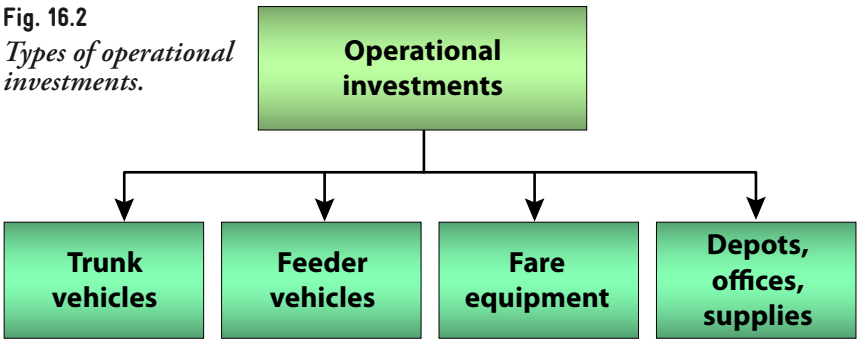
16.1.1 Operational investments

Operational investments include the cost of investment into the trunk vehicles, the feeder vehicles, and fare collection and verification equipment. The fare equipment can include fare vending machines, fare readers, fare verifiers, turnstiles, software, and the payment medium (e.g., smart cards). Operational investments can also be taken to include some or all of the depot-related costs, and in some cases the costs of the control centre equipment as well. There may be other office supply costs, training costs, and personnel costs, such as uniforms for staff (security staff, customer service staff, etc.). The more profitable the system, the more of these costs that can be covered from the fare revenue.

The principal objective, though, should always be to design a system with no operational

subsidies. If costs need to be shifted to the capital cost ledger, then there is a better solution than incurring an operational subsidy. A one-time subsidy infusion for infrastructure and other equipment is typically far preferable than an on-going subsidy for the life of the system. Operational subsidies require long-term administrative costs and close oversight. They are more difficult to control and thus are also more prone to improper and corruptive misuse. Operational subsidies can also be damaging to the image of public transport since it provides detractors with a focal point to say the system does not pay its own way and is a burden on public finances.

Fig. 16.2
Types of operational investments.



The vehicle costs are typically a major portion of operational costs and thus can have a significant impact on fare levels. The temptation may be to simply pay for the vehicles fully from public funds. However, it is critical that at least a portion of the vehicle costs are financed by the fare revenue. If system profitability permits the full costs of the vehicles to be paid through the

fare income, then it is highly recommended that the vehicles are fully purchased by the private operators. These operators can then incorporate the amortisation costs of the vehicles in their bids to the system management company.

In some cases, keeping customer fares low may be a political objective to foster social equity. Thus, a partial contribution by the public sector may be required to reach a targeted fare level. In such an instance, the vehicles should be fully owned by the private sector and not in any way held in the name of the public sector. If the vehicle is owned by the public sector and operated by the private sector, then maintenance and upkeep will likely be quite poor. The private operators would have no incentive to care for a vehicle they do not own. Additionally, public procurement of the vehicles also raises the potential for corruption through illegal payments from manufacturers to officials.

The fare collection and verification system includes both hardware and software. The fare system is overall considerably less expensive than the vehicles and will likely have a longer life (Figure 16.3). In many circumstances, it will be less costly for the government to simply directly procure the system. Further, publicly-owned fare equipment will give more flexibility with regards to the concession of the fare operations. If the fare concession company was to own the equipment as well, then the question arises as to what happens at the end of the concession period. It would be highly disruptive

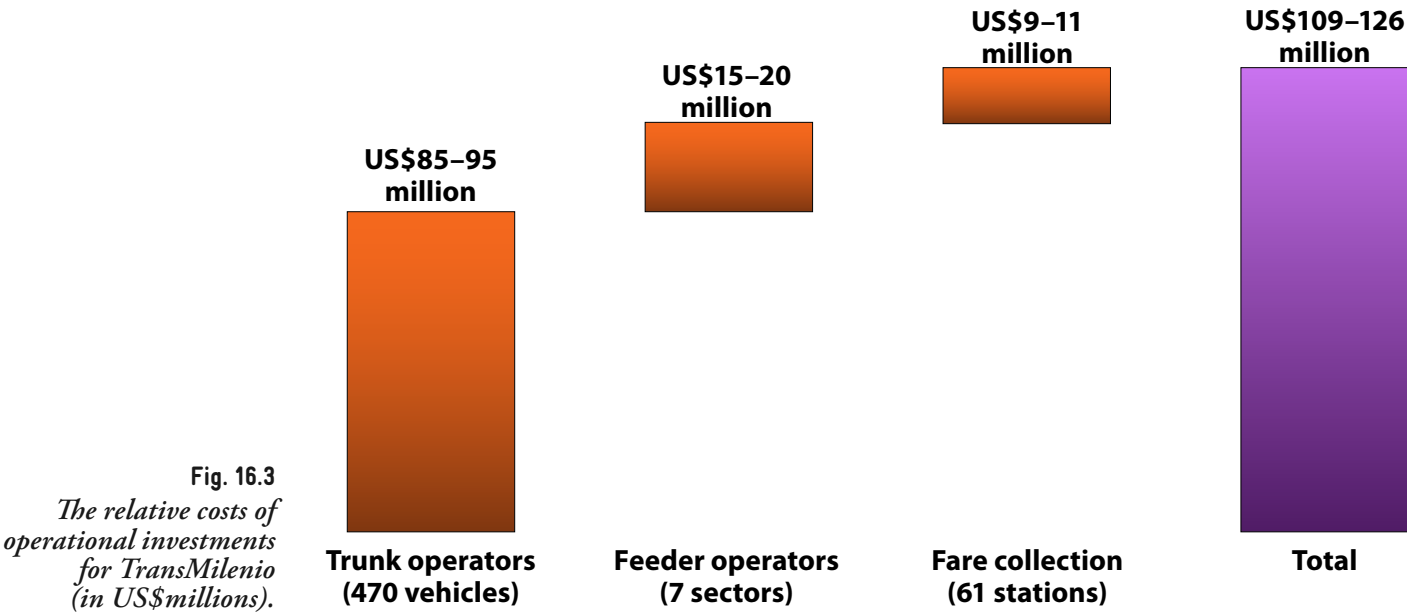


Fig. 16.3
The relative costs of operational investments for TransMilenio (in US\$ millions).

to have all the equipment removed due to a change in concession holders. Alternatively, a very long-term concession could be arranged, but this approach would limit the government's control over the system and diminish incentives for operator performance.

The depot is another area where there is some flexibility. For example, the vehicle operators might be expected to pay for the buildings which house their administrative offices. They might also procure the equipment used to clean, refuel, and maintain the vehicles. However, again, any private ownership of these assets will limit system flexibility at a later date. If another company was to take over the concession at a later date, then it becomes quite disruptive if all or part of the depot area is owned by someone else. Such a situation could even force the entire relocation of the depot. Certainly with some moveable equipment, there would not be a problem in permitting private ownership. In general, though, the depot fixtures should probably remain in public hands.

If the system turns out to be extremely profitable, the control centre technology and station maintenance costs would be the next items to be covered out of fare revenue. After this, road maintenance too might be covered by fare revenues.

16.1.2 Ongoing operating costs

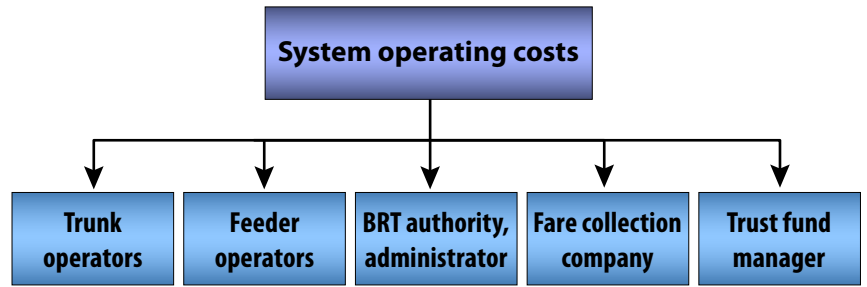
From the point of view of the system as a whole, the cost of vehicle operations on the trunk lines depends on the contractually determined rate that the BRT authority has agreed to pay the vehicle operator per kilometre, times the projected total annual kilometres of operations that are programmed. This relationship is outlined in Equation 16.1.

Equation 16.1 Calculation of payment to trunk operations

$$\text{Total payments to trunk operators} = \text{projected needed daily bus kilometres} * \text{projected total buses} * (\text{the estimated operating cost per kilometre} + \text{return on investment})$$

The operational costs of the BRT system as a whole are potentially composed of the following components:

- Payments to trunk operators;
- Payments to feeder operators;



- Payment to administration of BRT public authority;
- Payments to fare collection operator;
- Payments to trust fund manager.

These components are illustrated in Figure 16.4.

Similarly, from the point of view of the feeder operators, the operational cost will simply be the amount that the BRT authority has contractually agreed to pay the feeder operators per kilometre (or per passenger, whatever the contract stipulates), times the total projected passengers or kilometres provided by the planning consultants.

The administrative expenses of the BRT authority largely are principally the cost of salaries for the staff. Whether the operating costs of the BRT authority is paid from the fare revenues depends on how the business plan is initially organised. In some cases, the system administration may be simply part of the transport authority's general budget. As with vehicles and other components, the viability of including administrative costs as part of the revenue distribution depends on the expected system profitability and the targeted customer fare level.

Payment to the fare collection company will similarly be determined by whatever payment was negotiated at the outset.

The trust fund manager is an independent entity that receives the revenues collected from the fare collection company. The trust fund manager is then responsible for distributing

Fig. 16.4
Distribution of operating costs amongst the principal cost centres.

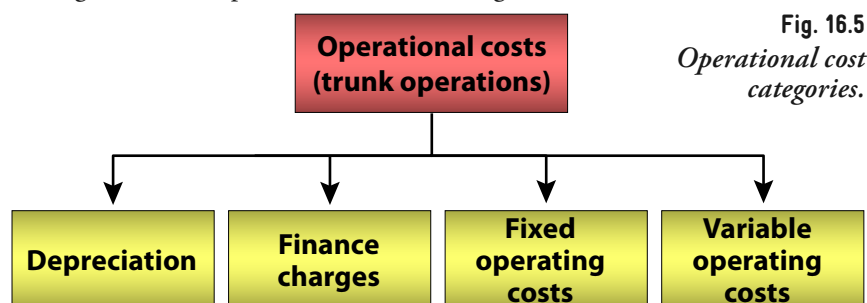


Fig. 16.5
Operational cost categories.

Table 16.1: Operational Cost Components of BRT

Item	Measurement units	Value per vehicle
Depreciation		
Vehicle depreciation	% of value of vehicle / year	10%
Finance charges		
Cost of capital	Effective annual interest rate on invested capital	14%
Fixed Operating Costs		
Driver salaries	Employees / vehicle	1.62
Salaries of mechanics	Employees / vehicle	0.38
Salaries of administrative personnel and supervisors	Employees / vehicle	0.32
Other administrative expenses	% of variable costs + maintenance + personnel	4.0%
Fleet insurance	% of value of vehicle / year	1.8%
Variable Operating Costs		
Fuel	Gallons of diesel / 100 km m ³ of natural gas / 100 km	18.6 74.0
Tires		
– New tires	Units / 100,000 km	10.0
– Retreading	Units / 100,000 km	27.6
Lubricants		
– Motor	Quarts of gallon / 10,000 km	78.9
– Transmission	Quarts of gallon / 10,000 km	4.5
– Differential	Quarts of gallon / 10,000 km	5.8
– Grease	Kilograms / 10,000 km	3.0
Maintenance	% of value of vehicle / year	6.0%

Source: TransMilenio SA, Bogotá, Colombia, June 2002

the revenues to each party based on the prior contractual agreements. In many cases, the trust fund manager is a bank or other trusted financial institution. The trust fund manager receives a fee for providing these services.

All parties involved in the system will want to conduct a thorough analysis of the costs prior to

entering any negotiations. The operational cost analysis is pivotal to being secure with concession terms that will likely be the basis for payments over a period of ten years. The BRT authority responsible for negotiating the operating contracts with the private operators will want

to know ahead of time roughly what the cost of providing this operation should cost in order to strengthen their hand in the negotiations. Likewise, from the point of view of the private operator, they must ensure that the quoted payment per kilometre served is sufficient to cover their total operational costs, plus a reasonable rate of return on their investment.

The major operational cost categories are: 1. Depreciation of assets; 2. Finance charges; 3. Fixed operating costs; and, 4. Variable operating costs. Figure 16.5 outlines these costs.

Table 16.1 provides a summary of operational cost categories along with sample values from Bogotá's TransMilenio system. The values shown in Table 16.1 will vary greatly, depending on local circumstances. For example, labour costs in developing cities are often in the range of 10 percent to 25 percent of total costs. By comparison, labour costs in developed cities can range from 35 percent to 75 percent of total costs.

Table 16.2: Operating cost comparisons for TransMilenio

Cost item	Trunk services	Feeder services
Fuel	24.6%	17.3%
Tires	4.7%	5.2%
Lubricants	1.5%	1.7%
Maintenance	9.0%	10.8%
Wages	14.7%	29.2%
Station services	0.0%	2.6%
Other fixed costs	45.5%	33.2%
Total	100.0%	100.0%

Source: TransMilenio SA

The values presented in Table 16.1 are used to calculate an overall operating cost per kilometre for the system operators. This value is the basis for negotiating the remuneration given to the firms given operating contracts for the public transport services.

The above operating cost figures assume companies with a fleet size in the range of 90 to 160 vehicles. When the fleet size falls below a certain level, the fixed administrative costs per vehicle will tend to increase.

If it is decided that the above operational investments should be paid for from the fare revenue, then the operational cost model will need to take into account the depreciation of the capital asset, the finance charges related to the procurement of the capital asset, the fixed costs related to operations, and the variable costs related to operations.

Table 16.2 compares the relative size of the individual fixed costs and the variable costs for the TransMilenio system. This table compares these costs for both the trunk and feeder services.

16.2 Fare levels

“The price is what you pay; the value is what you receive.”

—Anonymous

The total revenues distributed to the various contracted parties are based on the amounts collected from system’s “technical fare”. The technical fare is equivalent to a flat fare that the system would be required to charge in order to break even. By contrast, the “customer fare” refers to the fare paid by the users of the system. As will be discussed in this section, the technical fare and customer fare are likely to be slightly different values.

16.2.1 Calculating the technical fare

The technical fare represents the actual cost per customer of providing the service. It is the basis for the subsequent distribution of revenues to the operators. It is calculated by simply adding up the full estimated operational costs calculated for the trunk operators, the feeder bus operators, the fare collection company, the trust fund manager, and the administration costs of the BRT authority (if the BRT authority costs are to be included). These operational costs

include both the on-going operational costs and any operational investments that will be the financial responsibility of the private investors, including the depreciation of the vehicle value and financing charges. Equation 16.2 summarises this basic relationship.

Equation 16.2 Basic form of technical fare calculation

$$\text{Technical fare} = \frac{\text{Total BRT system daily operational costs}}{\text{total projected daily passengers}}$$

Equation 16.3 provides a more detailed and expanded calculation of the technical fare.

Equation 16.3 Calculation of technical fare

$$F_T = \frac{\sum \frac{C_{MLi} \times Km_i}{Q_{ST}} + \frac{C_F \times Pas_F}{Q_{ST}} + C_C}{(1 - \%Tr - \%M)}$$

1/PKI **%F**

F_T	Technical Fare
C_{MLi}	Main lane per kilometer of operator i (Trunk Cost)
Km_i	Kilometers covered by the operator i
Q_{ST}	Quantity of Sold tickets
C_F	Feeding cost (per fed passenger)
Pas_F	Quantity of fed passengers
C_C	Collection cost per sold ticket
$\%Tr$	Trust Company Remuneration
$\%M$	Manager Remuneration
1/PKI	Passengers per Kilometer Index
$\%F$	Percentage of fed passengers

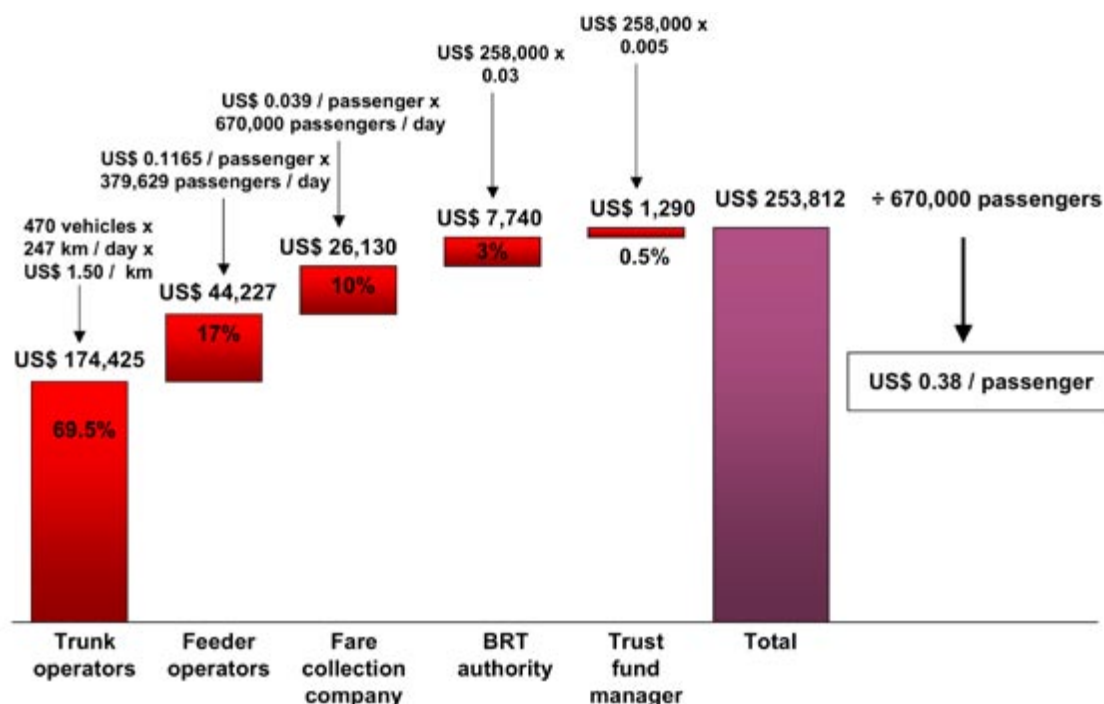
Source: TransMilenio SA

The contracts for the private operating companies are likely to be non-uniform. Some companies will invest only in 90 vehicles, while others will invest in more. In the case of TransMilenio, it was decided that there would be four trunk operating companies in the first phase. The number of vehicles purchased by the four different companies was: 1. 160 vehicles; 2. 120 vehicles; 3. 100 vehicles; and, 4. 90 vehicles. System planners estimated, based on projected demand, that each vehicle would operate roughly 247 kilometres per day, and used this estimate as the basis of the calculation of the technical fare. Contractually, however, the operators were not guaranteed any minimum number of vehicle kilometres per day, or they would not have been exposed to any demand risk. Rather, they were guaranteed 850,000 vehicle kilometres within a 15 year period.

Fig. 16.6

Calculation of technical fare for Phase I of TransMilenio

Source: TransMilenio SA



Original calculations were conducted in Colombian pesos. Assumed exchange rate for this graphic is US\$ 1 = 2,000 pesos

Because the operator is paid per vehicle kilometre, this meant that the cost of trunk operations to TransMilenio was the total number of vehicles times the total number of vehicle kilometres. The actual formula to calculate the technical fare is depicted in Figure 16.6.

The example given in Figure 16.6 is particular to the first phase of the Bogotá TransMilenio system. Each system will have its own cost structure based on the amount of the service that is provided by the trunk line vehicles vis-à-vis the feeder vehicles, the fare collection costs, the negotiated service rates of each component, and the cost of administration. In the case of TransMilenio's Phase I, 69 percent of the cost of operating the entire system resulted from payments to the trunk line operators, but this will be different for each system. This value also changed with the addition of the Phase II corridors in Bogotá.

The technical fare, calculated on a cost plus basis from the overall operating costs of the system, is basis for the distribution of fare revenues. In other words, each component of the TransMilenio system was promised a fixed percentage of the total fare revenues based on the calculation of the technical fare. In this way, these companies became shareholders with a collective stake in maintaining ridership.

16.2.2 Adjustments to the technical fare

A operator concession agreement will typically be in the range of 10 years, the estimated life of a vehicle, though it could be shorter if the vehicles can easily be resold. During that period, many of the input costs can change (e.g., fuel costs, labour costs, etc.). Since the concession agreements stipulate that revenues are paid based on the vehicle-kilometres travelled, both the BRT authority and the operators must be protected against dramatic changes in input cost levels.

The technical fare goes through a process of modification depending on cost swings in both system inputs and operational factors (Table 16.3). Fuel price volatility is one of the most

Table 16.3: Factors affecting changes in the technical fare

Category	Cost item
System inputs	Diesel price; Consumer price index; Minimum wage standard; Producer price indexes (lubricants, tires, maintenance).
Operational factors	Passenger per kilometre index (PKI); Percentage of passengers using feeder services.

significant risks. Spare parts that need to be imported will be subject to currency risk, a major factor in some countries. Base labour costs will vary in step with the local economy. Accurately predicting these cost levels over a long period is a nearly impossible task due to the great number of external influences. Thus, as base cost conditions change for the operators, the technical fare will go through adjustments.

On a periodic basis, such as every two weeks, the technical fare is updated based on the changes in the base factors outlines in Table 16.2. The calculation for the changes in the technical fare is given in Equation 16.4.

Equation 16.4 Calculating changes in the technical fare

$$\Delta F_T = \%C_{ML} \frac{\Delta C_{ML}}{\Delta PKI} + \%C_F(\Delta C_F + \Delta \%F) + \%C_C \Delta C_C - 1$$

where:

ΔF_T = Change in the technical fare
 $\%C_{ML}$ = Proportion of the main lane cost (%)
 ΔC_{ML} = Change in the cost per kilometer (main lane)
 ΔPKI = Change in the Passengers per Kilometer Index (Main lane)
 $\%C_F$ = Proportion of the feeder cost
 ΔC_F = Change in the feeder remuneration, by passenger that use feeding services
 $\Delta \%F$ = Change in the percentage of passengers that use feeding services
 $\%C_C$ = Proportion of the collection cost
 ΔC_C = Change in the collection cost

16.2.3 Customer fare and contingency fund

As noted above, the “customer fare” is the payment required by the customer for a single trip on the system. Unfortunately, costs tend to rise over time, implying that fares must also rise. For reasons of customer clarity as well as political considerations, the fare paid by the customer should not be changed frequently, perhaps no more than once or twice per year. Customers would be quite confused and angry if the fare changed every time world fuel prices changed. Further, raising customer fares can have a range of social equity impacts that must always be considered. If a public transport company needs to obtain political approval for each fare increase, then the adjustments may never happen. In turn, the entire system will eventually become financially untenable.

To overcome such an inherent stalemate, the system for fare adjustments should be relatively

automatic in nature based upon contractual obligations linked to key trigger points. TransMilenio has worked out a mechanism for adjusting the fare automatically to such changes. In the case of Bogotá, all operating costs are calculated on a bi-weekly basis. If a particular trigger point is reached (such as the technical fare exceeding the customer fare), then a fare adjustment is authorised by the municipality. The Mayor and other political officials are still involved in the authorisation through the public company’s board of directors, but the stipulation of a fare adjustment is reached through the operating cost calculation.

However, at the same time, some political discretion is required. As noted, fare level changes should not be frequent events.

Also, it is probably sensible to establish fare levels that are round numbers in order to coincide with denominations of the local currency. For example, a fare of US\$0.375 is not a possibility. Further, a fare level that requires handling many small coins means that both fare collection and fiduciary handling of the revenues will be slowed down. This inefficiency will in effect increase costs even more. Thus, fare levels should only increase at prescribed trigger points,

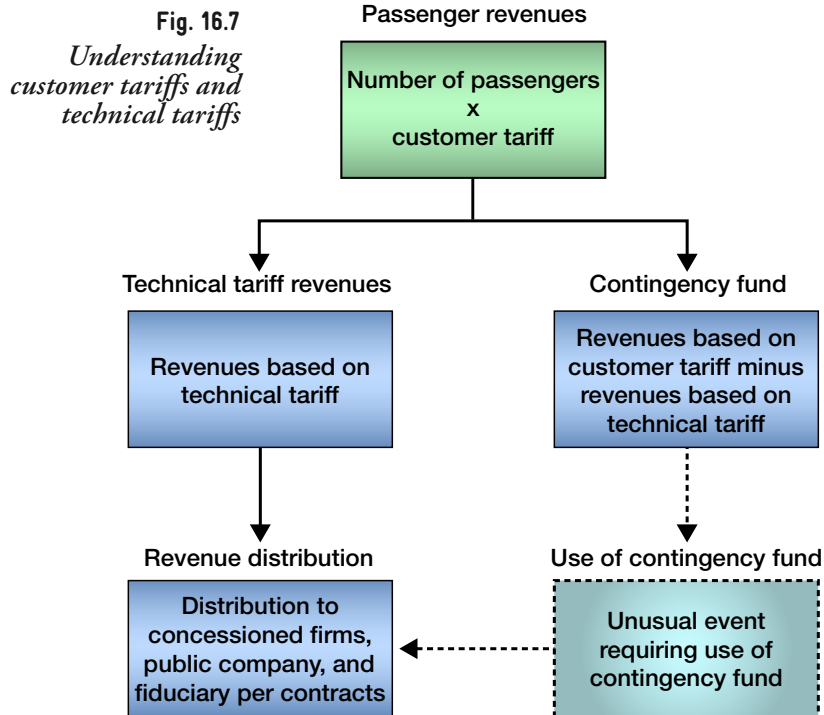
and the increase should be significant enough so that no further increases will be likely over the short term. A fare adjustment system should be ideally designed so that increases do not occur more than once or twice per year.

If unusual events occur (e.g., hyper-inflation) that require frequent adjustments, a contingency fund should be in place to bridge revenue short-falls. The contingency fund thus provides a buffer that allows the system management company to stabilise fare levels even in turbulent times. It is this need for some buffer against unexpected contingencies that led to the development of a contingency fund in the case of TransMilenio. The difference between the technical fare in Bogotá and the customer fare is simply that an additional charge has been created to pay into a contingency fund (Equation 16.5).

Equation 16.5 Relationship between customer fare, technical fare and contingency fund

$$\text{Customer fare} = \text{Technical fare} + \text{Contingency fund payment}$$

Figure 16.7 graphically shows the relationship between the customer fare and the technical fare. In general, the customer fare should be slightly greater than the technical fare, and this difference is deposited into the contingency fund.



The contingency fund is designed to handle unexpected events such as unusual low levels of service demand, extended hours of operation, terrorism and vandalism, and problems associated with hyperinflation. In general, the

customer fare will be greater than the technical fare, and thus the contingency fund will build up a positive balance. When unforeseen circumstances occur and the technical fare exceeds the customer fare, then proceeds from the contingency fund will be drawn upon for a temporary period. The contingency fund effectively acts as a safety net in times of unusual cost fluctuations. As the contingency fund becomes exhausted, the board of directors of the system will have to act in order to avoid a financial crisis.

The standard remedy would be to raise the customer fare to a point securely above the technical fare. The operation of the contingency fund provides a level of security and confidence to the operators as well as any outside funding entities to the system.

Figure 16.8 tracks the technical fare and the customer fare in the TransMilenio system. As expected, the customer fare is generally greater than the technical fare. As the technical fare has increased with time, the customer fare has also increased in order to maintain a comfortable margin. The graphic also demonstrates the difference in fluctuations between each fare type. The customer fare only increases in discrete amounts since these represent points of actual fare increases to the customer. By contrast, the technical fare will likely vary to some degree each month, as the constituent cost categories will change with economic conditions and input prices.

16.3 Revenue distribution

"In the end it's a revenue stream. And all revenue streams eventually reach the sea."

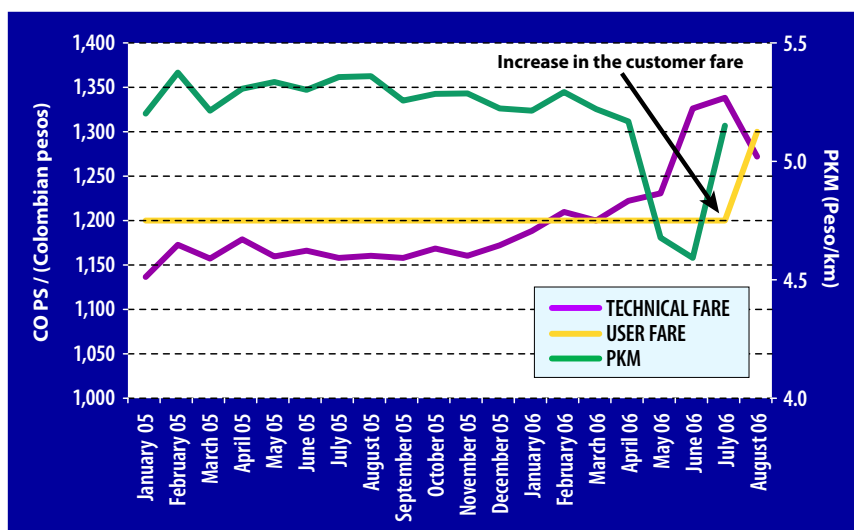
—Paul Schrader, screenwriter and film director, 1946–

The distribution of revenues is another process which will greatly influence the behaviour of the system operators. Distributing revenues on a basis of the number of passengers or on a basis of kilometres travelled will affect behaviour in different ways.

Fig. 16.8

Changes in the technical and customer fares for the TransMilenio system. When the technical fare exceeds the customer fare for any substantial length of time, an increase in the customer fare is likely to be required.

Graphic courtesy of TransMilenio SA



Traditionally, the handling of fare revenues in a developing-city public transport system is a rather opaque process. Portions of the fares may be kept by conductors or drivers with understood amounts being handed over to owners. There also may be payments to police or other official entities. As such, this process does not lend itself to a transparent business model in which the public interest is carefully weighed. This process also inherently rewards drivers to maximise the number of passengers they collect during the day. With the incentive of maximising passengers, drivers then work in a manner that can conflict with public safety and rider comfort.

The transparent and fair distribution of revenues is fundamental to operating a network of integrated transit providers. If operators do not have confidence in the distribution of revenues, then their behaviour will revert to self-interested actions that undermine customer satisfaction. The most important elements in a transparent system for revenue distribution are:

1. A business and institutional structure that provides for an independent fare collection system;
2. Checks and balances in place to verify revenues at different stages of process;
3. Revenues distributed based upon a clear set of rules and procedures;
4. An independent auditing system.

16.3.1 Revenue flows

Determining how the fare revenue is handled, and according to what guidelines the revenues are split, can determine the success or failure in a BRT system. There are many options, but generally, it is best to have an entity independent from the bus operating companies running the fare collection and distribution process.

The independent entity that collects the fare revenue could be the BRT authority itself, or it could be a private firm contracted out by the regulatory agency. An independent entity, acting as a custodian of the revenues, is preferable to having the bus companies collect fare revenues directly.

The reasons for taking revenue collection away from the bus companies is to facilitate the free integration of bus routes and lines among different BRT corridors without leading to conflicts between bus companies, and in order for the public sector to retain control over the information about the profitability of the system. Alleviating bus operators of the responsibility to collect fares also reduces system delays due to on-board fare collection, and reduces the likelihood of misappropriation of the revenues. The distribution of revenues should follow a clear set of rules based on contracts.

Figure 16.9 outlines the general process of revenue flows in Bogotá. The fare collection and

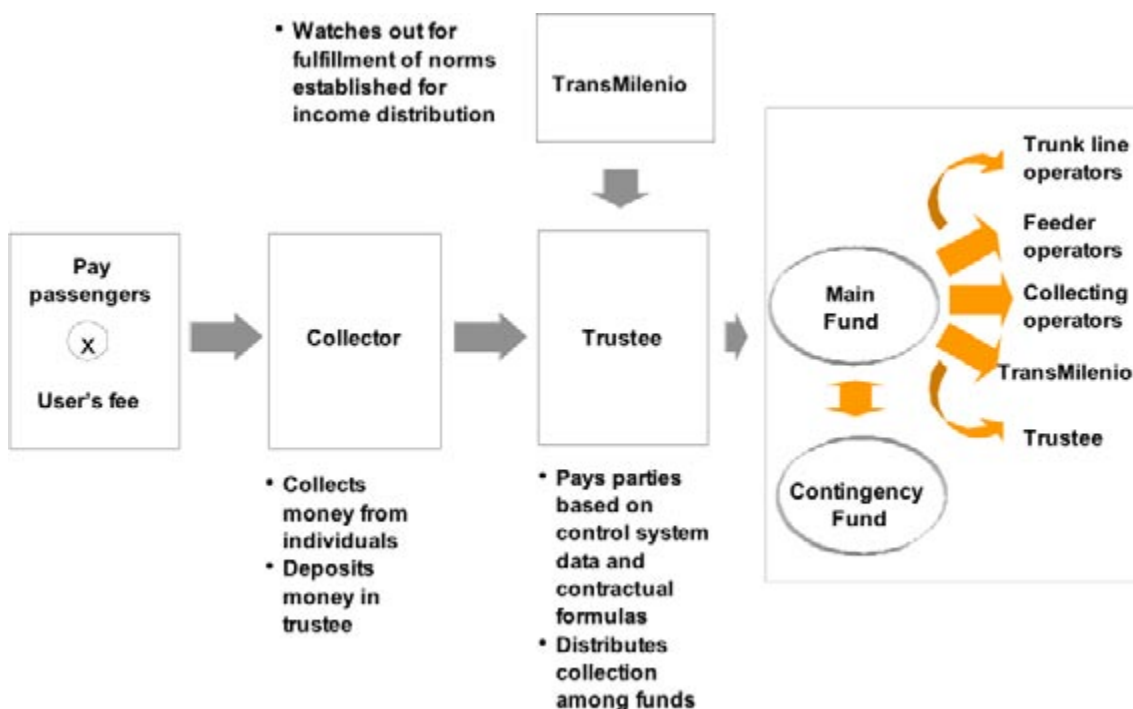


Fig. 16.9
*Flow of fare
revenues through
distribution process*

fare verification system is managed by a separate private company that successfully bid for the fare collection concession. The fare collection company has no involvement with any of the bus operating companies on the BRT system. In the case of Bogotá, this company agreed to procure the fare system equipment and operate it for a flat percentage of the fare revenue, approximately 9 percent. This amount was based on the calculation of the cost of this operation plus a reasonable rate of return. Most experts believe that this calculation was wrong and that the share for the fare collection system should have been lower, around 5 percent. Further, many systems may find it advantageous to capitalise the fare equipment rather than recoup these costs through the fare revenues. By capitalising fare equipment, there is less pressure on the required fare level.

In Bogotá, the fare system operator does not actually distribute the revenues to the operating companies. Since the fare collection company itself is due part of the proceeds, it would be a source of potential suspicion if the fare collection company was to fulfil this function. Instead, an independent fiduciary company (normally a bank) who manages the trust fund is the depository of the actual fares. Thus, the fare system operator collects the fare revenue and deposits it into the account of the trust fund manager. The trust fund manager first keeps their contractually determined 0.4 percent of the total revenues. At this stage, the BRT authority (TransMilenio) then tells the trust fund manager to pay the various operators based on their contractual agreements.

16.3.2 Revenue verification

In systems such as Bogotá where smart card fare systems are utilised, the data from the electronic system can act as a verification of the revenues collected. The revenues from a particular station or terminal should match the electronic records of the passengers entering the system. In the case of TransMilenio, the electronic records are actually independently verified in two locations. The electronic data is downloaded to mainframe computers at both the fare collection company and the public management company (Figure 16.10). This sort of electronic verification is an effective mechanism in building the confidence level of all parties in the fare collection system.

The electronic verification process requires a robust technological architectural design and the security levels that offer the require trust by the operators. Figure 16.11 describes the TransMilenio Technological Design Architecture. Under this architecture, a customer's entrance and payment into the system is recorded by the fare reader at the station. This information is downloaded to both the main computer of the oversight agency of the public transport company as well as the fare collection company. This information is also transparently available for review by the operating companies. Secure transmission lines help to ensure the integrity of the system. Additionally, a back office maintenance computer will oversee the data flows to guard against any problems.

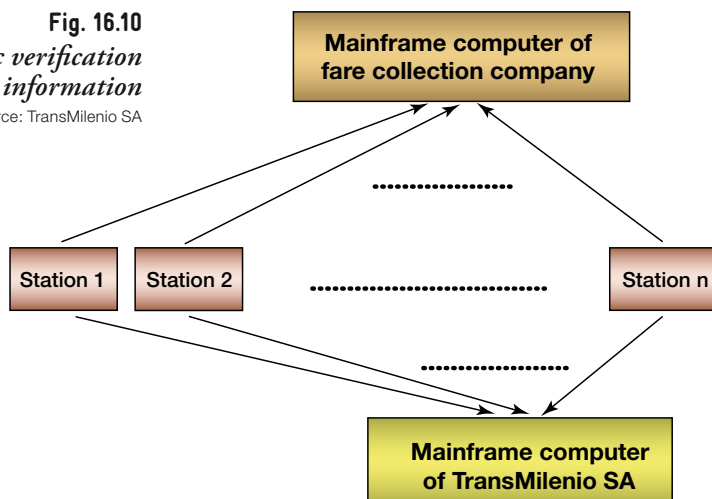
This type of information recording on fare transactions is most easily captured when systems are utilising smart card or magnetic strip type payment mediums. However, revenue verification can also be accomplished when non-electronic payment mediums (*e.g.*, paper, coins, tokens) are being utilised.

16.3.3 Revenue distribution process

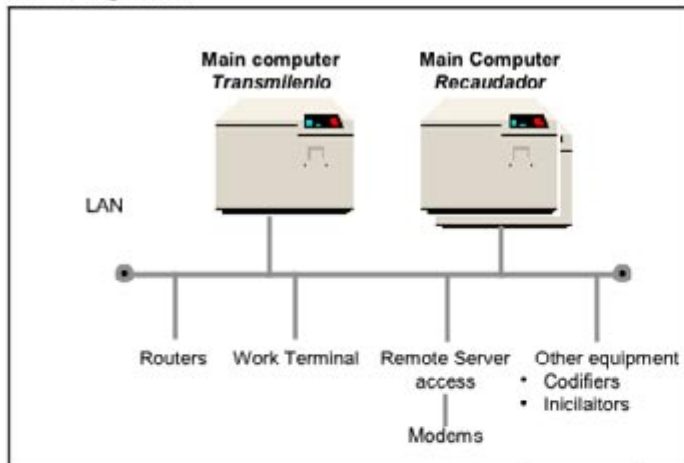
As revenues are collected into the system, a defined set of procedures then distributes these revenues based on the pre-arranged contracts. The distribution of revenues is based upon the technical fare and not the customer fare. As noted above, any surplus from the customer fare is allocated to the contingency fund.

Currently for TransMilenio, most of the revenues are distributed to the private bus operators

Fig. 16.10
*Electronic verification
of fare information*
Source: TransMilenio SA



Processing center

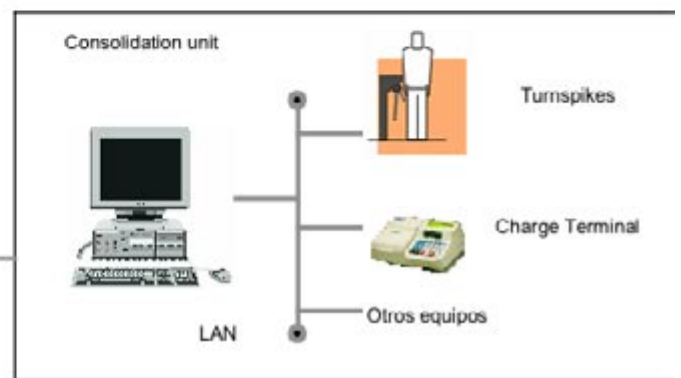

Fig. 16.11
Technological architecture

Source: Transmilenio

Maintenance



Bus stations

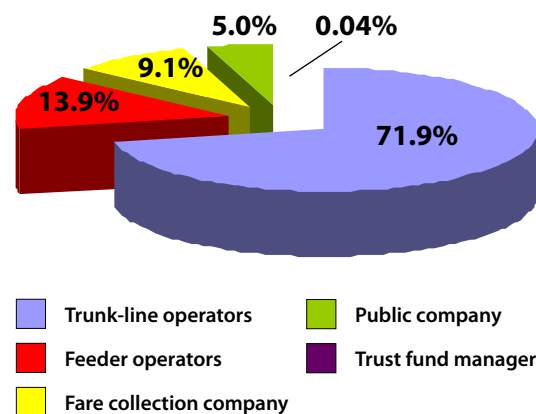


who are providing either trunk line services (71.9 percent of revenues) or feeder services (13.9 percent of revenues). The percentage going to TransMilenio, the fare collection company and the trust fund manager are all a fixed percentage of the total fare revenue. The company with the concession for the fare collection currently receives 9.1 percent of the technical tariff revenues. TransMilenio SA, the public company with overall management responsibility for the system, received initially a flat 3 percent, but with the high profitability, this was increased to 5 percent. Finally, the fiduciary company, called the Trust Fund Manager, retains 0.04 percent of the technical fare revenues. Figure 16.12 illustrates this distribution.

The trunk and feeder bus operators only receive a fixed percentage of the total revenue collectively. As individual firms, their percentage of the take is adjusted based on how many kilometres of service they actually provided, and this is adjusted as a form of reward and penalty for good or bad service, as has been discussed previously.

The categories of “trunk-line operators” and “feeder operators” actually consist of many different private firms. Thus, there is a further distribution process to divide these shares to each of the participating operating companies.

As noted earlier, the trunk-line operators are compensated strictly upon the number of kilometres travelled and any adjustments based upon performance. The number of kilometres each operating company is assigned is negotiated beforehand amongst all the interested


Fig. 16.12
Distribution of
system revenues from
TransMilenio

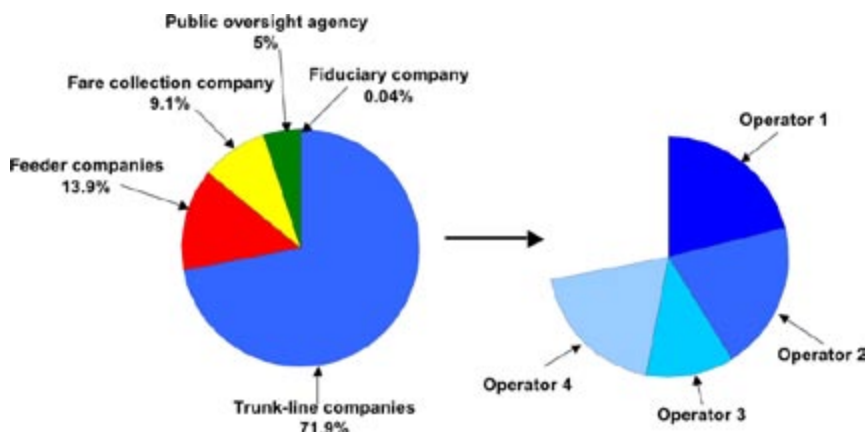


Fig. 16.13
*Distribution of
revenues to trunk-
line operators*

parties. The revenue distribution process to the trunk-line operators looks something like the process shown in Figure 16.13.

The basis for revenue distribution to feeder services is somewhat different than the trunk-line operators. On the trunk-line corridors, the activities of the operators are relatively controlled, due to the fixed nature of busways and the control centre oversight. Driver infractions such as not stopping at a station are readily observable as they are on the trunk lines. However, feeder services are less easily monitored and controlled. Thus, the revenue distribution system must account for any misplaced incentives.

For example, if the feeder services are compensated exclusively based on kilometres travelled, then the feeder operators have an incentive to drive as quickly as possible without picking up any passengers. Conversely, if the feeder operators are compensated exclusively on the number of passengers, then the operators will not operate during non-peak periods. Also, when the compensation is exclusively based on passenger numbers, the feeder operators are exposed to considerable demand risk. Thus, in some cases, the right incentive package for feeder operators may be compensation based upon both the number of kilometres travelled and the number of passengers carried. In this scenario, the operators have an incentive to both provide services across the daily schedule and to cater to passenger needs. In both Bogotá and Quito, feeder services were originally compensated only by the number of passengers served. However, both of these cities have now switched to a combined incentive scheme (distance travelled and passengers served) in order to improve feeder performance.

In reality, there is no reason why feeder movements cannot be controlled to the same degree as trunk line operations, using automatic vehicle location (AVL) technology to track movements. Regular auditing of feeder operations could be utilised to ensure that station stops are being respected. GPS-monitoring of feeder vehicles is also useful in terms of ensuring efficient spacing between the vehicles. Ultimately, the objective should be to create the same levels of customer service with feeder operations as there is on the trunk lines. Placing all efforts on the trunk lines and leaving feeder operations to their own devices will diminish the overall image of the system.

16.3.4 Auditing the process

The entire revenue collection and distribution process should be independently audited by a professional auditing firm. The selected firm should have no relation whatsoever with any of the other companies in the system (e.g., trunk operating companies, feeder operating companies, fare collection company, trust fund manager). This auditing process will especially check upon the handling of revenues by the fare collection company and the trust fund manager.

The auditing process in conjunction with the electronic verification of fares collected, as well as the presence of the trust fund manager, all help contribute to an environment of confidence in the system. Without such a rigorous and transparent process, operators would be less trustful of the system and less willing to act in a manner supporting the common good.

16.4 Fare policy

“The mere formulation of a problem is far more often essential than its solution, which may be merely a matter of mathematical or experimental skill. To raise new questions, new possibilities, to regard old problems from a new angle requires creative imagination and marks real advances.”

—Albert Einstein, physicist, 1879–1955

The fare policy will be as important to the long term sustainability of the system as the operating contracts and the business structure. If the BRT system is set up with a great business structure, but the government fixes the fare so low that the system does not generate enough

revenue to maintain its operating costs, the system is likely to collapse over time. If the fare is not allowed to rise with a sudden increase in fuel prices, then the profitability of the entire system can be jeopardized.

On the other hand, the fare is highly political, and if the fare price rises suddenly and sharply, it could have very serious consequences for low-income users and their employment. Because of these potential ramifications, fares are politically very sensitive. A bad policy can either undermine the long-term viability of the system on the one hand, or lead to social turmoil on the other. Fortunately, the efficiency of a good BRT system generally makes it possible to maintain low fares while still keeping the system profitable.

Now that the system's costs have been estimated, system planners have a rough idea of the technical fare. The technical fare as explained above will tell the system planners how much they need to charge for the system to break even. This initial measurement of the technical fare, however, was based on the assumption of a flat fare per passenger.

While the technical fare will be the starting point for deciding on the ultimate fare structure, the optimal customer fare level and structure now needs to be evaluated. A technical fare based entirely on costs could be higher than passengers are willing to pay. Actual system profits might increase rather than decrease if the customer fare is lowered below the technical fare, if passengers are highly sensitive to price changes.

The optimal fare structure will therefore depend on how sensitive public transport passengers are to changes in fare prices, or the *elasticity of demand*. Making a BRT system self-financing requires not only that the customer fare be high enough to cover operating costs, but it also requires that the customer fare be low enough to attract large numbers of passengers and therefore maximise revenues.

The next step, therefore, is to determine the optimal customer fare level and the optimal fare structure from the point of view of profit, customer convenience, and ridership.

Once the optimal fare level and structure is determined, it must be compared to the technical fare. If the optimal customer fare is much lower

than the technical fare, then the system design will have to be modified to the point where the technical fare and the optimal fare are the same. Only then should the fare system technology be selected and the business plan finalized.

As has been suggested, setting the fare level requires analysing two different values:

- The technical fare, or the fare needed for full cost recovery;
- The optimal customer fare, or the fare that maximises the system's profits.

Ideally, the business and operational model of the BRT system should bring the technical fare as close to the optimal customer fare as possible.

16.4.1 Cost recovery

The first decision that needs to be made regarding the basic fare level is how the fare revenues should relate to the system's operating costs. While normal bus systems operate in mixed traffic congestion, and hence face escalating operating costs beyond their control, BRT systems have been specifically designed to prevent congestion from cutting into the profitability of the system. In fact, a new BRT system can increase system cost efficiency through several factors (Table 16.4).

For this reason, BRT systems can generally avoid the need for government subsidised services, and all the management problems that result from subsidised systems. It is generally recommended that in developing countries the BRT fare be set at a level high enough to cover

Table 16.4: Efficiency gains through BRT

Category	Cost-saving component
Operations	Exclusive busway operation instead of mixed traffic lanes; Centralised control to optimise performance; Priority measures at intersections; Defined station locations that are often farther spaced than informal stops; Coordinated and integrated system permitting free transfers between routes and corridors (network effect).
Economies of scale in procurement	Vehicle purchasing; Fare equipment purchasing; Fuel purchasing; Maintenance.
Additional ridership	Higher-quality service attracting former car users

the system's operational costs, including if possible the cost of depreciation of the vehicles.

Thus, the starting point for considering customer fare levels is an analysis of operational costs (see previous section). In other words, *the customer fare should be set above the technical fare.*

With so many competing needs for public financing in developing-nation cities, from education to clean water to health care and sanitation, there is rarely a good justification for subsidising a transportation system that has already been given privileged access to the road infrastructure. By avoiding subsidies, the city is also avoiding the complexity and added costs of managing a subsidy scheme. The appearance of subsidies also tends to undermine political support for the system and resentment among non-users, making the sustainability of the system highly vulnerable.

Of course, affordability is also a primary consideration. Not all BRT systems are as well designed as TransMilenio, and not all of them can reach cost recovery no matter how high the customer fare is set. If a customer fare based on the technical fare is too high, it will alienate passengers, and this situation will not help increase system profits. The elasticity of demand for low-income public transport users can be quite high.

Furthermore, a very high customer fare would consume a large percentage of the daily income of low-income citizens, undermining the social development objectives of the BRT system that were its original impetus. If the fare is too high, unemployment can result.

It is therefore imperative that the system be redesigned to the point where it is inherently profitable from the beginning.

It should be noted that in most societies, governments reserve the right to provide discounts to certain categories of users, like school children and the elderly, and the very poor. These discounts need not constitute a threat to the sustainability of the BRT system so long as the BRT authority is protected from such political decisions by a contractual obligation. If the government decides to mandate a lower fare or categorical discounts, then it should compensate the BRT authority for the losses incurred.

Even in the case of TransMilenio, which is one of the most profitable systems in the world, the municipality reserved the option to subsidise the fare. The government has the right to require a lower fare than the technical fare, so long as it compensates TransMilenio for the losses incurred. To date, this option has never been exercised.

Thus, the initial basis of the fare should be the cost of providing the service, or the technical fare. Even if government subsidies cannot be avoided, they should be treated as fee for service contracts with other government agencies that have no impact on the general fare, and no adverse impact on the financial stability of the BRT system as a whole.

Prior to determining if the system requires an operational subsidy, however, additional options should first be considered.

16.4.2 Optimal customer fare

As a first step to determining an optimal fare structure, the projected impact of different flat

Table 16.5: Flat fare demand and profit analysis for TransJakarta

Fare level (Rp)	Demand (paying passengers)	Collected revenue (US\$)	Vehicle-km travelled	Operating cost (US\$)	Profit (US\$)	Peak frequency (buses/h)
Rp 2,000	11,523	\$3,201	2,732 km	\$1,973	\$1,228	40
Rp 2,200	14,634	\$3,577	3,248 km	\$2,346	\$1,231	52
Rp 2,100	16,511	\$3,853	3,618 km	\$2,613	\$1,239	56
Rp 2,000	18,191	\$4,042	3,955 km	\$2,857	\$1,186	63
Rp 1,800	21,640	\$4,328	4,516 km	\$3,262	\$1,066	69
Rp 1,600	25,172	\$4,475	5,153 km	\$3,722	\$753	77
Rp 1,400	28,759	\$4,474	5,671 km	\$4,096	\$378	86
Rp 1,300	30,445	\$4,398	5,842 km	\$4,219	\$178	89

Source: ITDP

fares on total system profitability should be analysed. Even if the system may eventually utilise a distance-based fare, a flat fare analysis should be the initial basis of the calculations. This choice greatly simplifies the analysis.

If a traffic demand model was used to generate the original demand estimate, it should be possible to derive the elasticity of demand from the model. If not, the impact of the projected technical fare on demand can be estimated by simply assuming that elasticity is 1, or that a 10 percent increase in the fare price will lead to a 10 percent decrease in ridership. Local experience with the impact that fare price increases had on ridership in the past would be a better guide to base an elasticity estimate. In the case of the modelling done for TransMilenio, it was initially assumed that elasticity was 1.

By way of example, when advising the DKI Jakarta government on an appropriate fare for TransJakarta, it was determined that the optimal customer fare from the point of view of maximising operating profit was Rp 2,100 (US\$0.25), which is the yellow highlighted figure in Table 16.5. The optimal customer fare from the point of view of maximising operating revenue was around Rp 1,500 (US\$0.20), which is the green highlighted area of Table 16.5.

However, when the other operating costs (vehicle depreciation and fare system operation and equipment) were added (*i.e.*, when calculating the “technical fare”), the system was found to require a fare of Rp 2,700 to break even. At that fare, the system cannot make a profit because it would lose too much ridership. In other words, there was no way to make the system financially self sufficient in Phase I without changing the operational plan. In this case, the lack of feeder services and failure to cut parallel bus routes was needlessly depressing demand, and poorly negotiated operating contracts with private operators were artificially inflating the bus operating costs. Ultimately the system opened with a Rp 2,500 fare, and in Phase I operations had to be subsidized. Rather than immediately deciding the system needs to be subsidised, the system designers should first try to correct these operational problems.

In the case of Bogotá, the technical fare for the BRT system was approximately US\$0.40, and

the fare for the previous bus services was in the range of US\$0.30 to US\$0.35. Demand analysis showed, however, that the technical fare was close to the optimal customer fare from a profit perspective. This was in large measure because the government had previously regulated the fare at a very low level. This low level was both cause and effect of a lower quality of service, and very low profit margins for the bus operators did not allow them to invest in new vehicles.

Therefore, one year prior to opening TransMilenio, the city permitted the existing operators to increase their fares to above the technical fare of the BRT system. While the population was not entirely pleased with the increases, in general, any displeasure was directed at the private operators and not the municipality. Thus, when TransMilenio was finally introduced into operation, the cost was approximately the same as the existing services.

In other cases, such as Quito, the BRT service was introduced at a slight premium to the existing services. However, the vast difference in quality between the new system and the previous older buses meant that the public was supportive of the new system.

16.5 Fare system options

“Technology presumes there's just one right way to do things and there never is.”

—Robert M. Pirsig, philosopher, 1928

In developing an effective fare system, there are many structural options that must be considered. These different options will affect overall system profitability as well as the social equity of the fares. The topics covered in this section include:

- Fare structure (free fares, flat fares, zonal fares, distance-based fares, time-based fares);
- Fare discounts (multi-trip discounts, inter-system transfers, categorical discounts);
- Fare options for feeder services.

Once these basic structural decisions are made, then a recalculation of the system's profitability should be undertaken. An iterative process may follow in which various structural options are tested for their impacts on overall system profitability. As with many aspects of BRT planning, there are inherent trade-offs that must be considered when weighing system profitability

against design. These trade-offs will likely affect issues such as customer convenience and social equity.

16.5.1 Fare structure

As noted in Chapter 12 (*Technology*), system planners have a range of fare structure options. There are at least five different options for structuring the fare system:

1. Free fares;
2. Flat fares;
3. Zonal fares;
4. Distance-based fares;
5. Time-based fares.

These fare structures are not always mutually exclusive. For example, a time-based fare is usually combined with one of the other fare structures. Also, a different fare structure may be used for the trunk services than for the feeder services. For example, some systems utilise a free fare structure for the feeder vehicles while a flat fare or distance-based fare may be used for the trunk services.

16.5.1.1 Free fares

A relatively new approach to public transport fares is to eliminate the fares altogether. As the name implies, free fare systems involve charging nothing for public transport use. Some public transport systems in Belgium have realised that their fare collection process is actually so costly that it makes sense just to provide a free service. By eliminating the fare charges for public

transport, there is no need for fare collection and fare verification equipment, no staffing requirements for fare operations, no smart cards or other payment mediums, and no customer wait times for fare purchases.

Further, the design of vehicle interiors and stations is void of the requirements from the fare system. For the vehicle interiors, there is much more space for seating. The implications for station design means that an open rather than closed design can be utilised. An open design means that there is less visual and physical severance from the station (Figure 16.14). These types of stations are also less costly to construct.

Of course, the main benefit from fare-free systems is the impact on passenger numbers. In Hasselt (Belgium), bus patronage jumped from 23,000 passengers per month to 300,000 passengers per month with the introduction of fare-free service. About 25 percent of private vehicle users have switched to public transport since the implementation of this scheme. Likewise, urban rail fares have also been eliminated in certain areas of Belgium.

The basis of the decision in Belgium was the fact that approximately 60 percent of the system's revenues were being used to print, distribute, and inspect fares. If other externality costs, such as impacts on station design and customer wait times, are considered, then the case for fare-free travel will be even stronger.

Fare free systems have become increasingly common in both Europe and North America. In the US, cities such as Denver, Miami, and Orlando have some services that operate fare free (Figures 16.15).

The development of a fare-free system does not mean that the overall business structure must radically change. Private operators can still bid competitively for providing the services. Payment to the operators can still be based on the number of kilometres travelled. The only change is the origin of the revenue stream, which instead of being from the customers will be from other sources such as road pricing, petrol taxes, and parking fees. For example, Orlando pays entirely for its Lymmo service through a parking fee.

In the case of developing-nation cities, there is likely to be less of a case for a free fare system,

Fig. 16.14
The Orlando Lymmo system charges no fare, and thus the station designers had considerably more freedom to create an intriguing and open design.

Photo by Lloyd Wright



principally because the cost of fare collection will likely be less. With lower labour rates, there will be fewer instances in developing-nation cities where the costs of fare collection begin to approach the revenues gained, and thus justifying the elimination of fares.

However, there are examples of cities such as Bogotá utilising free fare structures for feeder services. Since feeder services will typically operate with open rather than closed station environments, any fare collection will likely have to occur on-board the vehicles. This arrangement implies that fare readers are required at the doorways. An exit reader may also be required if the transition from the feeder service to the trunk service passes through an open area. All this on-board fare equipment means that the vehicle costs are considerably higher. Additionally, on-board fare collection and verification may also imply a required intervention from the driver (such as providing change) that will slow dwell times and overall travel times. For all these reasons, free fare systems have a fairly wide applicability to feeder services in both developed and developing nations.

The main arguments against free fare systems relate to financial viability, security, and economic principle. First, for many developing-nation cities, the spectre of attempting to secure system financing from other sources besides fares may be limited. In most cases, though, the growth in private motorised vehicles does provide significant scope for using some form of vehicle fees as a revenue source.

Second, some cities fear that their public transport systems will become over-run with homeless persons and others seeking to commit crime. It is true that, in general, open station designs can tend to encourage loitering (Figure 16.16). However, this situation can be true of any public space, such as sidewalks and public parks, and no one would suggest eliminating these aspects of the city environment. Further, there are a number of enforcement techniques that can be utilised to discourage sleeping or loitering within the system.

Third, some argue against free fares on the economic principle that free goods always lead to market inefficiencies. If a product is not priced, it simply will not be valued by the public and



Fig. 16.15

The Miami People Mover is a free city centre circulator.

Photo by Lloyd Wright

thus the public transport system will be seen as an inferior good. Again, though, one could extend this argument to many other aspects of public space such as footpaths, public parks, and even city streets. Few persons would suggest charging pedestrians for using a footpath or families for using a park. In the same way, public transport could also be viewed as an essential public good that should not be burdened with a fee.

In some countries such as South Africa, though, the government has worked hard to overcome a culture of non-payment for services. During the Apartheid years, the non-payment of public services, such as water and electricity, was equated as a protest against the ruling bodies. Since the end of Apartheid, though, the culture has unfortunately continued, creating hardship for municipalities attempting to reach financial sustainability. In such cases, there may be resistance

Fig. 16.16

A man uses the city centre terminal platform of the Porto Alegre system as a place to sleep.

Photo by Toni Lindau



to introducing another free public good that may only further the culture of non-payment.

16.5.1.2 Flat fares versus distance-based fares

Many cities often debate whether to apply a flat fare or a distance-based fare. A flat fare means that a single price applies to any trip within the system. By contrast, a distance-based fare means that the fare level varies by the number of kilometres travelled.

Each of these options involves a different set of trade-offs. Flat fares can be equitable if low income groups tend to take long trips and reside at the urban fringe. These peri-urban areas offer property at substantially lower costs than central areas. The long distances between the peri-urban communities and employment opportunities in the city can inhibit access to jobs, health care, and education. If a distance-based fare was implemented in such a situation, the poor at the urban fringe would end up paying the highest transport costs. In order to achieve greater social equity, a flat fare helps to give such low-income groups access to city centre services and opportunities. In such instances, a flat fare acts as a cross-subsidy from higher-income residents in the central parts of the city to lower-income residents located in peri-urban areas. One of the principal reasons that Bogotá instituted a flat fare was to promote a greater

sense of social equity within its public transport system (Figure 16.17).

As TransMilenio's system has expanded, however, the average trip distance within the system is increasing, as is the cost of providing each trip. This trend is putting upward pressure on the base fare.

A flat fare also permits the use of simpler fare collection technologies. Ticket-less options, such as coin-based machines, are possible with a flat fare. Further, a flat fare implies that no distance verification step is required upon exiting the system. The lack of this verification step reduces queues and thus improves overall system efficiency. In general, a flat fare scheme reduces the level of complexity in fare collection by an order of magnitude.

Distance-based fare systems are utilised quite frequently in developed nations as well as some rail systems in developing cities, such as the SkyTrain in Bangkok (Thailand) and the Metro in Delhi (India). Distance-based fare structures most closely mirror actual operating costs and thus provide a truer measure of expenses for system operators. A longer journey implies that more fuel and labour is required. Thus, distance-based systems do not involve the implied cross-subsidy that exists in flat fare systems.

While the fare should be high enough to cover the cost of providing the service, it may be the case that a distance-based fare will get the planned system closer to full cost recovery than a flat fare. So long as the fare revenue is higher than the cost of operating the system, the fare can also vary based on trip distance. More complex fare structures offer the possibility of optimising the profitability and equity of the system, and hence should be investigated before finalising the business plan.

The principal disadvantage of complex fare systems, such as distance-based fares, is the added cost of collecting and verifying the fares. Unless an honour system is utilised, more sophisticated readers and payment mediums are required, which will be more costly. Also, such fare systems naturally involve more customer queuing, especially since the payment medium must also be swiped upon exiting the system. Customer confusion can occur over the actual cost of a given trip. In order to indicate

Fig. 16.17
Bogotá chose a flat fare structure in part to achieve greater social equity for low-income communities located at the periphery of the city.

Photo courtesy of Oscar Díaz and Por el País que Queremos (PPQ)



the system fare structure, typically a complex matrix of fares must be posted at the stations. Customers may enter the system without knowing exactly how much their trip will cost. In turn, the result may be that a customer arrives at a destination without sufficient funds in their fare card. This situation at least implies the need for a fare adjustment machine at the exit area (Figure 16.18). It may also imply that customers may be liable for penalties and fines, which will stir customer anger and/or embarrassment. Such incidents can be quite effective in discouraging future use of the system.

The complexity also means that more things can go wrong with the system, adding to maintenance costs and potential system shut-downs. In the case of cities such as Jakarta, the complexity of the fare system meant that it did not work properly for the first year of operation.

It is also possible to have a mix of both flat fares and distance-based fares. The base fare can be set quite high and the additional distance-based fee can be set quite low relative to the overall fare price. Alternatively, a flat fare may be utilised within a well-defined urban area while journeys extending to regional locations, such as other municipalities, can require an additional charge. A mixed fare system can be appropriate when a metropolitan area includes satellite commuter cities. If such cities are predominantly middle- or higher-income in nature, then the justification for cross-subsidies are less. For example, the busways in São Paulo (Brazil) charge a flat fare in central areas but revert to a distance-based scheme for continuing onto satellite destinations. The fare collection system in such instances may require greater sophistication, such as smart cards. Alternatively, the point between flat fare and distance-based fares may be realised at terminal sites where it is necessary to transfer between vehicles. At this stage, the transfer between vehicles can require an additional payment.

Before deciding on a flat fare, it is worth testing the impact of different fare structures on total system profits. Different fare structures can have widely different impacts on ridership under different conditions.

For example, on the first corridor of the TransJakarta system there are a lot of passengers



going very short distances, as it is a major shopping area, and people are going from shop to shop. TransJakarta, which adopted a flat fare system, loses a lot of passengers because there are minibuses that offer a competing service at a price below the fare for TransJakarta. For short distance trips, customers tend to use the minibuses, but for longer trips, where the time savings becomes a major issue, passengers tend to use TransJakarta. These short trips on the corridor, however, are generally a highly profitable sort of trip to serve.

On the other hand, on corridors 2 and 3, most passengers were making a very long trip from the periphery to the city centre. On these corridors, the flat fare structure gives TransJakarta a competitive advantage over other commercial operators who charged a zone-based fare. This flat fare also attracted a lot of ridership from low-income residents who live at the city's periphery and who are highly price sensitive.

Therefore, TransJakarta wished to test the impact of a distance-based fare on profit. Table 16.6 shows the results of this analysis. These results clearly show that shifting to a fare structure with a reasonably high minimum fare combined with a distance based fare would yield substantially more profit than a flat fare system. Figure 16.19 highlights the amount of ridership that each of the different fare strategies would generate.

Fig. 16.18
A fare adjustment machine at the exit of the urban rail system in Tokyo.

Photo by Lloyd Wright

Table 16.6: Comparing different fare structures on TransJakarta

Option	Base fare (Rp)	Variable portion of fare (Rp/km)	Demand (paying passen.)	Collected fare (US\$)	Average distance (km)	Operating cost (US\$)	Profit (US\$)	Max. peak frequency (buses/h)
Flat fare	Rp 2,500	0 Rp/km	11,523	\$3,201	13.47 km	\$1,973	\$1,228	40
Variable fare 1	Rp 1,500	70 Rp/km	13,653	\$3,283	9.87 km	\$1,927	\$1,356	46
Variable fare 2	Rp 1,000	110 Rp/km	16,374	\$3,719	7.94 km	\$2,054	\$1,666	53
Variable fare 3	Rp 1,500	50 Rp/km	18,270	\$4,129	10.68 km	\$2,521	\$1,607	62

Doing this analysis requires a public transport model with an OD matrix of public transport trips. If average public transport trip distances along the planned BRT corridor can be closely estimated, then the technical fare can be recalculated using a distance-based fare. This analysis should also take into account the higher fare collection costs associated with distance-based structures, including the value of time for longer customer queues.

16.5.1.3 Zonal fares

Zonal fares are sometimes touted as a simplified version of a distance-based fare. In the case of a zonal fare, customers are charged by the number of zones that are crossed. Thus, if a customer travels from one city district to another, he or she is charged more than someone who only travels within a single district.

The principal advantage of a zonal system is its simplicity, both in terms of reducing customer confusion over fares as well as in terms of the fare technology required. It is easier to understand the cost implications of travelling in a city with a few zones as opposed to a significant

number of permutations related to distance-based combinations.

The principal disadvantage of a zonal system relates to peculiarities in the fare structure where very short trips between zones can cost double a long trip inside a zone. This type of situation leads to a fairly inequitable application of fare policy and can lead to anger amongst customers. This very scenario has occurred in Santiago and has resulted in some dissatisfaction with the system (Figure 16.20).

To function properly, a zonal system thus requires a city with clear and logical physical separation between districts. Cities with rivers, hills, and other physical barriers can be amenable to a zonal system. However, zonal systems may also ultimately create artificial barriers within a city. Such barriers are clearly counter to the objective of most public transport systems, which is to act as a catalyst for corridor development and continuity. In many respects, zonal system rely upon a city demographic and development pattern that is at odds with the nature and expectation of good public transport.

To a certain extent, the advent of the smart card has made the zonal system unnecessary.

Fig. 16.19
Analysis of the impact of different fare structures on TransJakarta's Phase II ridership.

Graphic courtesy of ITDPv

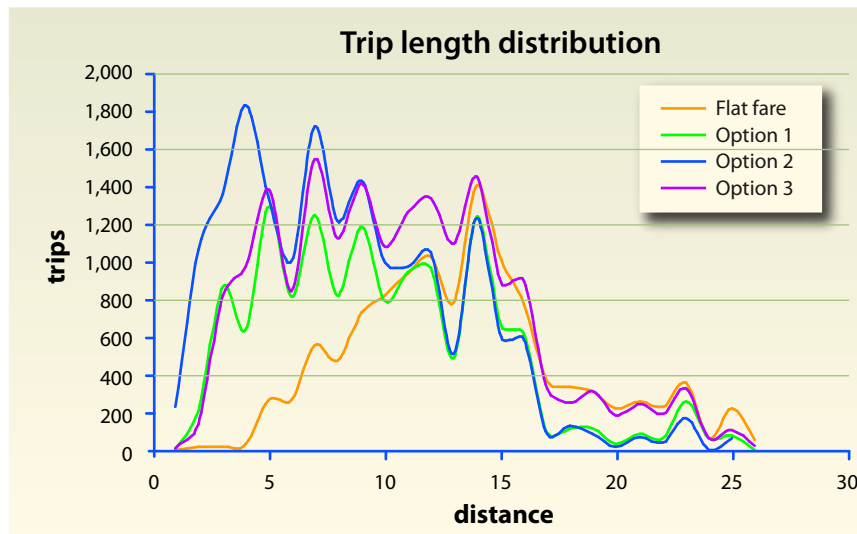


Fig. 16.21

London's Oyster smart card improves the cost-effectiveness of the fare system as well as creates new opportunities for more customer options.



Fig. 16.20

In this example from Santiago, the short passenger trip (Trip A) will cost double the long passenger trip (Trip B). Zonal fare systems can thus provide simplicity at the expense of fare equity.

Previously, technology limitations meant that zonal systems were a necessity in many situations. For smart cards, it is as easy to handle a pure distance-based system as it is a zonal system. The evolution on the London tube system from magnetic strip cards to the Oystercard (smart card) may allow it to move from a zonal system to a purely distance-based system (Figure 16.21).

16.5.1.4 Time-based fares

While fares can vary by distance, they can also vary by time. The most typical form of time-based pricing is to have a peak-period fare and an off-peak fare. Charging more for peak periods tends to be more profitable in part because roads are the most congested during peak hours, creating the strongest incentive to use a BRT system then. Peak-hour passengers are also mostly commuters, who have the least flexibility in their travel schedule. Being less flexible means they are less price sensitive, and will pay more to make the trip.

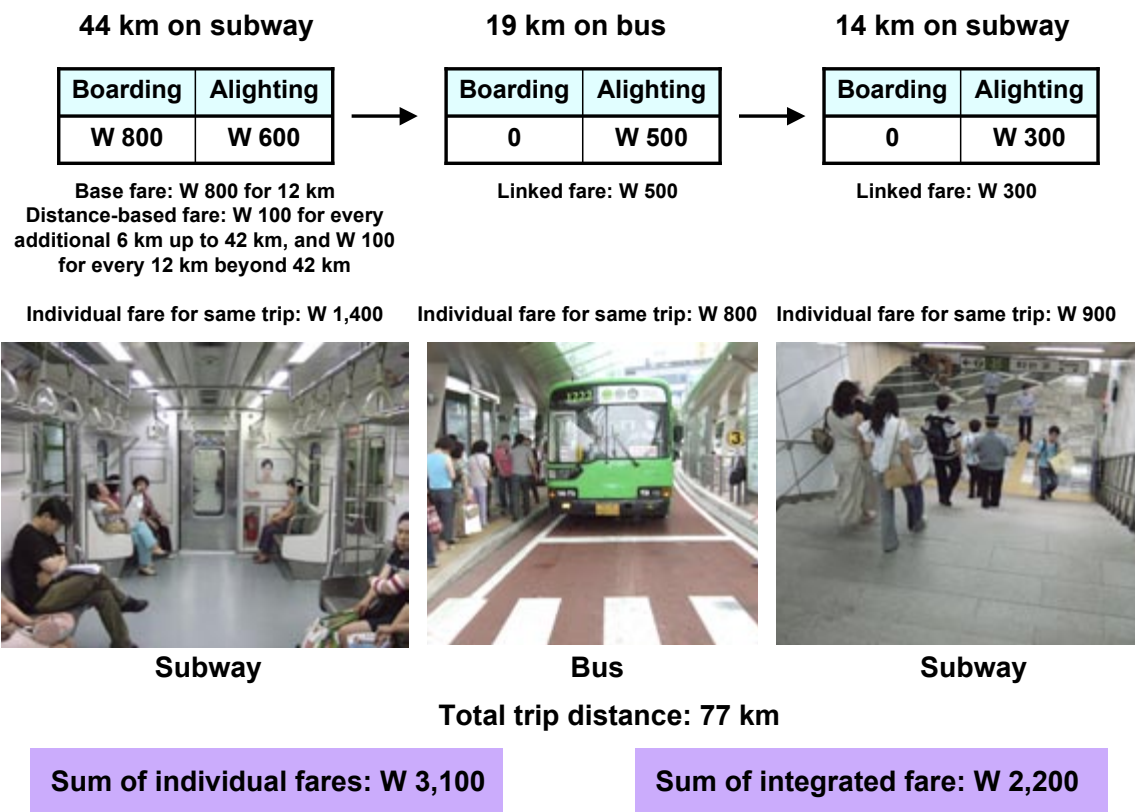
Heavily-peaked public transport services also have higher operating costs than demand that is more smoothly distributed throughout the day. The higher costs occur mainly because more vehicles are needed to service the peak period, and also because of the impact on labour. Bus drivers and other system operators tend to want

to work an 8 hour day, whereas the morning and evening peaks will require extra labour. The less peaked the demand, the fewer the number of additional workers that are required to cover the peak periods. A fare system which encourages people to travel during non-peak periods will help to better distribute demand in a way that is more operationally efficient.

Santiago (Chile) has defined a 20 percent discount during non-peak hours so transport users prefer to ride during non-peak hours reducing system congestion, and improving the efficiency of the fleet. TransJakarta also offered a discount for early morning passengers; before 07:30 am in the morning the fare was reduced from Rp 2,500 to Rp 1,500. This type of pricing acts to help spread the peak. Additionally, the lower price served social equity purposes since early morning riders tend to be from the lowest income groups.

Other systems use a time-based fare where the fare card buys the right to use the system for a maximum amount of time. This type of fare has much application when it is desirable to provide free transfers in systems without physical integration between stations. Thus, transfers between rail services, trunk BRT services, and feeder BRT services can take place without the need for physically closed transfer environments.

Fig. 16.22
Example of integrated fare structure for multi-modal travel in Seoul
Photos by Lloyd Wright



The City of Seoul operates a combined time-based and distance-based fare system. Customers can transfer freely between the road and rail public transport systems within a certain time period. Each transfer must take place within a 30 minute window. Figure 16.22 provides an example of the integrated fare structure for a multi-modal trip (subway and bus) in Seoul. If the customer was to pay for each journey segment individually, the total fare would be W 3,100 (US\$3.25). Through the integrated fare structure, the total is only W 2,200 (US\$2.30), a savings of nearly 30 percent.

To make the Seoul system work, though, a customer must remember to swipe their fare

card upon exiting. Otherwise, the passenger will be hit with a penalty the next time they enter the system. This requirement of exit verification can lead to longer dwell times at stations as well as customer anger if the swiped card does not properly register or if the person simply forgets to swipe the card (Figure 16.23). Additionally, the complexity of combining both time-based and distance-based elements into the system means that a fairly sophisticated control and

Fig. 16.24
The complexity of a multi-modal fare system that is both time-based and distance-based requires a significant investment in control technology.

Photo by Lloyd Wright



Fig. 16.23
Forgetting to swipe one's card upon leaving the Seoul bus system will result in a penalty payment upon entering the system again.
Photo courtesy of the City of Seoul



management centre must be in place, along with high-quality communications equipment and system software (Figure 16.24).

SPTrans, which serves the City of São Paulo, introduced a route system called Interligado comprising 1,200 km of high-capacity corridors and 3,300 km of local services (similar to feeder services), as presented in Figure 16.25. The routes can be used with a single payment of about US\$0.70 for two hours (boarding check-in), allowing customers to make as many transfers as needed to reach the desired destination. Most (95 percent) trips can be completed within this time frame, and nearly 100 percent of the trips can be accomplished with boarding onto the last trip segment within the two hours.

The São Paulo Interligado system is made possible through the use of electronic contact-less cards known as Bilhete Único (Figure 16.26). There are issues of distribution and evasion control, with this implementation, but it is a good example of innovative practices in the developing world.

The advantages to a time-based system is the savings provided to certain customers, especially those travelling at non-peak periods or those making linked trips using various modes. A time-based restriction also sometimes is useful to prevent some customers from loitering in the system.

However, there are also some disadvantages to time-based fare systems. These systems require more sophisticated and more costly fare equipment, payment medium, control system, and software. The system will also likely require fare adjustment equipment at the exits so that customers who stay too long in the system can pay a penalty. The technology also has to adjust for incidents when it is not the customer's fault that the time has been exceeded. For example, if a serious delay occurs in the system due to a breakdown, customers will become irate if they also have to pay more.

Time-based systems can also lead to fare inequities. For example, a person who is able to do three errands within 30 minutes each will only pay a single fare for three trips. A customer who takes 32 minutes each for three errands will pay triple the fare of the other person who is marginally faster. In a non-subsidised system,

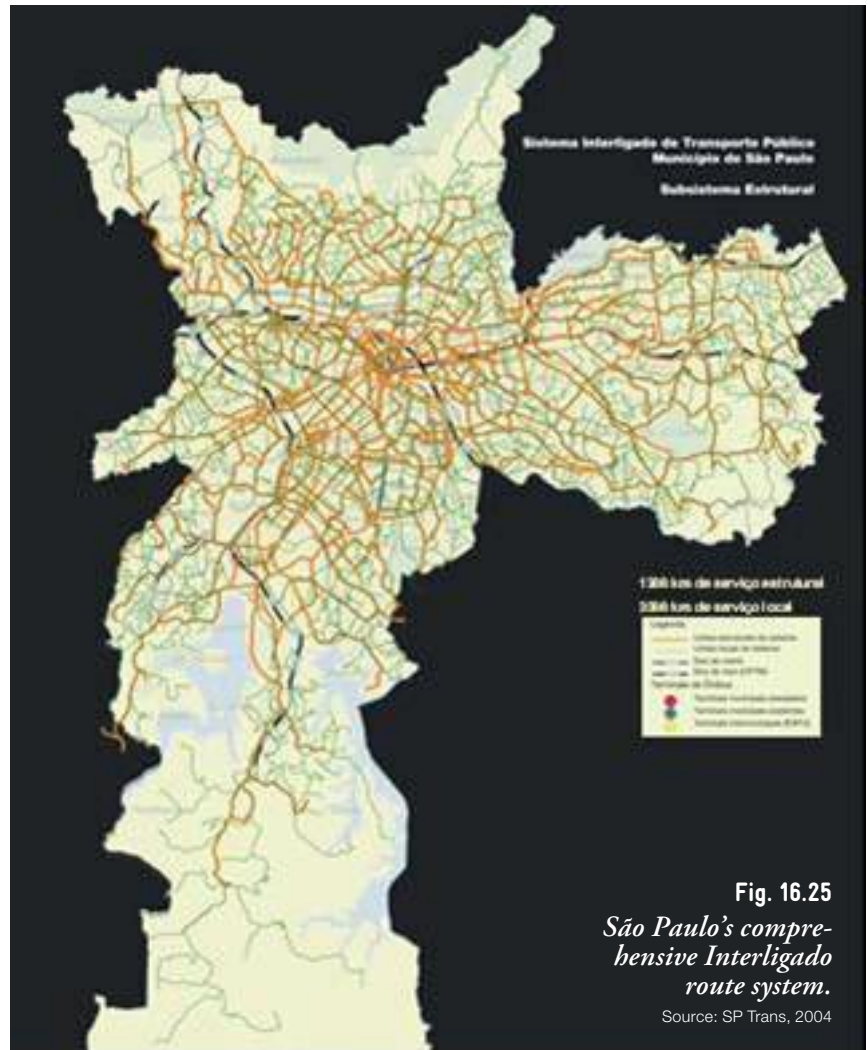


Fig. 16.25
São Paulo's comprehensive Interligado route system.

Source: SP Trans, 2004

the total income must equal expenses. Thus, the person who happens to make quick errands rather arbitrarily receives a cross-subsidy from the person who makes slightly slower errands.

Further, the time-based nature of the fare can add considerable stress to the customer, who must dash quickly from one place to another to meet the time requirement. This type of rushed and stressful activity can lead to serious consequences. Individuals may rush across intersections to make the time deadline, and in doing so, may risk an accident (Figure 16.27).

There also may be instances when customers want to make a trip requiring much time. For example, tourists will sometimes use the public transport system as a way of viewing the city. A family may spend much time on the system just enjoying the sights of the city. Harassing tourists with fines and penalties for travelling too long is a very effective way of discouraging tourism.



Fig. 16.26
The contact-less smart card utilised in São Paulo makes it possible to operate a time-based fare system.



Fig. 16.27

In cities such as Seoul with time-based fares, customers may cross the street in a hurried manner to meet the time requirements. This situation can lead to an increased number of pedestrian accidents.

Photo by Lloyd Wright

16.5.2 Fare discounts

16.5.2.1 Multi-trip discounts

One of the main cost advantages that private motor vehicle travel has over public transit is that once the passenger has sunk the investment into the procurement of the vehicle, the marginal cost of using the car goes down the more the vehicle is used. This situation creates an incentive to drive more. Public transport fares that force people to pay per trip create the opposite incentive, to use the system as little as possible.

Daily, weekly, and monthly passes, and multi-trip discounts are a good way to create incentives among public transport passengers to use the system more. Studies show that such incentives will have a particularly large impact on discretionary travel during non-peak periods. Multi-trip passes can also have significant benefits in terms of reducing queues at the fare booths, and reducing the amount of labour needed to staff ticketing sales.

16.5.2.2 Discounting transfers from other transport systems

In many cities today, fare structures between different modes, such as between rail and bus services, are not well integrated. However, the increasing sophistication of cash cards and modern fare systems is creating many possibilities for giving special discounts for passengers transferring from other public transport systems. Such forms of integration can even take place without necessarily having to integrate these public

transport systems from a management perspective. This issue is particularly important in the growing number of cities that are building metro systems on some high demand corridors but are considering BRT on other corridors.

In the past, providing a discount for metro or commuter rail system users on the BRT system required a high level of inter-agency coordination, and discussions frequently broke down on these grounds. For example, in São Paulo, there were bus services operated by the State of São Paulo, the commuter rail service operated by the State of São Paulo, and the metro system operated by the State of São Paulo, but another, bigger bus system operated by the Municipality of São Paulo. Fare system integration between these systems remains elusive even today despite the fact that these systems are all currently governed by the same political party.

True fare “integration” between different modes is sometimes confused with fare “compatibility”. Fare integration implies that a customer pays for a multi-modal fare that does not incur any penalty for changing from one mode to another. Seoul’s fare system comes quite close to achieving this level of integration. Fare compatibility instead just means the various modes share the same payment medium. With fare compatibility, the customer will pay multiple fares, according to the number of systems utilised in the journey. Thus, with fare compatibility the customer gains some convenience with a single fare card but incurs another full fare cost whenever transferring between systems.



Fig. 16.28

Unified fare cards in Tokyo provide fare compatibility but not necessarily fare integration.

Photo courtesy of PASMO



Fig. 16.29 and 16.30
Integrating fares can be challenging when one service, such as the metro underground, requires significant operating subsidies, and another service, such as bus services, does not require a subsidy.
 Photos by Lloyd Wright

In Tokyo there are several different public transport systems, each with its own fare structure. For example, there is both the Tokyo Metro and the Toei Subway. There are several smart card systems that allow a customer to use the same card for the various modes. The most recent card to be introduced is called “PASMO” (Figure 16.28). However, these fare cards simply deduct a new fare amount for each mode utilised, and thus does not recognise linked journeys from the perspective of providing a discounted, single-journey trip.

Perhaps the greatest challenge to fare integration between different public transport modes is not the payment technology but the significant differences in operating costs. Attempting to combine systems with dramatically different per kilometre operational costs raises many equity issues. This incompatibility is especially true when one system requires a significant operating subsidy and another system does not. For example, in Seoul the underground rail system requires a massive operational subsidy while the bus system operates with no subsidy (Figures 16.29 and 16.30). In order to equilibrate an integrated fare and business structure, the underground metro operator receives a much higher payment per passenger-kilometre served than the bus operators. Such inequities may be acceptable in some cases, but it does raise questions about fairness, especially if two services are of comparable quality but of radically different cost structures.

16.5.2.3 Categorical discounts and vouchers

Providing fare discounts to special groups is a relatively common practice in mass transit systems around the world. In some countries,

legal regulations oblige transport systems to offer special discount fares to a range of special groups (Figure 16.31), including:

- Children;
- Students;
- Elderly;
- Physically disabled;
- Low-income households;
- Military and police personnel;
- Staff of the public transport authority;
- Other government workers.

These legal obligations have to be taken into account when designing the fare system.



Fig. 16.31
Providing fare discounts to special groups may be required by law.

While sometimes socially desirable, the requirement that a BRT authority accept special discount fares creates a difficult challenge for any public transport agency. Controlling fraud in the use of discount passes poses a difficult technical challenge.

The determination of discount eligibility for children and the elderly is typically based upon age limits. For example, system managers and operators may decide that children under five years of age and adults over 60 years of age qualify for special discounts. The determination of student eligibility is often predicated upon either age limits and/or the possession of a valid student identification. Student discounts may be limited to only certain student segments, such as primary, middle, secondary, and university levels of education.

Discounts to children, students, and the elderly are typically given for reasons of social equity (Figure 16.32). Economically, a discount strategy can make sense provided that the discounted fare covers at least the marginal cost of each passenger. If fare levels are to be reduced below marginal cost levels, then some sort of subsidy system will need to be put in place. Subsidies can take the form of cross-subsidies between customer user groups or direct subsidies from the government to the operators. In either case, the introduction of subsidies significantly increases financial complexity within the operation of the system, and subsidies also create complications with respect to operator incentives. Thus, if a discounted fare structure is to be utilised, it is usually best for the discounted fares to at least cover marginal costs. Otherwise, the resulting cross-subsidy can effectively render the discount meaningless while simultaneous

increasing the management costs of the system. For example, providing a below marginal cost subsidy to a child may simply mean that the parent must pay more to cover the subsidy. In effect, no social equity is being achieved.

Chile and Brazil, for example, both place a legal obligation on the public transport operators to accept special discounts for students and the elderly. In Brazil, private bus operators are not compensated for the provision of this service, and the cost burden related to this service and its fraudulent abuse is a continuing cause of operator claims that they need fare increases. In many instances, operators will simply not stop if they see many students at a stop.

If the BRT system does not have a reliable mechanism to track the number of trips made using such discount passes, it has no way to place a valid claim to the government for compensation. This situation has created an ongoing justification for requiring government subsidies, but no clear basis on which to determine an appropriate level. The subsidies are thus a source of ongoing tension between the government and the operators.

On the other hand, Brazil has another subsidised fare that goes to employed workers called “Valetransport”. Valetransport is a public transport voucher that is as good as cash to any bus operator. Recently the Valetransport voucher system has been extended and can even be used with some formerly informal sector minivan services. As this increases demand for public transport services, and does not adversely affect bus system profits, it is generally supported in the public transport community. Critics of the programme are unhappy about the fact that it targets middle income people with jobs rather than the very poor, and it costs the government a lot of money to administer, but these are not problems from the point of view of the public transport operations. Voucher systems are therefore the preferred route for subsidising categorical discounts.

Discounted fare systems are also highly susceptible to fraud. As noted above, the qualifications for a child, student, or elderly discount is based upon age or a special identification. However, once the discount passes are issued, it is extremely difficult to ascertain exactly who is using the pass. The discount passes can be



	TARIFAS
TARIFA INTEGRAL	\$ 0.25 cts.
TARIFA REDUCIDA	\$ 0.12 cts.
Tercera edad, estudiantes, menores de edad	

Fig. 16.32

As noted from this fare pricing signage in Quito, the elderly, students, and children must only pay US\$0.12 per trip while others must pay the full fare of US\$0.25 per trip.

Photo by Lloyd Wright

“lent” to family or friends who otherwise do not qualify for the discount. More worryingly is the development of a grey market for discount passes in which persons obtain passes and sell them to others. Likewise, certain types of monthly passes for frequent users can be abused. If the monthly pass allows unlimited travel on the system, then the pass may end up being shared amongst several persons.

There are mechanisms to combat fare fraud to an extent. First, the avoidance of discount passes that allow unlimited travel is one option. Instead, discount fare passes that deduct credits for each trip undertaken can somewhat help avoid shared passes. Or, a discount pass could limit its use to no more than two trips per day (*i.e.*, the number of trips in a typical commute).

Second, formal registration and photo identification on the discount card can be the basis for a verification process. The verification could be conducted randomly when customers on inside the system. Also, when a discount card is read at the turnstile area, an indicator light could alert the platform staff. A random verification of such persons could help to stem fraud.

Third, advances in biometric technologies can quite effectively eliminate unauthorised usages. Biometric systems use inherent biological information, such as fingerprints or iris pattern, to assure that the person using the transit pass is the same as the person who was issued the pass. At the point of entry a scan verifies the identity of the user. The current cost of biometric technology, its complexity, and its impact on the speed of fare verification mean that it is not expected to be in widespread use for the short to medium term. However, the city of Goiânia (Brazil) is already testing such systems. Thus as the technology improves and the costs decrease, biometric systems may have a future role in fare verification processes.

An exception to these recommendations is travel for very young children as designated by a certain age. Requiring a travel pass for a very young child is problematic since it can create a burden on parents (Figure 16.33). Further, small children who sit in the lap of a parent are not necessarily adding significantly to the operational cost of the system, although certainly space for any strollers can more than compensate. Also, given



that the appearance of young children changes considerably in the earliest years, photo passes are not particularly useful. Undoubtedly, some parents will insist that their six or seven year old is only five, but the scope of this sort of deception is usually not significant enough to warrant a stringent approach.

An effective fare discount system also implies the need for more costly fare collection and fare verification technologies, such as magnetic strip or smart card technologies. The software to incorporate a fare discount system within these technologies will increase fare collection and verification costs to a degree. Further, the added complexity is another factor that can lead to system failure.

In summary, fare discounts are well-meaning attempts to increase affordability and social equity within a public transport system. In some cases, though, the added costs and complexity of implementing a fare discount strategy can negate these intended benefits. Before committing to a fare discount system, cities should carefully consider the full ramifications.

16.5.3 Fare options for feeder services

The fare handling system for feeder services will often follow a different operational process than the fare system for trunk lines. As noted earlier, cities such as Bogotá and Quito now compensate feeder operators by a combination of the vehicle-kilometres travelled and the number of

Fig. 16.33
Discounts for small children can benefit parents, provided there are no cross-subsidisation effects.

Photo by Lloyd Wright

passengers carried. This compensation package attempts to balance incentives in order to motivate operators to provide a high-quality service.

Within this model, feeder operations have a range of options for fare collection and fare verification. In Bogotá, feeder operators do not collect the fares from passengers boarding at feeder shelters. Instead passengers only pay once they reach the terminal stations or intermediate transfer stations. For the return trip home, passengers pay upon entering the trunk-line corridor, and then transfer fare free to the feeder services. However, for the return trip, entry into the feeder service is restricted to those persons collecting a transfer slip upon exiting the trunk service (Figure 16.34). This system holds the advantage of not making the feeder operators handle any revenues from passengers. By avoiding fare collection and fare verification at the feeder level, there is considerable time savings as well as the avoidance of any corruption.

However, the system has the disadvantage of allowing passengers to travel from one feeder stop to another feeder stop without paying anything. This situation occurs due to the fact that payment is only made once passengers reach a terminal. In some ways the “free ride” between feeder stops could be viewed as a positive marketing point for TransMilenio since

people will enjoy having a free neighbourhood service. However, the number of persons taking advantage of this free service is now reaching 15 percent of total feeder ridership. TransMilenio has changed feeder operator contracts from being based exclusively on kilometres travelled to being a combination of kilometres travelled and passengers carried. It is possible that the addition of passengers carried to the contract will provide an incentive for operators to curb the free use of the feeder services.

There are other options for feeder fare control that can avoid some of the issues faced by TransMilenio. Another option is for feeder services to collect fares when passengers board the feeder vehicle. While it would likely not be practical to make the driver handle fare collection and/or fare verification, the addition of fare collection staff to the vehicle could be a solution. Boarding the vehicle could take place at a single doorway (e.g., the rear door). Likewise, alighting the vehicle would then only be allowed at the other doorway (e.g., the front door).

The fare collection staff (i.e., conductor) could be from the fare collection company and not from the feeder operating company. This separation of interests would help to avoid any mishandling of fare revenues. Passengers boarding the feeder vehicle would enter a closed reservoir area in the bus, and then proceed through a turnstile once payment to the fare collection staff is made. The reservoir concept allows the bus to continue to the next stop while passengers are being processed through fare collection. The reservoir concept is already utilised extensively in countries like Brazil for conventional bus services. The disadvantage of this option is the cost of adding another staff person to the vehicle and the cost of the fare collection infrastructure within the vehicle. However, in many developing cities, the lower labour costs in conjunction with political needs to maximise employment make this option a viable possibility. Further, if the free ridership problem experienced in Bogotá was of such a magnitude, then the additional fare collection staff could be fully cost justified.

If the feeder passenger volumes are sufficiently high, then other options utilising more sophisticated fare technologies may be possible. These options include:



Fig. 16.34

In Bogotá, a customer takes a transfer pass upon leaving the trunk station.

Photo by Lloyd Wright

- Fare collection vending machines at feeder shelters (either open or closed shelters);
- Smart card readers upon entering a closed feeder station;
- Smart card readers upon entering the feeder vehicle.

Cities such as London are utilising coin-fed fare collection machines at conventional open bus stations (Figure 16.35). This type of technology could be adaptable to feeder services in some developing cities. If the shelter was closed (*i.e.*, no entrance without fare payment), then a coin-based or even smart-card based system could permit entrance to the shelter. Alternatively, a fare card purchased at a vending machine in an “open” shelter could then be verified inside the vehicle. The verification could either be done in a closed reservoir environment on the bus or by way of an honour system where passengers self-validate their fare tickets. If smart cards are utilised, then again the fare verification could take place through a self-validating machine inside the vehicle.

All of these technological solutions, though, do have limitations in the developing city context. First, the cost of the technologies for feeder services may be prohibitive from both a capital and operating cost standpoint. Second, creating “closed” stations at feeder stops may not be practicable from either a spatial or a cost perspective. Third, the effectiveness of “honour” payment and verification systems in developing cities is still not proven. Fourth, costly fare collection machines left unprotected at feeder shelters could be subject to maintenance issues and even theft.

16.5.4 Estimating system revenues

Once the analysis concludes that a particular fare structure will optimise the profitability of the system, the system’s basic revenues can be estimated. The system’s revenues can be calculated based on Equation 16.6.

Equation 16.6 Calculation of total system revenues

$$\text{Total system revenues} = (\text{Daily passengers per price category} * \text{Fare for that category}) + \text{Other revenues}$$

At this point, all that can be done to improve system profitability by changing the fare price



Fig. 16.35
Pre-board fare vending machine in London.
Photo by Lloyd Wright

has been done. If the total cost of operating the system, as reflected in the technical fare, is still higher than the optimal fare, then the system designers should still consider making some changes in the operational plan before resorting to subsidies. The areas to be considered first are discussed in the next section.

16.6 Reappraisal of operating costs

"We achieve everything by our efforts alone. We decide our own fate by our actions. You have to gain mastery over yourself... It is not a matter of sitting back and accepting."

—Aung San Suu Kyi, pro-democracy activist, 1945–

The calculation of the system’s profitability plays a critical role in the planning process. If the system is not going to be profitable given the initial proposed operational structure, before suggesting increased government subsidies or changes in vehicle technology, it is the responsibility of the team doing the business plan to request modifications in the proposed operational system to try and bring the system closer to profitability without subsidies.

There are at least four operational and costing areas to review first prior to any consideration of subsidies:

- Restrictions on competing transit and paratransit services;
- Restructuring of operations;
- Levels of compensation to operators;
- Shifting of costs from operations.

16.6.1 Restrictions on competing transit and paratransit services

When the operational plan was developed, some decision had to be made regarding what to do with existing public transport and paratransit operators already serving the BRT corridor, and how these will relate to the new service. If the initial business model is not profitable, one of the first things to investigate is whether or not more competing public transport services in the BRT corridor should be cut.

Normally, the original operational plan will cut some existing bus and paratransit routes that closely correlate to the route of the new BRT system, while allowing those routes that only use the BRT corridor for short stretches to continue to operate.

If too few of the old bus and paratransit routes are cut, the old bus routes will drain passengers away from the new BRT system, undermining profitability. The continuation of old buses in the mixed traffic lanes will also contribute to mixed traffic congestion, undermining political support.

On the other hand, many of these old buses may only use a portion of the busway corridor for their routes. At different points along the corridor, the operators will enter and exit from various other routes and neighbourhoods. Curtailing their operations will imply that some areas may be cut-off from public transport services altogether. Additionally, residents who

will be accustomed to a certain type of routing service may be displeased with the removal of these services.

Thus, to avoid difficulties both to the public transport operators and the serviced communities, the transit agency as part of its operational plan should have performed a complete review of transit routes and licensing along the BRT corridors. After the analysis of profitability of the system, this restructuring decision needs to be re-evaluated. If the system is not profitable, then the following should be considered:

- Banning more existing operators from servicing the same areas as the BRT system;
- Rerouting more of the existing operators to serve areas farther from the BRT corridor;
- Tighten restrictions on informal modes of public transport, like minibuses, shared taxi, combis, etc.

TransJakarta and TransMilenio took roughly opposite approaches to this problem. TransJakarta allowed all but 10 minor bus routes to continue in the new BRT corridor in the mixed traffic lanes. This decision led to good service for public transport passengers, very bad mixed traffic congestion, and low demand on the BRT system. TransMilenio, by contrast, removed all bus routes from the BRT corridor, forcing them to use parallel roads. As a result, TransMilenio is profitable, and TransJakarta is not (Figures 16.37 and 16.38).

While banning the operators from certain areas of the city may seem difficult to achieve in political terms, incentives can be used to encourage acceptance. The withdrawal of existing services can be a pre-requisite for participation in the BRT bidding process. Intransigent operators can lose the opportunity to participate in the new system. Additionally, technical assistance and identification of alternative markets can help ease the process of consolidating existing services.

Another strategy sometimes employed is to simply permit the existing operators to continue operating in the BRT corridors. If the BRT service is of superior quality at a similar price, then it is likely that the BRT service will dominate the market. The reduced travel times in busways along with a more secure and comfortable ride will likely attract the major share of the

Fig. 16.36
In Quito, the large number of conventional buses running alongside the Central Norte BRT corridor initially undermined the new system's profitability as well as caused significant traffic congestion.

Photo by Lloyd Wright





Fig. 16.37 and 16.38
Jakarta (left photo) did not initially cut competing bus lines from the BRT corridor. By contrast, Bogotá (right photo) did restrict competing services. Partly for this reason, the Jakarta was not profitable and Bogotá system was profitable.

Left photo courtesy of ITDP
 Right photo courtesy of TransMilenio SA

ridership. In this scenario, the existing operators will likely withdraw voluntarily due to the unprofitable market conditions. This strategy potentially avoids the conflicts that can arise from eliminating operators by mandate.

However, permitting the continued operation of the existing operators can also be a risk to the BRT system. Since many developing city residents are quite price sensitive, even small differences in fare levels may permit the existing operators to retain significant market share. In instances where existing operators provide direct services and the BRT system requires a transfer, the existing operators may retain an advantage. Thus, a strategy of permitting existing operators to continue along the BRT corridor should only be undertaken in situations where the BRT system will likely dominate the market due to its inherent advantages. Otherwise, the financial viability of the system will be undermined.

The disposition of existing operators is a sensitive point in the development of any new transport service. Since drivers, conductors, and other staff of existing services tend to come from lower-income groups, concerns over fairness and social justice should be at the forefront of addressing this issue. If the process is managed properly, the market opportunities within the new BRT system can be a win for everyone, including the existing operators. Solutions are available that can address the needs of the operators. However, at the same time, a strong sense of political will is required to ensure that the goal of a high-quality public transport system is the over-riding objective.

16.6.2 Restructuring of operations within the BRT system

There are many elements of the operational plan that will have significant impacts on the system

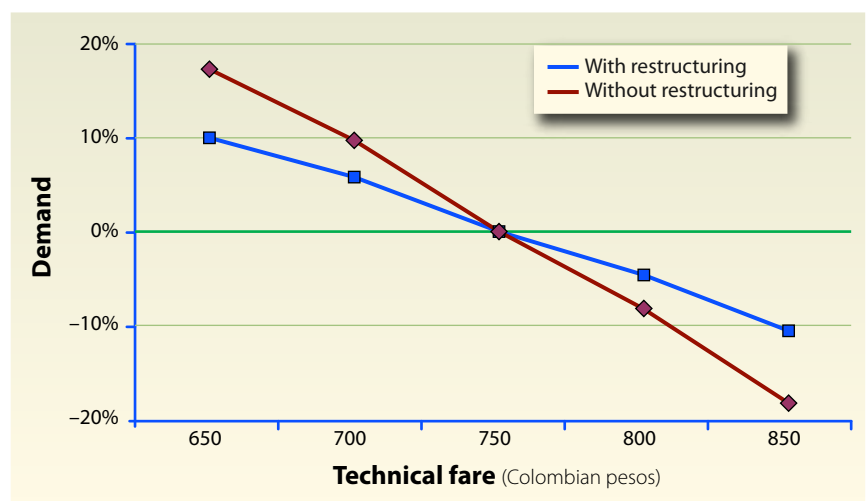
cost. System designers may wish to provide a good frequency of service and less crowded buses. However, if it is necessary to make the business work, the business planners may wish to consider cutting back on the frequency of service and increasing the load factors so that each vehicle is carrying more passengers per trip.

The load factor (passengers per vehicle) can also be increased by having some routes not make the entire trip from one end of the BRT corridor to the other, but rather to turn around and only cover the more congested parts of the route. Introducing such services, as discussed in the operations section, will increase system profitability.

Any shift from direct services to trunk and feeder services should also be reappraised. Initial system planners may have tried to maintain as many direct services as possible, or may have decided to retain direct services by having buses that operate both on and off the BRT corridor. This would increase the needed vehicle procurement, and hence the operational cost. At this point, it may be time to consider forcing more passengers to use feeder buses even if this

Fig. 16.38b
Analysis of the impact of route restructuring on the technical fare.

Source: Steer Davies Gleave.



decision implies that more customers will have to undertake a transfer.

When designing TransMilenio, the consulting team conducted an analysis of the overall impact of both cutting parallel bus routes and restructuring of the bus routes into trunk and feeder routes, and found that *the technical fare would be 15 percent higher without route restructuring.*

16.6.3 Compensation for existing bus owners and vehicle scrapping

Another issue to be reappraised is the amount of compensation paid to existing bus owners, and/or the number of vehicles that the bus operators will need to scrap in order to win the bid to operate the system. These two issues are related in many cases, because one way of ensuring that the former bus owners do not completely lose the value of their vehicle asset is to force the principal investors into the new BRT operations to scrap a minimum number of old buses. This vehicle scrapping requirement forces the new investors to buy the old buses from the former owners, either offering them stock in the new company or at least allowing them to cash out their old investment. Without this requirement, the main asset the former bus owners held is likely to drop significantly in value, creating a large group of very angry people.

However, this bus scrapping requirement will increase the costs of the BRT operations, and these costs can be fairly significant.

If the system is not very profitable, one option is to drop the bus scrapping requirement, and suffer the political consequences, or have this element of the project financed by a separate government programme. Several BRT projects in Latin America developed by the World Bank have considered using World Bank loans to finance the bus scrapping component of the BRT project, and having the government pick up these costs.

16.6.4 Shifting costs away from operations

Once all of the operational modifications suggested above have been made, and the system has been made as profitable as possible from an operations point of view, a final decision can be made regarding which parts of the new BRT system are to be financed out of the fare box and which will have to be financed by the government. Some operating costs can be shifted to capital/infrastructure costs and some can possibly be shifted to other budgets (*e.g.*, police department for security).

If the technical fare is now much lower than the optimal fare, then the system is highly profitable, and more capital, operating, and



Fig. 16.39
The business model for Transantiago is attempting to have private operators cover all operating costs as well as part of the infrastructure costs.

Photo by Lloyd Wright

infrastructure costs can be shifted from the responsibility of the government to the responsibility of the private operators. Ideally, the system as designed will be highly profitable, and many elements of the system can be paid for out of fare revenue. If the system is being designed on a high-demand corridor in a high-income country, the system could be highly profitable.

It is conceivable that for a very profitable system, not only could the fare revenues pay for the operations, system administration, and vehicle procurement, but also some elements of infrastructure, such as road and station maintenance. Transantiago (Santiago, Chile) is being designed so that operators contribute to portions of the road infrastructure.

In highly profitable circumstances, putting some elements of equipment into the operating cost category can make sense. For example, Bogotá required the private firm with the fare collection concession to include the electronic turnstiles and smart cards as part of the operational bid. The private fare collection firm thus amortises the cost of this infrastructure through their share of the fare revenue. In effect, the concessioned firm is acting as a financing agent for the particular piece of infrastructure.

On the other hand, it is quite likely that the technical fare will still be much higher than the optimal fare. In this case, the business model needs to be modified until the optimal fare is at least as high as the technical fare. Ultimately this can only be done by shifting more of the financial burden onto the government.

Where the BRT system has been designed in a corridor without much demand, and/or where riders are of low income, system designers will be hard pressed to find investors willing to pay for the vehicles, let alone other elements of the system. Typically, this situation arises when the BRT corridor has been chosen for political rather than demand reasons. It can also occur in lower-income countries. For example, many African nations have both relatively low- to medium-density urban environments as well as low per capita incomes. Since the cost of vehicles and fare collection equipment will probably be even higher in low income countries, as there is likely to be limited domestic manufacturing, it may prove

challenging to design the system to be financially sustainable without operating subsidies.

In the case when the system is not very profitable, system planners will need to consider the following modifications to the business plan:

- Explore value added tax and tariff exemptions on the vehicle procurement;
- Explore lower interest financing on the vehicle procurement;
- Change the technical specification on the vehicle and other equipment to make them more affordable;
- Pay for the public administration costs of the system from government revenues rather than fare revenues;
- Treat certain elements of operations such as station security and cleaning as part of ongoing public administration costs;
- Move some operating costs (*e.g.*, vehicle depreciation) to the capital cost category (government pays some part of the vehicle procurement or fare system procurement).

16.6.4.1 VAT and import duty relief

The taxes and import duties on the vehicles will be one of the most significant costs incurred by the private operators. Since these vehicles will be providing a public good, it is worth attempting to get an exemption so that import duties or VAT taxes do not have to be paid on the vehicle procurement. These taxes and fees are likely to be particularly onerous in the case of imported vehicles. In the case of Dar es Salaam, the VAT and import duties are significantly driving up the vehicle cost, making VAT and tariff exemptions critical to project success.

16.6.4.2 Alternative financing of vehicles

Financing will likely be a significant cost item within vehicle procurement. Because of the social benefits of BRT, many lending institutions like the International Finance Corporation (the private sector lending arm of the World Bank) and the bi-lateral lending agencies of developed countries might be willing to finance the vehicle procurement at a concessionary interest rate.

The local government itself might also play a role in vehicle financing through a lease-own arrangement with the private operators. For the Quito Ecovía corridor, the local government

purchased the vehicles and then attempted to obtain part of the fare revenue as a way of paying back the vehicles on a gradual basis. In Quito, this arrangement largely failed because of a lack of transparency in the fare system. However, in other circumstances a lease-own option could help reduce overall vehicle costs for operations. Such financing options are discussed in Chapter 17 (*Financing*).

16.6.4.3 Modifying the technical specifications of equipment

Modifying the technical specification on the vehicle and other technology items can be considered. For example, reducing the engine size can be an option to consider, although this size reduction will limit the maximum passenger capacity of the vehicle. The size of the vehicle is also a factor to consider. Because of peculiarities in local vehicle supply markets, different bus options are cheaper or more expensive than one would think. For example, in Dar es Salaam, the price difference between a standard-sized bus (12-metre vehicle) and an articulated bus (18-metre vehicle) is much higher than it is in Latin America. With only minimal system design changes, it is often possible to use normal buses without compromising the quality or comfort of service. Different types of interiors and customer amenities can also be considered. If these modifications are still not enough, changes in the technical specification that compromise the level of emissions, or the comfort and the quality of service could be considered.

At a certain point, however, if the technical specification is set too low, it will begin to compromise the quality and status of the system, and the loss of system quality will undermine the rationale for the entire project. The public must see the new system as a significant leap in terms of improved public transport service, and the vehicle itself will play a big role in giving that impression.

16.6.4.3 Moving system administrative costs off-budget

In Bogotá, the administrative oversight agency for the new public transport system requires 5 percent of the operating revenues in order to cover its costs. If this agency was instead funded

through general agency budgets, it would be a savings to the system.

The idea of public transport customers paying for their own administrative oversight can be controversial. Customers of other transport modes may not have to cover their own administrative costs and forcing public transport passengers to do so can be regarded as a regressive policy. It is likely that a city will have an existing Public Works Department, Transport Department, and/or Transport Authority. These agencies may oversee vehicle regulation, licensing, planning, emissions testing, and infrastructure development. In most cases, private vehicle licensing fees do not cover the costs of these activities. Thus, in such a case, private car owners are receiving their administration from the general tax base, which includes both car users and public transport users. It can therefore be quite inequitable to require public transport users to fully pay for their administrative costs when car users do not. This inequity can be particularly true when public transport users are primarily lower-income citizens.

For all these reasons, placing administrative costs of the public transport authority under the general municipal budget may be quite appropriate. However, it may also subject the BRT authority to increased levels of political interference and cumbersome civil service rules.

16.6.4.4 Moving security and maintenance costs to other budgets

Likewise, other system costs may be best moved to other budgets rather than burdening the operating budget of the new public transport system. System security, cleaning, and infrastructure maintenance are examples of such budget areas.

Security for the system can be either provided by the public security forces, such as the municipal or national police departments, or by private security staff. There are multiple reasons why it may be appropriate to place this responsibility with the public police forces. First, like the case of system administration, there is a question of budget equity. In most cities, car users receive much protection, support, regulation, and enforcement from the local police department. Typically, the policing of private vehicles is the

largest line item in a local police department's budget (Figure 16.40). The income from fines and fees do not usually fully cover these costs. Thus, the policing for private vehicles essentially receives a public subsidy from the general tax income. To require public transport passengers to fully pay for their security is again a highly regressive policy, especially if wealthier car users receive their security from the general tax base.

Second, public policing may be more effective in terms of its scope of responsibility. In Bogotá, the national police are deployed to maintain a presence both at stations and at times inside vehicles (Figure 16.41). These police can respond to incidents and emergencies anywhere in and around the system. If a person is being mugged in the vicinity of the station, these police can take immediate action. The public police can also make a direct arrest of any perpetrator.

By contrast, the Ecovía line in Quito employs a private security force (Figure 16.42). They also patrol the stations and the vehicles. However, their jurisdiction ends at the station exit. The private security staff will not intercede if a crime is in place along the footpaths leading to the station. Instead, station staff may (or may not) call for help from the metropolitan or national police if they see a crime being committed in the area. Of course, if criminal activities outside the station are not their responsibility, the staff

Fig. 16.41

In Bogotá, public police officials provide security to the public transport system as well as the surrounding area.

Photo by Lloyd Wright



Fig. 16.40

Police departments expend significant resources in managing, protecting, assisting, and enforcing traffic laws for cars and motorcycles, as shown in this image from Port Louis (Mauritius).

Photo by Lloyd Wright

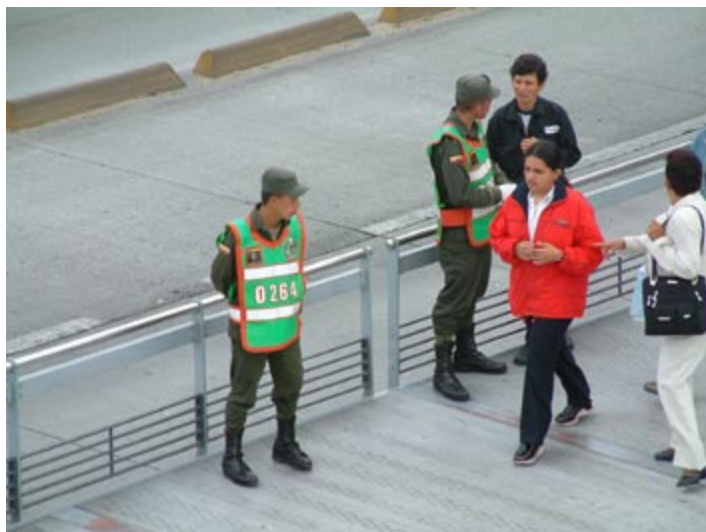
may not even consciously make an effort to be attentive to it. Further, during the time delay in calling in an incident, a robbery or beating could be fully consummated. Also, the private security team does not have the authority to actually make an arrest, although in most circumstances, they do have the authority to detain suspects.

Conversely, in some cities, private security staff are regarded as more reliable than the public forces. With private security, the public transport authority will have direct control over their schedule and performance. If the public police report to the national or local police departments, there can sometimes be coordination problems with the transport authority. Many

Fig. 16.42

On the Quito Ecovía line, a private security company is used to watch over the stations.

Photo by Lloyd Wright



of these issues can be overcome, though, if the transport authority is given some operational control over the scheduling, deployment, and priority-setting of the police personnel.

Cleaning and maintenance activities of vehicles and/or infrastructure are another area where philosophical issues are raised regarding the onus of responsibility for financing. Again, infrastructure for private cars is often paid for through the general tax base. It could be construed as inequitable to require public transport passengers to fully pay for their infrastructure maintenance if car users do not.

16.6.4.5 Capitalising some operating costs

Shifting a portion of equipment costs to the capital rather than operational cost category can significantly relieve pressure on the fare levels. However, moving equipment purchases to the capital cost category can bring with it some unintended consequences. In general, it is best to have the companies utilising the equipment to pay for it and to maintain it. Companies that operate buses that they do not purchase or do not own will tend to not maintain the vehicles properly. These companies may also not pursue the most cost-effective models at the time of purchase. Thus, public procurement of equipment can result in many misplaced incentives.

A compromise to such circumstances is for the public sector to share costs with the private sector. For example, the public sector may provide 50 percent of the vehicle cost while the private firm must pay off the other 50 percent through fare revenues. The vehicle would be entirely owned by the private operator but with an initial subsidy from the government. In this way, the private firm still has an incentive to properly maintain for the vehicle, but the reduced cost means that pressure on cost recovery is lessened.

As noted earlier turning an operational subsidy into a capital subsidy can be beneficial for many reasons. Operational subsidies are quite complex and costly to manage administratively and such subsidies can be prone to misuse. The preferred circumstance is obviously no subsidy at all.

However, to the extent any subsidy is required, a one-off infusion of capital at the project's outset is often preferable to long-term governmental commitments to on-going operational subsidies.

17. Financing

“Money never starts an idea; it is the idea that starts the money.”

—W. J. Cameron, author

Financing is rarely an obstacle to implementing a successful BRT project. In comparison to other mass transit options, BRT’s relatively low capital and operational costs puts the systems within the reach of most cities, even relatively low-income developing-nation cities. Many municipalities have actually found that loans and outside financing are unnecessary. Internal municipal and national funding may be sufficient to fully finance all construction costs. Further, since BRT systems should be designed to not require operational subsidies, at least in the medium term, minimal public financing should be necessary beyond the provision of infrastructure.

The first step in arranging the financing for a new BRT system is to design the system from its inception to be financially self-sufficient. Even with a financially viable system design, however, developing a complete financing package will require effort and persistence. Ideally, an effort on financing should begin at the earliest stages of the planning process. The financing plan should be developed on an iterative basis with the operational and infrastructure design process since the available financing will be a determining factor in the final design. For example, in Dar es Salaam, the architects and urban designers initially designed very beautiful stations requiring a lot of imported materials that drove the total system cost above the capacity of the government to finance, and some cost reductions

were required. Another typical example, the cost of an initially specified ultra-clean, high quality transit vehicle may exceed the projected revenues of the private operators. In this case, the technical specification for the vehicle may require modification in order to ensure medium-term financial sustainability.

The way in which different elements of the BRT system are financed may have a profound impact on the quality of the BRT system that is designed, the quality of the operations, the fare level, and the long-term sustainability of the system. The financing plan therefore needs to first define the basic principles upon which to make a financing decision. Some reasonable goals are listed below:

- maximise the quality of the service over the long term;
- minimise the cost of the service over the long term;
- maximise the level of private sector investment over the long term;
- minimise the public cost of financing.

Investment in a new public transport system must be compared to other possible uses of limited capital. Investment in transport can mean less capital availability for other high priority areas, such as education, health, nutrition, water, and sanitation. Some very low-income municipalities have legitimate financial constraints, and many cities may be near lending limitations with international development banks. However, in some cases, claims of financial constraints are often simply masking a lack of political will to develop a new system.

This chapter examines the principal BRT elements requiring a financial plan. The topics covered in this chapter thus include:

- 17.1 Financing overview**
- 17.2 Financing planning and operations**
- 17.3 Financing infrastructure**
- 17.4 Financing equipment (vehicles, fare system, etc.)**
- 17.5 Financing system maintenance**

17.1 Financing overview

“Usually with things, you go where you can find the financing to do it.”

—Don Bluth, animator, 1937–

17.1.1 List of financing options

Financing for BRT can be divided into five groups of activities: planning, operations, infrastructure, equipment (such as vehicles and fare equipment), and system maintenance. Each of

these activity areas typically involves different sorts of financing or funding options. Table 17.1 summarises the potential financing and funding sources for these activity areas.

17.1.2 Financing strategy

At the outset, the planning team should develop an overall strategy and approach to system financing. Some common characteristics of a successful financing strategy are:

- Diversity;
- Competition;
- Sustainability;
- Clarity and transparency;
- Realism;
- Cost-effectiveness;
- Timeliness.

A diverse portfolio of financing options can be a healthy strategy to hedge against difficulties with a single financing organisation. All relevant local, regional, and international financing sources should be investigated as options. Ideally, the planning team will create such a strong financial case for the new system that a degree of competition will occur between potential financing groups. When multiple lenders are competing to participate in a project, the city will likely be able to negotiate more favourable terms.

Sustainability refers to whether the proposed financing package places an undue amount of pressure on future administrations. If the financing stream is based on tenuous assumptions about certain future revenues, then the long-term viability of the system will be placed in doubt. In such cases, the quality of all public services can be compromised if future administrations and future generations are burdened with an unrealistic debt level. For this reason, as far as is practicable, the financing process and the financing obligations should be discussed in a wholly transparent manner to allow all parties (including civil society) to provide input. The total financing package must also be cost-effective. The package should strive to achieve an optimum interest rate and a reasonable debt level. Finally, the financing needs to be timely. Generally, the political leadership of a BRT project will require implementation to be within a particular time frame, and sometimes higher interest rates may be required to

Table 17.1: Potential financing / funding sources for BRT

Activity Area	Financing Source
System Planning	Local government Provincial government National government Bi-Lateral assistance agencies (e.g., GTZ, USAID, JICA, Sida, etc.) United Nations agencies (e.g., UNDP, UNEP, UNCRD) Global Environment Facility (GEF) Loans or grants from the World Bank Loans or grants from regional development banks (e.g., IADB, ADB, etc.) Loans or grants from bi-lateral export banks Private sector (e.g., bus operators, property developers, vehicle manufacturers, fuel suppliers, etc.) Private Foundations
Operations	Fare revenues Leasing of commercial space near stations Advertising Merchandising Emissions trading
Infrastructure	Local, provincial, and national general tax revenues Petrol taxes Road pricing / congestion charging Parking fees Improved enforcement of traffic regulations Land value taxation Sales or leasing of commercial space near stations Advertising Merchandising Commercial banks Municipal bonds Loans from the World Bank Loans from regional development banks National and sub-national development banks Emissions trading Emerging private investment options (e.g., PPPs)
Equipment (e.g., vehicles)	Private sector operators / fare revenues Bus manufacturers Bi-lateral export banks International Finance Corporation Commercial banks
Maintenance	Local, provincial, and national general tax revenues Petrol taxes Road pricing / congestion charging Parking fees Private sector operators / fare revenues

bring a project on line in time to meet a specific political timetable.

The long-term vision of the financing strategy will likely vary from the financing applied to the system's initial corridors. Bogotá relied upon local funding sources in its first phase since the concept was relatively unknown at the outset. However, with the great success of TransMilenio's first phase, commercial banks and international entities now compete to participate in financing subsequent phases. If an initial project phase is successful, then subsequent cost of financing will likely decrease. This tendency is largely due to financial organisations gaining confidence in a project once the city successfully delivers initial phases.

17.1.3 Strategic recommendations

While there are exceptions, the general strategy for financing a BRT system will often focus on the following principles:

- BRT planning should be financed by the government and donor agencies with a combination of municipal funding and international funding when possible;
- Construction of BRT infrastructure and its maintenance should be paid for by the government;
- Revenue from fares will often be sufficient to cover the cost of the system's operations, vehicle procurement, and ongoing vehicle maintenance and replacement;
- In cases where the system can only achieve borderline profitability, the public sector may cover the cost of ancillary services such as security and station cleaning; in some cases, public sector contributions to vehicle procurement may also be required.

Most BRT systems in the developing-nation cities have been designed to be self-financing from an operational standpoint (*i.e.*, fare incomes cover all operational costs). The high density of many developing-nation cities in conjunction with lower labour costs makes operational profitability a viable objective. The advantage of designing a system without operational subsidies cannot be underestimated. Operational subsidies can cause significant complications in terms of requiring on-going governmental budgetary support, propagating a negative image of public transport being unable to finance itself, and

creating opportunities for misappropriation of public funds.

However, it is also recognised that there are inherent trade-offs between designing a system that is profitable and a system that is affordable to all. In some cases, the social objective of providing a highly affordable fare may take precedent over profitability objectives. This situation may be particularly true of smaller, lower-density cities in the developing world.

Nevertheless, an initial financial analysis should at least explore the opportunity of developing a system with profitable operations. While this point may seem self-evident, in practice, some BRT systems are built in ways that are inherently unprofitable. Because most BRT systems are designed by governments rather than private investors, the primary concerns of public officials may be political rather than purely economic. However, inherently unprofitable systems significantly constrain the conditions under which private investment can participate.

Finally, project developers must be careful not to be overly pessimistic on the finance possibilities and subsequently under-design the system. BRT's success in cities such as Bogotá and Curitiba has raised the profile of this mass transit option with many public, private, and international financing organisations. Political acceptance of BRT should not be the default result of officials turning to a low-quality, utilitarian BRT system against the alternative of an exorbitantly expensive metro system. Finance should not become an obstacle to delivering a high-quality system that not only meets a city's mobility needs but also restores pride of place to the citizens of the city.

17.2 Financing BRT planning and operations

"Thought, not money, is the real business capital."

—Harvey Firestone, industrialist, 1868–1938

The financing of BRT planning and BRT operations has already been discussed in earlier chapters of this guidebook. In general, neither the financing of planning nor the financing of operations typically represent major obstacles to BRT development.

As noted earlier, a BRT plan for a Phase I BRT project will typically cost in the range of US\$1 million to US\$3 million per kilometre, although municipalities utilising principally in-house staff may be able to develop a plan at a lower cost. In comparison to other forms of mass transit, BRT's planning requirements are relatively low-cost. For this reason, outside financing assistance to BRT planning may be unnecessary for many cities.

However, at the same time, abundant international sources exist to provide funding assistance for planning activities. BRT has found favour with many international funding entities, including the Global Environment Facility (GEF), United Nations Development Programme (UNDP), and bi-lateral agencies. Grant-based support from these types of international organisations is frequently focussed upon planning activities. Grants are obviously preferable to loan arrangements which require repayment. Chapter 3 (*Project set-up*) of this guidebook provides more detail on options for funding BRT planning.

Most successful BRT systems to date function without operational subsidies. If the cost of depreciation of the vehicle fleet is excluded from the operational cost, no BRT system in the developing world should be designed that cannot at least cover its ongoing operating costs from fare revenues virtually from its inception. The lack of such subsidies eliminates the need for operational financing. Instead, the revenues from fare collection cover all aspects of operational activities, including drivers, fare collection staff, fuel, and vehicle maintenance. In most cases, fare revenues are also utilised to finance the vehicles, as will be discussed later in this chapter. Chapters 15 and 16 of this guidebook provide more detail on creating a business structure that avoids the need for operational subsidies.

17.3 Financing BRT Infrastructure

"Money often costs too much."

—Ralph Waldo Emerson; author, poet, and philosopher, 1803–1882

Building a BRT system is a major investment. As noted in Chapter 12 (*Infrastructure*), BRT systems will generally cost in the range of US\$1 million per kilometre to US\$7 million per

kilometre. The actual cost will depend upon a range of factors including the complexity of the infrastructure, the capacity level required, the desired quality of the stations and terminals, the necessity for property acquisition, the need for flyovers or tunnels at rivers, railway crossings or problematic intersections, the amount of general infrastructure improvements included in the corridor reconstruction (sewage, drainage, and electrical improvements), and the level and quality of corresponding public space improvements in the corridor (landscaping, cycling and pedestrian facilities, street furniture, etc). Since a Phase I project will generally involve from 20 to 80 kilometres of infrastructure, anywhere from US\$20 to US\$560 million may be required for a project's initial phase. This total is a large infrastructure investment, and financing this investment will be similar to financial mechanisms for other public works of similar size in any given country.

To date, most international BRT projects have financed the infrastructure entirely from public sources. Only Santiago is in the process of leveraging large amounts of private sector capital for system infrastructure, though there are early discussions in other cities as well. In general, public financing of BRT infrastructure is recommended. As such, the bulk of this chapter reviews public sector financing options. It is theoretically possible to use private financing for BRT infrastructure development using Build-Operate-Transfer (BOT) methods and other forms of Public-Private Partnership (PPP) being increasingly used for highways and metros in developing countries. While this approach is generally not recommended, under some specific conditions it may be worth exploring.

17.3.1 Local government funding

Ultimately, it will generally be the taxpayers of the municipality who will pay for the bulk of the BRT infrastructure. Since local residents will be the principal beneficiaries of the new public transport system, it is appropriate that these citizens contribute the largest share of the funding. Cities may also exert more control over their own resources, and thus in many instances, can ascertain the long-term reliability of the revenue flow. Local officials may also have more incentive to make a project work

than national agencies. Many Mayors would like to have full control over the project since it can have a significant impact on their political career. Further, many potential local sources for BRT also carry the benefit of discouraging private vehicle use, which will only further strengthen the soundness of the BRT system.

While local tax revenues are often a principal local funding mechanism, local governments actually have access to a wide range of financing options. Dedicated funding streams from fuel taxes, parking fees, and road charges all hold much potential to assist BRT financing. Of course, financing public transport through charges on private vehicles can take a good deal of political will. Additionally, new local funding sources exist in the form of commercial development around station areas and Land Benefit Levies (LBL).

17.3.1.1 Existing transport budgets

The logical starting point for any financing plan is to examine existing budgets for public transport and roadway development. Often the price of a single flyover project is equivalent to launching much of the BRT system. Re-directing local and national roadway projects to public transport priority projects can be justified on both cost and equity grounds. In many instances, the BRT investments will serve the dual purpose of improving both public transport and private vehicle infrastructure. The construction of the TransMilenio corridors in Bogotá also included upgrades to the nearby mixed traffic lanes.

17.3.1.2 Congestion charging / cordon tolls

Congestion charging

As discussed in Chapter 14 (*TDM and land-use integration*), congestion charging and electronic road pricing has served as an effective mechanism to reduce traffic congestion in cities such as London, Singapore, and Stockholm (Figure 17.1). In the medium term to long term, congestion pricing can also provide revenues to system infrastructure, maintenance, and operations. In the very short term, the costs required to implement such a scheme will likely reduce immediate financial returns. The camera technology utilised in London and the electronic gantries now used in Singapore both require a

fair amount of initial investment and technical sophistication. However, the initial Singapore approach of special licensing zones enforced at police-monitored physical gantries, can be implemented more quickly and at lower cost. In addition to the equipment costs, substantial investments in consulting services are also likely to be required in order to deliver a successful scheme. For this reason, congestion charging is often cited as a highly-effective mechanism to reduce congestion, but its effectiveness in raising revenues will vary on a case by case basis:

“London has shown that congestion charging is a good way of reducing congestion, and for providing all the benefits such as reduced pollution, reduced traffic, more reliable bus services, fewer road crashes, and more efficient deliveries, but as we spend half the revenues on collection (staff, cameras, signage, advertising, computers, a call centre, links to the DVLA, chasing non-payers, payments to congestion charge sellers in shops and petrol stations, etc.), it is not about making money” (Wetzel, 2005a).

The rate of the congestion charge, and hence the amount of revenue that can be expected, is based on the price sensitivity of private motor vehicle trip demand. In developing countries,



Fig. 17.1
The London congestion charge generates about £ 122 million pounds of net revenue each year.

Photo by Lloyd Wright

motorists tend to be fewer, and price sensitivity of demand is much higher. Thus, the desired traffic impact can be achieved at a lower charge than in developed countries. These developing-nation circumstances also mean, unfortunately, that the potential revenue from congestion charging is also going to be considerably less.

The equipment cost of the system depends on the area being charged, the density of the road network, and the type of system chosen. Developing countries often have a fairly limited number of arterials providing access to a central business district (CBD), and thus the likely equipment costs may be reduced.

Before Singapore modernised its congestion charging system to Electronic Road Pricing (ERP), it had a simpler area licensing scheme (ALS). Entering the five-square kilometres of the central business district required a special colour-coded license that cost roughly US\$1.25 or US\$25 per month. Access to the CBD was controlled by police at gantries on all major roads entering the CBD. Violators were charged US\$22, so there were very few violations. The cost of the gantries was approximately US\$2.8 million and the police enforcement was about US\$400,000 per year. In 1975, the scheme's first year of operation, it generated an operating profit of US\$2.57 million, so the full investment cost was recovered in a little over a year. This revenue would, however, only have built about approximately 3 to 4 kilometres of BRT a year based on prices in the 1970s (Hau, 1992).

In London, the system cost £ 180 million (US\$324 million) to set-up and approximately £ 88 million (US\$158 million) annually to operate. These costs only apply to the relatively small central London zone that has been implemented in the project's initial phase. A city that includes an entire metropolitan area may cost considerably more. Thus, the London congestion charging system can cost more than the entire phase I of a BRT system in a developing-nation city.

However, the London system does return healthy annual gross revenues of £ 210 million (US\$378 million), and nets about £ 122 million (US\$220 million) (TfL, 2006). Based on these results, the London system returns its original investment after the third year of operation, and at this point the congestion charging scheme is

actually generating sufficient revenues to finance an initial BRT system. Furthermore, as congestion charging matures and economies-of-scale are achieved with the technologies, then implementation costs will likely fall.

In the case of a developing-nation city, the returns achieved in London are not likely to be equalled. The £ 8 (US\$14.40) per day charge utilised in London would not be achievable in a developing city, nor would such a charge bring in anywhere near the same amount of revenue. If a London-type system was adopted in a developing-nation city, the equipment costs would be not be appreciably less. As such, lower cost technologies, such as area licensing schemes, should be explored first.

Cordon tolls

A cordon toll is another option to consider, especially in circumstances requiring a lower initial investment. Rather than requiring electronic or visual technology to record vehicle movements within a confined zone, cordon tolling schemes only exact a toll at the entrance to a zone or across a cordon, often a river. A relatively low-technology and low-cost toll booth can potentially return greater net income to the city. The main problem with these systems is the traffic delay caused in paying the toll, and the space occupied by the tolling stations. Also, tolling stations generally do not afford the flexibility of an electronic system, which can more easily distinguish different user groups and permit charging based on time in the zone. The city's physical form and road structure will have to be amenable to road charging in order for it to be viable. Cities with naturally restricted entry points (*e.g.*, bridges) will have a better chance of making road charging work. Cities with many difficult to control entry points may be more suited to an electronic surveillance system, such as those used in congestion charging schemes, to properly monitor and enforce the charge.

Political support

Implementing a congestion or road pricing scheme is likely to require a high level of political leadership and will power. Objections from powerful lobby groups, such as motorists, can make political officials wary of this type of approach. For this reason, there are no congestion charging

projects to date in the developing world. Some cities, such as São Paulo and Jakarta, have considered the option, but political difficulties have pushed implementation off into the future.

Dedicating revenue streams from congestion charging or road charging to projects like BRT can help to improve public acceptance. If the funds are seen as directly benefiting public transport, non-motorised options, or public space, then some of the objections raised by lobbying groups can be overcome. London was particularly successful in marketing how the use of congestion charging revenues would benefit users of public transport and cycle ways. In practice, though, the direct linkage of revenues from one source to a particular expenditure is not always easy to arrange. In many cities, all public revenues are put into a single account and disbursed according to budget negotiations. In other cases, there may be some latitude for hypothecating funds to a specific purpose. In still other cases, governments have created a Road Fund with a somewhat independent governing board. However, whether it is advisable to give the Road Fund control over a congestion fee earmarked for public transport improvements will depend on many local factors.

17.3.1.3 Parking fees

Parking fees can be another effective mechanism for raising revenues for a BRT system, while also discouraging private vehicle use, and often at a lower implementation cost. Like with congestion charging, however, the cost of a parking scheme will depend on the technology used, and can vary widely. Similarly, as with congestion charging, in the cities of lower-income countries, motorists are more likely to be highly price sensitive to parking charges. This price sensitivity will increase the effectiveness of the measures from a traffic perspective, but limit somewhat the revenue-raising capability.

Politically, raising parking fees and enforcing them has proven to be as demanding as implementing congestion charging. Voters are as likely to resist an increase in parking fees as the imposition of a road user charge. Parking revenues are also frequently controlled by sub-municipal level governments that have no responsibility for public transport systems, and which are loathe to give up the revenue. Enforcement

is frequently controlled by police that are not under the control of the municipal government but under the control of provincial or national governments. Most importantly, in developing countries parking revenues are generally not fully under the control of the government, and are controlled by informal sector mafias with powerful political connections inside decision-making bodies.

Nonetheless, reclaiming public control of parking is a critical part of the process of regaining public political control over urban space. Once this political battle is won, parking fees are relatively easy to implement, and can generate significant revenues for BRT, while also reducing congestion. Since a parking space is a highly visible part of land use, it is a difficult type of fee to avoid or hide. Parking fees are discussed as a TDM measure in Chapter 14. This section discusses the revenue raising aspects of parking.

Parking fees can take several forms, including commercial parking taxes and per space fees (Litman, 2006). Parking areas can be either publicly or privately owned. The access to a particular parking area may be either open to the general public or reserved for specific individuals or groups. Table 17.2 notes the range of typologies for parking areas. To maximise the effectiveness of a parking strategy, such a strategy should address most of the typologies noted in table 17.2. A parking fee applied to all non-residential parking spaces has the potential to both raise considerable revenue as well as discourage the use of private vehicles. Further, relatively little physical set-up is required and the administrative structure may already be in place through existing parking regulations. Thus, a parking fee programme can begin providing BRT revenues relatively quickly, though in practice the amounts of money raised in a developing country context may not be that high.

Table 17.2: Typology of parking spaces

Ownership of parking space	Users of space	On-street or off-street
Local authority controlled	General public General public	On-street Off-street
Privately owned	General public Private non-residential parking Residential	Off-street Off-street Off-street

Source: Enoch and Ison, 2006, p. 6

Parking case studies

In the cities of developing countries, an important first step is therefore to wrest control of current on-street parking away from unregulated private mafias to legitimate corporate entities. The cases of Bogotá, Dar es Salaam, and Yogyakarta (Indonesia) are instructive.

During the period of TransMilenio's development, Bogotá eliminated on-street parking from many parts of the city. At the same time, Bogotá encouraged the development of off-street parking facilities, which could be subjected to special user fees (Figure 17.2). In many developing-nation cities, parking on city streets is a large hidden subsidy to relatively wealthy motorists, and charging for the use of this valuable real estate can both generate revenue as well as create more equity in how public space is utilised.

The city of Cuenca has utilised a parking control initiative to both regain control of urban space as well as to generate revenues for bus priority measures (Figure 17.3). Through the privatisation of parking services, Cuenca has formalised a sector that was previously relatively uncontrolled. Further, by contractually tying the public sector's share of parking revenues to bus improvement initiatives, the city has established a steady and reliable revenue base to move towards BRT-like infrastructure for its bus services. Likewise, Orlando utilises parking fees to support its Lynx LYMMO BRT system. In fact, due to the income of parking revenues, the

Fig. 17.2

By moving parking to off-street sites, Bogotá regained control of public space as well as concentrated parking revenue collection.

Photo by Lloyd Wright



Fig. 17.3

Cities such as Cuenca (Ecuador) have formalised city centre parking in order to generate revenues for public transport development.

Photo courtesy of the Municipality of Cuenca

Orlando system is able to offer its service with no fares to the customer. The parking of private vehicles is thus enabling the city to offer a free public transport service.

In Dar es Salaam, until the late 1990s, all on-street parking was controlled by street touts (Figure 17.4). In 1998, a contract was signed with a private company which allowed the company to collect parking fees set by the City Council on the Council's behalf. A fixed percentage of each fee collected was transferred back to the city, and the rest was retained by the company to cover the cost of its operations. In 2002, a study was completed which indicated that the company was only reporting about one-third of the actually parked vehicles. As a result of this study, the company was replaced and a new company hired.

Today, the new company generates roughly US\$475,000 a year for the City Council. This figure represents only 25 percent of the total revenue collected. Since this income is a more than three-fold increase in the total revenue going to the City Council, the project is universally viewed as a success. However, the contract



Fig. 17.4
In Dar es Salaam, parking is slowly being controlled in a more formalised manner.

Photo by Adam Millard-Ball

stipulates that the City Council should collect 75 percent of the total revenue (US\$1.43 million), but only after the capital costs of the new electronic ticketing machines has been fully repaid. These electronic ticketing machines are supposed to make the revenue collection process transparent, but in fact they are currently not used in a way that would achieve this result. As such, they are functionally useless.

As an alternative, it would be much better for a traffic expert to estimate the total projected parking revenue for the city centre and then have the City Council negotiate a lump sum contract for the operator. Then, the ticketing machines would not be necessary, and the company would have a stronger incentive to collect the fee. The City Council would still need to regulate the total amount of officially designated parking locations, as otherwise the private parking operator has an incentive to let as many motorists park on the streets as is physically possible. Enforcement is also a major problem, as the police remain under the control of the national government and do little on parking enforcement. The potential revenue being earned for parking is potentially large enough to pay for elements of a BRT system, but it is currently dedicated to the construction of designated parking places and for road maintenance (Millard-Ball, 2005).

In Yogyakarta (Indonesia) the city currently collects no legal revenue from on-street parking in



Fig. 17.5
A complex web of street bosses and informal parking attendants has made parking reform in Yogyakarta quite difficult.

Photo by Michael King

the central business district. As part of an effort to pedestrianise the central Malioboro Road market area, a parking analysis was done by Instran, an Indonesian NGO, which concluded that at least US\$860,000 per annum and probably closer to US\$2 million, is currently being appropriated by the informal sector in the Malioboro area alone.

At the bottom of the hierarchy are 118 on-street parking touts earning US\$2 a day. They in turn report to 14 street bosses, who have 8 parking attendants each under their control (Figure 17.5). The street boss is usually in a political party, and uses political connections to maintain market control. Above the street boss are land owners or “white-collar parking attendants.” These persons are generally in control of some form of thugs who can protect the interests of the land owners at the street level as necessary. Each land owner has three or four street bosses under their control, and these street bosses earn about US\$8 dollars a day. Above them are area leaders, who are usually active members of the police or military service. They receive up to US\$2 per day per location that they control.

There are about 2,650 parking units in the Malioboro area. When all this is added up, it indicates that approximately US\$2 million in annual parking fees are being appropriated by mafias just in the Malioboro Road area alone. Efforts to relocate this parking into off-street parking garages have continued for more than a decade, with talks breaking down largely over the issue of who is going to pay for the off-street garages (Aunurrohman, 2005).

Once a municipality has managed to bring parking under its control, parking revenues can be either collected directly by the municipality, or indirectly in the form of revenue sharing arrangements, concession agreements, or commercial parking taxes.

Parking space levies

As discussed in Chapter 14, parking fees can be effective at both discouraging private vehicle usage as well as achieving other municipal objectives, such as improved public space. While the most common application of a parking charge is perhaps the commercial parking tax, a “parking space levy” is a new technique that holds many advantages to the city. A parking space levy sets a fee to all non-residential parking spaces, regardless of whether the space is utilised or not.

In comparison to a commercial parking tax, a parking space levy provides the following benefits:

- Provides a steady and known revenue stream to the municipality;
- Encourages an overall reduction in the provision of parking spaces;
- Discourages private vehicle use and encourages public transport use;
- Reduces the incidence of problems of record-keeping, enforcement, and non-compliance.

Experiences to date with parking space levies indicate that overall numbers of parking spaces are reduced, and thus making public transport more competitive with private vehicle usage.

From a revenue standpoint, parking space levies have shown to be effective mechanisms for financing public transport infrastructure. The revenues generated from parking space levies can be directly tied to BRT financing.

In 1992, Sydney (Australia) initiated a parking space levy for non-residential parking spaces in the central and northern parts of the city. An annual fee of A\$200 (US\$150) was applied to each parking space (Enoch and Ison, 2006). The Sydney fee has now risen to A\$800 (US\$615) in the central business district and A\$400 (US\$308) in other business districts. The parking levy is currently returning approximately A\$40 million (US\$31 million) per year to the city (Litman, 2006a).

Land owners must pay the fee on all parking spaces, whether or not the spaces are actually being utilised. If an unmarked lot is utilised for parking, the Sydney municipality determines the number of space by “dividing the total area by 25.2 square metres, which takes into account parking spaces and access lanes” (Litman, 2006a, p. 6).

Some exemptions are permitted in Sydney, especially to parking spaces for the disabled and for areas of loading and unloading goods. Revenues from the Sydney programme are applied exclusively to public transport infrastructure and maintenance. In the case of Sydney, the revenues cannot be applied to subsidising public transport operations; any such subsidisation would give the appearance that the parking levy is simply replacing general revenue inputs to the public transport system. Also, such an arrangement may force the city to actually encourage parking in order to properly finance public transport operations.

Perth (Australia) adopted a “parking license fee” in 1999, which was applied to all on- and off-street non-residential parking spaces. The modest fee raised A\$3.35 million (US\$2.5 million) during its first year and most recently has produced A\$8.2 million (US\$6.3 million) in revenues (Litman, 2006a). Non-payment of the fee has been less than 2 percent of the total raised. The fee also helped to persuade land owners to convert over 6,000 parking spaces to other uses. All revenues from the Perth programme goes to supporting the local bus system (Enoch and Ison, 2006).

Fig. 17.6
Parking fees on all non-residential parking spaces are a steady and potentially lucrative revenue stream that can help finance BRT infrastructure.

Photo by Lloyd Wright



Beginning in 1975, Singapore assessed a S\$60 (US\$35) monthly fee on non-residential parking spaces. This fee provided approximately S\$40 million (US\$25 million) in annual revenues. The cost to administer the programme was relatively low at approximately S\$30,000 (US\$18,000) per month (Enoch and Ison, 2006). When the Electronic Road Pricing (ERP) was introduced in 1998, the authorities decided to phase out the parking fee. In this sense, a parking fee can be seen as transition stage towards congestion pricing or road pricing. This incremental approach may be particularly appropriate for developing-nation cities where establishing a congestion charging system may be both technically difficult and cost prohibitive.

17.3.1.4 Enforcement of traffic regulations

Enforcement of laws on speeding, stopping, and obeying lane markings will help ensure smoother traffic patterns as the new street configurations are introduced. Improved traffic enforcement can also generate revenues from fines and penalties. While enforcement of previously ignored traffic laws requires a tremendous change of street culture, the promise of the new public transport system can help mitigate some of the criticism. If the fines and penalties are dedicated towards the new public transport

Fig. 17.7

Simply enforcing existing traffic regulations can be a moderate revenue opportunity. However, in cases such as Quito where even the police may not obey such regulations, enforcement is difficult.

Photo by Lloyd Wright



system, then there may be greater public acceptance of tighter enforcement of traffic regulations. Clearly, though, coordination with the local and national police agencies will be required to implement a new enforcement ethic (Figures 17.7 and 17.8). Further, tying traffic fines to public transport development may require legislative action.

17.3.1.5 Municipal bonds

Municipal bonds, a popular mechanism for financing infrastructure in the US and Europe, have not yet been used extensively in most developing countries. Issuing municipal bonds requires that the municipal finances be audited by an internationally recognised accounting firm. The city's financial conditions must be found sufficiently transparent and legally sound by an international bond rating company in order to provide sufficient security to bond holders. This process is not that expensive, generally costing around US\$1 million to US\$2 million, but municipal finance in many developing countries is insufficiently transparent and legally sound to secure the necessary approvals from the bond rating companies. Nonetheless, this is a process that cities should go through as they develop. Many central and eastern European cities have recently gone through this process and their bonds have sold well, offering reasonably priced financing for municipal infrastructure projects.

Fig. 17.8

The non-enforcement of parking regulations is particularly prevalent on the footpaths in front of police stations in Quito, which sets a bad example for parking enforcement elsewhere in the city.

Photo by Lloyd Wright



17.3.1.6 Land taxes and development rights

“The trouble with land is that they're not making it anymore.”

—Will Rogers, humorist and social commentator,
1879–1935

Introduction to land and property taxes

Unlike most things that are bought and sold, the value of a piece of real estate has more to do with investments near the land that affect its accessibility and the quality of the surrounding neighbourhood, as it has to do with improvements specific to the land. Land itself is a finite resource. Land as a tradable good is created by legal instruments which define the meaning of the ownership right in a specific context. Because any major urban investment that directly or indirectly affects the desirability of land will tend to have a significant impact on site value, most economists believe that land taxation is a good and equitable way for municipalities to recapture the value of their investments into infrastructure.

A property tax is generally based on the total value of the land inclusive of the value of what is built on it. A land tax is generally based on the value of the land exclusive of the value of the property built on the land. Followers of the late Henry George strongly feel that land should be taxed exclusive of the value of whatever has built upon it. This form of taxation, Georgists feel, is one of the most equitable forms of taxation as it only taxes pure land rents which arise from community activities and not from the activity of individual landowners. Land taxation also tends to encourage owners to build rather than to engage in real estate speculation and leave the land idle. Unfortunately, land taxes are still relatively rare, while property taxes are widely used in developed countries, and are increasingly used in developing countries. One of the problems with a property tax is that if a building is improved and thus made more valuable, more property tax has to be paid, but if the building is allowed to fall into disrepair the owner is rewarded with a lower property tax bill.

Some cities have developed more carefully targeted Betterment Taxes, which are imposed specifically on sites that benefit from specific public investments. In some countries, particularly in China, the municipal authorities have

the power to impose project-specific levies on specific land owners. This levy was implemented as a means of financing several metro projects. The somewhat arbitrary nature of this form of taxation makes it highly subject to abuse.

Because BRT projects can significantly increase land and property values along the BRT corridor, using land taxes to finance the infrastructure is a sound municipal finance decision. The stations and terminals in particular can increase commercial land values nearby due to the high volume of persons passing through the system. The proximity to the higher-speed public transport network can mean greater convenience for residents and greater customer flows for commercial enterprises. However, much depends on the impact the system on local noise and air quality, and this will vary on a case by case basis. Busways have had negative as well as positive impacts on land adjacent to the system when systems were badly designed, especially in areas that are a considerable distance from interchange access.

Also important is whether or not there are simultaneous changes in the zoning system. Most experts believe that zoning should be changed along a BRT corridor to allow increased population density along the corridor, though it is rarely done. Up-zoning properties along a corridor will tend to increase land values in that corridor irrespective of any public transport improvements.

Curitiba up-zoned properties along its BRT corridors at the same time it built its BRT system. It witnessed dramatic increases in land and property values along the corridor. Curitiba had a standard property tax that taxed the total value of the property, not just the land. While Curitiba benefited from the general increase in property taxes that resulted from the increase in property values along the corridor, no specific betterment tax was imposed. The increase in property values led to the construction of many high-rise buildings, but it also led to a proliferation of vacant lots owned by land speculators that would have been avoided by a general or corridor specific Location Benefit Levy (LBL). It also led to a displacement of the poor to the periphery. This example underscores the importance of simultaneously planning for affordable

housing in the corridors served by the new BRT system to insulate the poor from displacement.

Recent research from Bogotá, indicates that site values within a ten minute walk of the new TransMilenio trunk corridor increased on average by some 1.8 percent per annum relative to average property value increases, and by more than 5 percent per annum in areas served by feeder buses (Muñoz-Raskin, 2006). Bogotá did not change the zoning along the corridor. It did situate its “Metrovivienda” low-income housing programme in locations served by feeder buses to the TransMilenio system. Metrovivienda functioned as a kind of land banking, where the municipality bought the land and then had private developers develop the housing on a commercial basis exclusive of the land cost. In this way, Metrovivienda insulated its beneficiaries from the increases in land prices in the TransMilenio corridors.

By contrast, land and property values along São Paulo’s Novo de Julio/Santa Amaru busway and Bogotá’s pre-TransMilenio busway on Avenida Caracas suffered adverse impacts, as the busway concentrated polluting and noisy buses along a single corridor. Thus, any positive land value impact is directly tied to the quality of the new system.

The ability of the government to capture any positive land value impacts of a BRT system first requires that the municipality has the means to collect property or land taxes. In many developing countries, site ownership rights, particularly in poor neighbourhoods, are not that clearly defined (Figure 17.9). Land rights often exist along a continuum between outright illegal occupation and full ownership. Land title deeds are also frequently ambiguous even in higher income neighbourhoods. Accurate cadastral surveys are generally a pre-requisite for using municipal property taxation in developing countries, and for political reasons these surveys have often been difficult to implement. Nevertheless, most municipal governments are moving in the direction of implementing land or property taxes.

Location Benefit Levy (LBL)

A Location Benefit Levy (LBL) is a new financing opportunity that holds much promise to revolutionise the manner in which mass transit projects are financed. The concept has also been known as Land-Value Taxation (LVT). LBL is essentially a land tax applied annually based on a site’s “optimum permitted use” (Wetzel, 2006). A tax rate is applied to the estimated



Fig. 17.9
Developing-nation governments often do not have a formal land or property taxation system in place for informal settlements.

Photo by Lloyd Wright



Fig. 17.10
The Jubilee Line extension through Canary Wharf in London led to an explosion of high-rise development.

Photo by Lloyd Wright

value of the land and thus producing a public income. If land value increases due to a new public transport project, then the amount collected also rises. LBL is quite different from a standard property tax, which typically includes the value of added infrastructure such as buildings. LBL is only based on the value of the land itself, and thus a similarly placed property would pay the same LBL whether it hosts a skyscraper or an empty lot.

In most cases to date, public transport systems have not greatly benefited from the land value changes induced by the new systems. Instead, private individuals and companies have reaped significant financial windfalls based on public investment in the new public transport system. Site values within one kilometre of stations on the Jubilee Line extension (London Underground system) increased by approximately £ 13 billion (US\$23.4 billion) as the project developed (Riley, 2001). The extensive development around stations such as Canary Wharf reshaped London's urban landscape (Figure 17.10). The public transport management agency, Transport for London (TfL), estimates that land value appreciated by £ 2 billion (US\$3.6 billion) at Canary Wharf and by £ 800 million (US\$1,440 million) at the Southwark station (TfL, 2003). The land value appreciation in conjunction with other recorded benefits, including employment and time savings, will produce a gross GDP benefit of £ 21.2 billion over a 60-year appraisal period (TfL,

2003). The cost of the entire extension was only £ 3.5 billion (US\$6.3 billion).

Unfortunately, none of the windfall increases in site values were captured by the government. A tax on the land value increases could have paid for the Jubilee Line extension. Thus, many groups are devising land valuation mechanisms to help capture revenues to pay for the public transport infrastructure. LBL is increasingly recognised as the appropriate mechanism to do this.

LBL has already been applied in a few locales with highly positive results. Each year in Denmark, the value of all land is appraised and charged a percentage tax (Wetzel, 2005b). Harrisburg, Pennsylvania in the US has successfully utilised LBL to help revitalise the local economy and the urban environment. Some form of LBL is also practised in Estonia, Hong Kong, Singapore, and Taiwan as well as the cities of Sydney and Canberra (Australia).

LBL has not only been cited as the most effective mechanism to recoup investments to public transport improvements, but has also been recognised to provide the other following benefits:

- 1. Encourages urban revitalisation of brown-fields and abandoned properties**

Since these underutilised sites will be taxed the same as other land in the same area, there is a significant incentive for the owner to make best use of the land or to sell the land to someone who will develop it (Figures 17.11 and 17.12).

- 2. Discourages sprawl and encourages smart growth**

The LBL provides a strong incentive for land owners to maximise the use of sites within the central portions of a city. As the number of commercial and residential units increase, the overall market price for land should drop and thus allowing more affordable housing to individuals and families wishing to live closer to work and services. In turn, demand for land at the periphery of the city should be reduced.

- 3. Equitable and progressive**

LBL essentially returns revenue to a community for value that the community itself has created. The public funds used to build a new public transport system will deliver a windfall

profit to property holders along the corridor. The LBL helps to return a portion of this windfall profit back to the public. Further, since city centre land holders tend to belong to the higher-income groups, the LBL is a highly progressive tax.

4. Fairness

The amount taxed by an LBL will vary depending on the land's current market value. If for some reason land declines in value, then the amount taxed will decline as well. Thus, if proximity to new public infrastructure should somehow reduce a site's value, the owner is compensated through a lower tax. Litigation for other forms of compensation can be avoided. Likewise, since a new public transport system will likely affect land values in relation to the distance from the station, the LBL automatically accounts for all distance-based value gradients. By contrast, a development tax that just targets new-build properties within a specific perimeter of the new infrastructure will invariably be somewhat arbitrary and unfair.

5. Administrative efficiency

LBL is generally a fairly low-cost and simple tax to implement. Since land ownership is fairly readily identifiable, LBL is quite difficult to evade. One cannot move land to another city or jurisdiction.

Another tax option for capturing private benefits from new public transport systems is known as the Development Land Tax (DLT). DLT applies a targeted tax only to new properties

around a public development project. Unfortunately, DLT essentially provides a disincentive to development and creates significant problems regarding administration and equity. In general, developers will likely strive to avoid the DLT by avoiding development. Further, since the positive impact of a new public transport system may extend well beyond the immediate area of the corridor and the public transport stations, there can be much inequity in terms of which properties are burdened with the tax. For these reasons, DLT is not regarded as an effective financing mechanism and is generally not recommended for any city or State.

The Bangkok Skytrain has utilised a form of a DLT by charging a fee to building owners who wish to link directly to a Skytrain station. The building owners must pay for the sky bridge infrastructure as well as an additional fee to obtain the linkage. Obviously, a commercial centre has a vested interest in allowing customers to enter directly and easily from the mass transit system (Figure 17.13). However, this approach does raise some concerns about the appropriateness of essentially selling station access. If a site owner cannot afford the connection fee, then customers may be needlessly forced to make a difficult transfer between the public transport station and their destination. For example, some key destinations, such as a school, may not be able to afford a direct link even though there is likely a good deal of public interest in permitting school children to easily access public transport.



Fig. 17.11 and 17.12
A Location Benefit Levy provides an inherent incentive for derelict and vacant land to be developed and rehabilitated.

Left photo by Carlos Pardo (Bogotá)
Right photo by Lloyd Wright (Montevideo)



Fig. 17.13
The Bangkok BTS Skytrain charges a fee to building owners wishing to have a direct sky bridge link to the system. However, thi practice can raise questions over equity.

Photo by Lloyd Wright

Fig. 17.14
The Hong Kong subway system features underground commercial concourses that house a variety of shopping opportunities for customers.

Photo courtesy of the MTR Corporation



Fig. 17.15
The elevated platforms of the Bangkok Skytrain creates space for lucrative commercial opportunities.

Photo by Lloyd Wright

could present a formidable challenge that would require several years of effort and investment. For those cities, though, that do make the effort to establish an LBL system, the rewards will not only be improved public transport but also a fairer and more effective tax system overall. There are agencies established that will assist cities that are interested in developing an LBL system (<http://www.labourland.org>).

17.3.1.7 Property development at public transport hubs

An attractive new public transport system can open up new commercial opportunities through property development at or near the stations and along the corridors. Land values often increase substantially upon the mere announcement of a new public transport project. Often the most attractive locations are stations with high volumes of passengers. For example, a new transfer station between a busway trunk line and its feeder buses in Belo Horizonte is being entirely financed by a private developer in exchange for the right to build a shopping mall adjacent to the station. Similar arrangements are being discussed in Porto Alegre. In other cases, the properties at popular stations and along corridors are managed directly by the public transport authority or concessionaires under contract to the authority. Mass transit systems in cities such as Bangkok and Hong Kong have used the leasing of commercial space to help fund infrastructure costs (Figures 17.14 and 17.15).

By contrast, LBL has been highly regarded for its ability to create a synergistic package of benefits which lead to a virtuous circle of economic development and improved public infrastructure. However, despite these accolades LBL is not being universally adopted at a rapid pace for several reasons. First, changing tax collection mechanisms is a process fraught with considerable public emotions and political challenges. Nobody likes any new tax, even if it provides multiple benefits and displaces less equitable revenue raising schemes. Second, LBL does require a regular appraisal and evaluation of all properties. For some cities and countries, a property appraisal system already exists and can be successfully converted to an LBL system. However, for many developing nations, the administrative and technical capacity to establish a competent appraisal regime may not be in place. The establishment of such a regime



Fig. 17.16
The aerial platform envisioned for the Bangkok BRT system provides space for commercial leasing.

Image courtesy of Pacific Consultants International (PCI)

Land Banking

Municipalities planning to develop a new public transport system may find it profitable to purchase key properties prior to the announcement of the system. Since property values will tend to jump considerably at the time of system announcement, pre-empting this speculative surge with strategic land purchases can reap significant dividends for the municipality. Such purchasing was a common practice in Singapore and Hong Kong, though not related to BRT projects. Once the system is announced, the municipality may then elect to sell the properties to private developers or develop the property itself. However, one of the limitations of this approach is that it only provides a one-off financial assistance to the construction of the project and is incapable of utilising increases in land values that will arise with the operation of the system. By contrast, LBL provides an annual income to assist revenue funding forward into the future and increasing as the land values continue to rise.

This internalisation of property appreciation may not be possible in all local circumstances. Use of public funds for property transactions by local government is frequently restricted by law to those properties specifically needed for a public purpose, and some courts have defined “public purpose” quite narrowly. Further, keeping news of the impending new public transport system from the news media and general public may simply not be realistic in all circumstances. Further, land speculation by the municipality can open officials to charges of misappropriation and corruption. Thus, while municipal property development can be financially beneficial to

the public transport project, the management of this process must be carefully planned and administered. Otherwise, such dealings are perhaps best left to the private sector and an application of LBL in which the windfall gain can be captured for public use.

Aerial and underground rights

In general, land cannot be created. Municipalities, metropolitan areas, and even our planet have a finite size in which new land cannot be magically added. However, public transport systems can develop new property opportunities from previously unused forms of urban space. BRT stations can be designed to include new areas for commercial development above or below the road right of way. The construction of set aside areas for commercial development within the station area itself can return significant financial dividends. In some cases, this set-aside commercial space can pay for the entire station.

Fig. 17.17
The development of a hospital complex over the Mater Hill station in Brisbane generated important infrastructure revenues for the BRT system.

Photo courtesy of Queensland Transport





Fig. 17.18
An underground shopping concourse managed by the Hong Kong MTR.

Photo courtesy of the MTR Corporation

Some of Curitiba's transfer stations have leased a moderate amount of commercial space out to private shopkeepers. The currently planned Bangkok BRT system and the stalled Hyderabad BRT system had both planned to make extensive use of aerial commercial space. Since customers approach the stations by an overhead walkway and a large aerial platform, there is much opportunity for this form of commercial property development (Figure 17.16).

Perhaps the best known example of aerial property development is Brisbane's Mater Hill station. Shops and a hospital have been constructed over the exclusive lanes of the Brisbane busway (Figure 17.17). Proceeds from this property development have been utilised to build the BRT system's infrastructure.

Likewise, the pedestrian tunnels connecting nearby TransMilenio stations in Bogotá offer the potential to include commercial shops within the infrastructure, though Mayor Peñalosa was strongly opposed to this for fear of degrading the image of the system with litter and advertising. The Hong Kong subway system has turned its underground concourses into highly profitable shopping malls (Figure 17.18). Station shops can also add much convenience to the customer. Being able to conduct one's grocery shopping within the confines of a transfer station could do much to save customer time. Further, such amenities may also make the act of transferring less burdensome from the customer's perspective.

These in-station commercial spaces have much opportunity to generate significant revenues. Since the site is sometimes owned by the public transport system, though often managed by a

management company, there are a few different options for capturing value from the shop owners. The site can either be leased or sold to private developers. Typically, leasing is the preferred option since it gives the system future flexibility. If the system's alignment changes in the future or if platform space is required for other functions, then the system managers retain the right to make changes. Further, as the system expands, the ridership will increase and so will the likely value of the commercial space. Thus, a lease agreement allows the system managers to increase the future site income as the underlying economic conditions change. If the site is permanently sold to a commercial developer, then the initial income generated will be greater but future spatial flexibility will be lost.

Existing systems such as the Hong Kong subway and the Bangkok BTS Skytrain have whole divisions devoted to property management. The private Japanese commuter railway companies make most of their profits from real estate development and leasing both at stations and in areas served. Likewise, the British Airport Authority (BAA), which owns Heathrow Airport, makes nearly as much income from shop and site rentals as it does from landing fees. These companies are more than just transport providers, but also sophisticated property management companies. These activities have not yet become common practice in BRT systems but it is likely to be an emerging trend.

Development rights

In many cities, especially in developed nations, the right to develop a site in a particular manner must be formally approved by the local government. Zoning ordinances may also restrict a site to a particular type of development. The auctioning of the right to develop a site can be a significant revenue source to a new public transport system.

In order to gain access to development rights for a particular property, a developer will put forward a development plan. The local government will then determine whether this plan is in the public interest. Employment impacts, tax revenue impacts, and environmental impacts are some of the considerations that will typically determine whether a proposal is approved. Often there are competing development plans

for a site. In some cases, private developers will bid to gain the development rights. The private developers' contribution could include helping to finance the BRT infrastructure near the site.

The commercial opportunities around new public transport stations can make the auctioning of development rights a financing option to consider. The selling of development rights is not mutually exclusive with other property valuation sources such as a Location Benefit Levy (LBL). A city could reap benefits both from LBL and the auctioning of development rights.

17.3.2 Provincial and national funding

17.3.2.1 Roles of different government entities

While the bulk of the BRT funding should be contributed by local residents who will directly benefit from the new system, provincial and national funding can be a natural complement to local government investments. The exact role of provincial or national governmental entities in municipal transport depends much on local practices.

In some instances, national or provincial agencies may explicitly control all transport decision-making and investments within the cities. In other cases, national or provincial agencies may play a particular role in transport investments involving the largest cities or just the capital city. In Panama City, it is the national government that largely determines whether a public transport project will proceed. In Bangkok, public transport decision-making is largely a shared responsibility between the provincial and national governments. In Jakarta, the provincial government played the central role in developing the TransJakarta BRT system.

In Africa, municipalities more frequently lack the financing and institutional capacity to implement major infrastructure projects on their own without national government or at least provincial government (in a few countries) support. Even modest Phase I BRT infrastructure projects are major infrastructure projects, and municipalities without the finances or capacity to handle projects of this size are liable to rely on provincial or national government ministries for assistance both with the financing and with contracting and implementation.

In South Africa, the National Department of Transport has established a Public Transport Investment Fund (PTIF) that serves as a grant-making source for cities to prepare for hosting the 2010 World Cup event. BRT is currently being envisioned as a principal mechanism for many South African cities to meet the demand of World Cup visitors.

That being said, most countries in Africa and around the world are gradually increasing the power and financial independence of municipal governments, with generally positive impacts on the quality of urban management and local service delivery. Moderately sized BRT projects represent a unique opportunity to further develop the capacity of a municipal government.

A single city project can also inspire a national government to take a larger role in promoting and financing BRT. The success of Bogotá's TransMilenio system motivated the national government to launch an ambitious national BRT programme, encompassing the cities of Barranquilla, Bucaramanga, Cali, Cartagena, and Medellín, and the role of the national government increased significantly in TransMilenio Phase II and III.

The issue of who finances the project is largely a matter of control over the project. As different levels of government are frequently under the control of different political parties, forcing them all to agree on the financing is often a difficult barrier to overcome. In Bangkok, while the Bangkok Metropolitan Administration (BMA) wished to proceed with a BRT project, the national government, led by an opposing political party, did not give the BMA authority to utilise the roadways. The national government thus effectively blocked the project so as to prevent another political party from gaining the credit for improving the public transport situation in the city. In some cities, even parts of the same road might be controlled by different governmental agencies. In Delhi, for example, even two parts of a single major road might be controlled by the Delhi Municipal Corporation and the Delhi Development Authority.

17.3.2.2 Specialised taxes

Dedicated revenue streams from petrol taxes and sales taxes can help establish a long-term

sustainable basis for financing BRT development and expansion. Fuel taxation is both a lucrative revenue source as well as an effective mechanism to help discourage car usage. However, relatively few municipalities have the jurisdiction to control or impose their own locally collected fuel taxes. National legislation and national coordination is usually required to erect fuel taxes and to hypothecate the taxes to public transport projects.

For those municipalities that can gain access to fuel tax revenues, the possibility of funding much of the BRT system through such a tax is quite strong. Bogotá's TransMilenio has benefited greatly from the proceeds of a petrol tax that is partly dedicated to public transport. 28 percent of Colombia's petrol tax is hypothecated directly to eligible public transport projects. Approximately one-quarter of the first phase of TransMilenio was funded through petrol tax revenue.

General sales taxes also represent a significant revenue stream if national or provincial leaders approve its partial usage for public transport projects. The State of North Carolina in the US has developed an innovative scheme to ensure public transport projects receive the necessary funding. One-half of one percent of the State sales tax is set aside for municipal public transport projects. This revenue source generates approximately US\$50 million each year. The State then uses these funds to provide a 50 percent match for municipal public transport projects. New York State has a whole host of special taxes that finance public transport capital investments. These taxes include an indirect fuel tax imposed on oil companies called the "Petroleum Business Tax", a dedicated portion (0.25 percent) of the sales tax, a tax on mortgages, and

also a fixed percentage of the toll revenue collected on several important bridges.

17.3.2.3 Ownership and licensing fees

While many of these revenue-raising mechanisms are based upon charging motorists for vehicle usage, the ownership and licensing of vehicles also represents a potential financing source. Vehicle ownership may not seem directly related to usage, but there is some evidence to suggest a relationship. Once a motorised vehicle is purchased, the convenience of use often induces additional trips (Gilbert, 2000). Further, once an individual makes a financial commitment to a vehicle, there is a psychological preference to maximise the vehicle's use. Thus, discouraging vehicle ownership can help shift patronage to public transport. The financial disincentives to vehicle ownership also can produce revenues for public transport development.

Singapore has gained much fame not only from its Electronic Road Pricing (ERP) scheme but also from its vehicle fees that discourage ownership. Singapore uses an assortment of fees and charges to increase the total purchase price of a vehicle. These additional fees can work to increase the vehicle purchase cost by nearly three times its normal retail price (Table 17.3).

A vehicle arriving in Singapore is first subjected to a customs duty equalling 20 percent of the vehicle's "Open Market Value" (OMV). The OMV consists of all the costs required to deliver the vehicle to Singapore, including vehicle purchase price, freight costs, handling fees, and any other cost associated with the vehicle arriving in the country. The new vehicle is also subject to two different registration fees. A basic registration fee (RF) is first assessed. Then, there is an Additional Registration Fee (ARF) which exacts a cost equal to 130 percent of the OMV. Another major cost is the "Certificate of Entitlement" (COE). The number of COEs are limited in order to keep vehicle numbers manageable within the city-state. Perspective vehicle owners must bid on the open market to obtain a COE. Finally, there is also a 5 percent Goods & Services Tax (GST) applied to the OMV. Thus, for the example given in table 17.3, a vehicle normally costing US\$40,000 will end up costing nearly three times this amount in Singapore (Figure 17.19).

Table 17.3: Vehicle ownership fees and charges in Singapore

Fee type	Cost (S\$)	Cost (US\$)
Open Market Value (OMV)	64,543	40,339
Customs Duty (CD), 20% of OMV	12,909	8,068
Goods & Services Tax (GST), 5% of OMV	3,227	2,017
Registration fee (RF)	140	88
Additional Registration Fee (ARF), 130% of OMV	83,906	52,441
Certificate of Entitlement (COE)	26,000	16,250
Total	190,725	119,203

¹⁾ Example given is for a BMW 325i; actual fee level will depend on the vehicle make and model.
Source: Ching Hoon Choor, 2004

Cities seeking to finance a BRT system could consider using a similar set of fees and charges to help pay for BRT infrastructure and system maintenance. Like all fees and taxes, though, implementation requires a good deal of political will. Further, cities will likely not be able to implement such a regime in isolation. National legislation would most often be required. Without nation-wide implementation prospective car-buyers could potentially avoid payment by purchasing and registering the vehicle outside of the city.

17.3.2.4 National development banks

National development banks are often the appropriate vehicle by which cities can leverage capital for major infrastructure projects. These banks lend funds to cities at interest rates below commercial rates. Projects that promote national developmental objectives are eligible for such loans. National development banks may hold several advantages over international development banks. First, these banks may be more receptive to national priorities, especially if a mayor or governor is particularly promoting a project. Second, these banks often have far less cumbersome application procedures and contracting rules than international development banks, and thus can deliver a loan more rapidly.

In both Asia and Latin America, financing from the national government is frequently made available indirectly through state development banks. India has several state development banks that have expressed interest in providing financing for BRT infrastructure, although actual loans have yet to occur, principally because BRT is a relatively new phenomenon there. China has banks both owned directly by municipalities as well as banks owned by the state and provincial governments. These banks are controlled by the Mayor or the Governor, and are frequently involved in major infrastructure projects, particularly if there is some sort of revenue stream associated with the project. The Brazilian Development Bank (BNDES) has provided considerable financing to BRT infrastructure projects in many Brazilian cities. For example, BNDES has played a key role in upgrading and modernising several of São Paulo's BRT corridors. Additionally, BNDES has played a role in supporting non-Brazilian



BRT projects in which Brazilian-built vehicles are utilised. Mexico's BanObras, a national development bank, is currently examining the viability of extending loans to BRT projects.

17.3.3 International funding sources

International financing may be an appropriate addition to a locally- and nationally-based financing plan. If outside financing proves to be necessary, bi-lateral and multi-lateral institutions are increasingly supportive of assisting BRT projects. The relative cost-effectiveness of BRT has gained the concept favour with a range of international financing sources.

When international financing is pursued as an option, it is generally in addition to locally- and nationally-based financing. International grants, for example, may help catalyse an initiative, but this type of funding typically only augments local sources. Funding organisations will want to see some risk and investment from local and national entities. Only with a substantive local component will it be clear that cities are taking ownership over the project.

The main disadvantage of international development bank financing has been that the procedures for loan approval tend to be time consuming. Given that one of the key benefits of BRT is the ability to implement the system within the administration of a single Mayor, international development bank financing may come on line more in the later phases of a BRT system. Most international development banks also require the approval of national financial ministries, and this requirement sometimes creates additional bureaucratic and political obstacles.

At this time there are no international donor agencies that have proven willing to provide grant funds for the development of BRT infrastructure. Grant funding is more typically applied during the planning stages. While

Fig. 17.19

Singapore's addition of various fees and charges to private vehicle costs helps to both discourage ownership as well as raise local revenues.

Photo courtesy of iStockPhoto

frequently discounted financing is available from international, national, bi-lateral, or regional development banks, ultimately these funds will come in the form of loans that have to be repaid primarily by municipal taxpayers.

17.3.3.1 World Bank

The World Bank is one of the premiere lenders to major infrastructure initiatives in the developing world. The World Bank is also increasingly interested in providing loans for BRT projects. The World Bank has active BRT-related loans in Lima, Santiago, six cities in Colombia, Dar es Salaam, and Accra, and countless others are under development. It is likely that BRT will become a growing part of the World Bank's urban transport portfolio in the coming years.

The World Bank Group actually consists of five different organisations, each with a different mandate in supporting development. Most loans for BRT would likely be managed through the International Bank for Reconstruction and Development (IBRD). However, for the lowest-income countries (Tanzania and Ghana, for instance), the International Development Association (IDA) is the appropriate lending organisation.

17.3.3.2 Regional development banks

Regional development banks operate in a similar manner as the World Bank but with a more

focused geographical mandate. In Latin America, the Inter-American Development Bank (IADB) was one of the earliest funders of BRT, providing financing to Phase II of the Curitiba BRT system back in the late 1970s. The IADB has been actively involved in financing many BRT projects particularly in Brazil, and are in discussions with Managua (Nicaragua) and several other cities.

In Asia, the Asian Development Bank (ADB) has yet to play a direct role in lending to BRT initiatives. However, this absence could soon change with ADB now taking active interest in financing BRT, particularly in India, China, and the Philippines (Figure 17.20).

Other development banks that finance infrastructure but have not to date loaned money specifically for BRT include:

- African Development Bank (AfDB);
- Andean Development Corporation (CAF);
- Central American Bank for Economic Integration (CABEI);
- Council of Europe Development Bank (CEDB);
- Development Bank of Southern Africa (DBSA);
- Eastern and Southern African Trade and Development Bank (PTA);
- European Bank for Reconstruction and Development (EBRD);
- European Investment Bank (EIB);
- Islamic Development Bank (ISDB);
- Nordic Development Bank (NDB);

In countries with access to World Bank, regional development bank, national, and sub-national development bank financing, there is frequently stiff competition for financing between these institutions. This competition generally does not influence significantly the cost of capital, but it does generally give the borrower a lot more independence from the influence of a single bank's policy agenda. However, in most cases the policy requirements of these banks represent good practice procedures; the requirement of a competitive and open tendering process is particularly beneficial to any project.

17.3.3.3 Bi-lateral export-import banks

For some developed nations, export-import banks are a mechanism to promote national technologies

Fig. 17.20
The ADB in conjunction with GTZ and UNCRD has supported BRT training in Manila.

Photo by Lloyd Wright



and firms. Loans are extended on a bi-lateral basis to developing nations if there appears to be a benefit to the developed nation's interests. Thus, if markets exist for construction companies, vehicle manufacturers, and fare equipment vendors from developed nations, then concessionary loans from bi-lateral export-import banks are a possibility for developing-nation cities.

While to date these bi-lateral lending institutions have not been involved in the infrastructure side of BRT projects, several of them are interested in lending money for BRT infrastructure if their own corporations are involved. Those export-import banks actively involved in lending money for infrastructure include (but are not limited to):

- German Kreditanstalt für Wiederaufbau (KfW);
- Japanese Bank for International Cooperation (JBIC);
- United States Export-Import Bank (EX-IM Bank);
- United States Overseas Private Investment Corporation (OPIC);
- US AID's Housing Guaranteed Loan program.

The German KfW has been a principal financier for the mass transit rail projects in Bangkok due to the use of technology from Siemens. KfW is potentially moving ahead with a grant and loan to the Johannesburg BRT project. Likewise, JBIC has helped to finance the Delhi Metro system and its use of technology from Hitachi.

This form of “tied” aid may act to ultimately compromise the intended direction and quality of the project as well as increase the overall capital cost. Further, promoting developed-nation companies at the expense of local suppliers will likely be counter to local development objectives. Nevertheless, financing from export-import banks can be an important part of the financing package for vehicle procurement in some circumstances.

17.3.3.4 Emissions trading

To date, the emerging global market for emissions trading has yet to be used for BRT projects. The more readily available sources of other financing will likely make emission trading less useful than other sources in the short to medium term. However, there is future potential



for financing mass transit initiatives through emission reduction credits. The most prominent opportunities are related to reductions in greenhouse gas emissions. In 1997, under the auspices of the United Nations, member nations drafted the Kyoto Protocol. The protocol calls for developed nations to reduce emissions by an average of 5.2 percent from a 1990 baseline. The Protocol went into force on 15 February 2005.

Several mechanisms under the Kyoto Protocol hold potential to generate revenues for projects in developing nations that reduce greenhouse gases such as carbon dioxide (CO₂) (Figure 17.21). The initiatives inspired by the Kyoto mechanisms are being developed under the framework of the “Clean Development Mechanism” (CDM) and “Joint Implementation” (JI). These mechanisms permit investors to gain Certified Emission Reductions (CERs) by investing in emission reducing projects in developing nations and economies-in-transition. There also exists an active emissions trading market within the European Union (EU). Companies with emission reduction requirements within the EU are able to offset their requirements by purchasing verified emission reductions from other nations, including nations in the developing world.

Several bi-lateral and international organisations are working to support the burgeoning market in carbon emission credits. Some of these programmes include:

- ERUPT Programme (Netherlands);
- Finnish CDM/JI Programme (Finland);
- Austrian CDM/JI Programme (Austria);
- Belgian CDM/JI Programme (Belgium);

Fig. 17.21
Efforts to fight global climate change has resulted in existing markets where Certified Emission Reductions (CERs) can be traded on the market.

Photo courtesy of iStockPhoto

- Japanese CDM Programme (Japan);
- Latin American Carbon Programme, Andean Development Corporation (CAF);
- Prototype Carbon Fund (World Bank).

In addition to these governmental programmes, there are many private trading firms seeking to arrange carbon credit deals between buyers and sellers.

TransMilenio SA of Bogotá and the Andean Development Corporation (CAF) have had a calculation methodology for BRT approved by the United Nations Framework Convention on Climate Change (UNFCCC). With approval of this methodology, Bogotá hopes to claim “Certified Emission Reduction” credits to help finance future extensions to the system. The methodological challenges to gaining approval can be daunting, especially for projects such as BRT which depends on emission reductions from mode shifts. Further, the administrative and transaction costs can greatly diminish the net proceeds earned from the sales of carbon credits. Nevertheless, emission credits should be explored by cities developing a new public transport system.

17.3.4 Private sector loans and investment

17.3.4.1 Commercial banks

While development banks will often offer interest rates below those of commercial lending institutions, this type of concessionary financing may not always be available. A country may not qualify for concessionary terms or a city may have reached its borrowing cap with a particular lender. Also, development banks may be wary of lending to a project if the loan will act to crowd out interested commercial banks. Further, in some circumstances, the commercial lending rate may also be quite competitive with a development bank, if project development costs are included. Cities may also wish to include a commercial lender in the project for several additional reasons: 1. Diversification of financing sources; and, 2. Development of a successful track record with a commercial lender could be useful in subsequent project phases.

Municipal, provincial, and national governments frequently approach commercial banks to participate in the financing major infrastructure projects like metros and BRT. In metro rail

projects it has been fairly common for private banks to participate as part of a consortium of public and private lending institutions. As the experience with BRT has grown, commercial lenders have increasingly viewed BRT infrastructure as a viable lending opportunity. While private banks did not participate in the infrastructure part of the first phase of Bogotá’s TransMilenio, the system’s success has spurred a competitive environment for banks vying for participation in later phases. However, as most of this type of lending goes to sovereign or sub-sovereign entities, a private bank loan to a municipality for BRT infrastructure is generally assessed based on the faith and credit in the overall municipal finances. In such cases, the viability of the BRT system itself would be only a secondary concern to a private bank.

17.3.4.2 Public-private partnerships (PPPs) for BRT Infrastructure

Private sector involvement in BRT infrastructure investment has been extremely limited to date. It is conceivable that under very specific circumstances it could be beneficial for the public. In some cases private equity investment into infrastructure could help to reduce the public sector’s overall financing costs and diversify a financing package from dependence on public sources only. However, in other cases private infrastructure investment simply represents an extremely expensive form of public sector financing used only to get around legal borrowing limits. The marketing and managerial skills of private sector actors can sometimes help deliver a higher-quality and more professional public service, or it can be used to take advantage of unsuspecting or corrupt public officials and compromise the public interest for private gain.

Private investment in public transport infrastructure can take an array of forms including Public-Private Partnerships (PPPs) and Build-Operate-Transfer (BOT) schemes. In general, the idea is that the private sector provides investment capital in exchange for a concession agreement that gives the investor the right to collect some revenue stream like the fare, and/or to develop real estate along the corridor on state land. Private sector investment in public transport infrastructure has a mixed history, with both successes and failures. This section will

attempt to highlight the conditions to make a PPP-type arrangement work both for the private investors and the public transport system.

A public-private partnership (PPP) generally refers to leveraging private sector investment to deliver a public good such as a new mass transit system. Most BRT projects to date have made at least some use of private sector investment, but in most cases, private investment is restricted to the vehicle procurement and sometimes the fare system. While these type of arrangements are a form of PPP, this section examines the extent to which PPPs can be utilised to help finance BRT infrastructure. Section 17.4 addresses private investment for vehicles and other system equipment.

To date, private investment has not been used extensively to finance BRT infrastructure, with only the Santiago project currently attempting this type of financing. However, this mode of financing is an increasingly popular method for metro rail projects and toll roads. As such, while not generally recommended, PPPs are likely to be pursued by an increasing number of governments facing constraints from traditional financing approaches. This section reviews the likely structure of a successful PPP and presents both the advantages and disadvantages of the PPP approach.

Conditions for a successful PPP

A successful PPP should deliver a higher quality, more sustainable project that better serves the long-term public interest at a price that is competitive with other financing mechanisms for achieving the same public good. In rare cases, the project itself will generate sufficient revenue that the private firm's infrastructure investment can be fully amortised over the life of the concession contract. In other cases, a PPP may still require large government subsidies, but because of legal borrowing limits, lack of government technical capacity, or other specific circumstances, may be the only way to get a reasonably well designed BRT project implemented.

It is exceptionally rare that a mass transit system can generate sufficient revenues from fare revenues and real estate development to cover not only the operations but also all or part of the infrastructure from private investment. While BRT systems are certainly likely to get closer

to full cost recovery than metro systems, the conditions remain rare. Having a clear grasp on the inherent profitability of the system being designed is the critical first step for the public administrator to negotiate a reasonable deal for the public from private investors. Certainly, a system with the following conditions will increase the chances of possible private investment into infrastructure:

- Public transport corridor(s) is capable of attracting very high levels of passenger demand;
- Other lucrative income opportunities are included in the agreement, such as property development rights, leasing of space for telecommunications cables, advertising rights, etc.
- Length of concession agreement is relatively long.

The limits to the viability of this form of PPP, where full-cost recovery for private infrastructure investment is expected, are due to the basic economics of most public transport corridors, and especially for corridors in developing nations. In order to deliver a realistic and equitable fare level, most corridors will simply not generate sufficient revenues to cover infrastructure, rolling stock, and operational costs.

There are a few cities and corridors where full cost recovery of private infrastructure investment proved to be possible. The Hong Kong subway system is perhaps the world's most successful PPP. In 2004, the Hong Kong MTR Corporation achieved net profits of nearly US\$500 million. Each day an average 2.4 million trips are realised on the Hong Kong subway. The extremely high population densities existing in much of Hong Kong means that the system can consistently rely upon high passenger demand. The peak demand of nearly 80,000 passengers per hour per direction (pphpd) also does not dramatically fall to extremely low levels at non-peak times. The average non-peak afternoon demand in Hong Kong is approximately 70,000 pphpd (Frommer, 2006). Thus, a successful PPP may not only require an extremely high peak demand but also a relatively high non-peak base as well.

Even in Hong Kong, though, the PPP structure has meant limitations to system development. While publicly-financed metro systems in New York, London, and Paris host networks

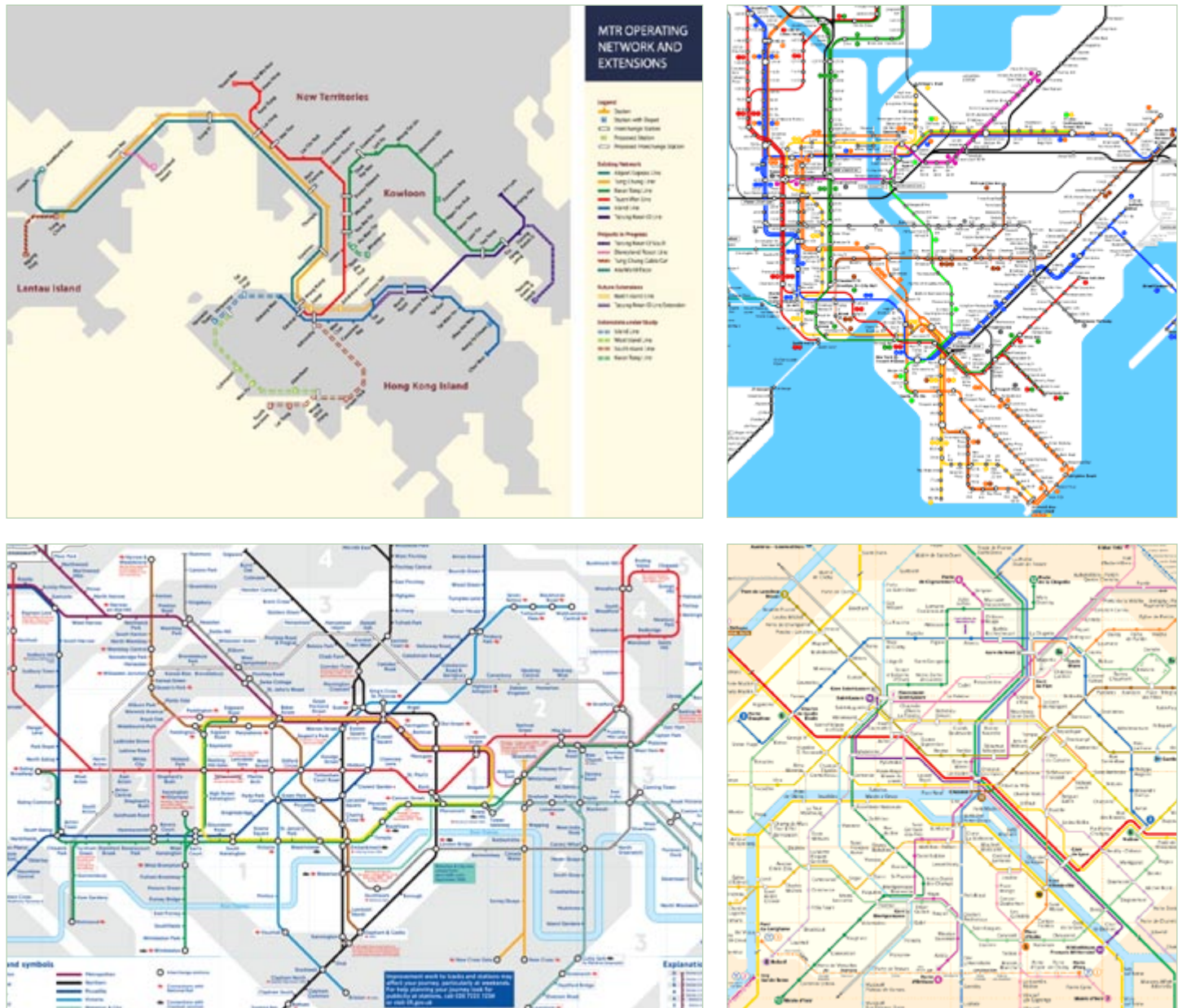


Fig. 17.22
Hong Kong's sole reliance on PPP financing for subway development limits the network size when compared to publicly-financed systems. Comparison of system networks (clockwise from upper left): 1. Hong Kong; 2. New York; 3. London; and 4. Paris.

spanning hundreds of kilometres of track, the Hong Kong system has been limited to just 88 kilometres (Figure 17.22). Since only the highest-demand corridors provide sufficient revenues for a PPP, Hong Kong's system effectively cannot expand beyond its smaller base (Frommer, 2005). For this reason, the Hong Kong PPP model is largely not being extended into the new metro systems of China. Instead, publicly-financed infrastructure is being combined with privately-managed operations. In many cases, the Hong Kong MTR Corporation is involved in managing the development and operations of these new systems. However, the Hong Kong MTR is largely not supplying the capital for

the infrastructure due to the limited number of cases where this approach meets investor requirements.

Beyond the example of Hong Kong, few other PPP arrangements have delivered the same degree of financial success. Both the STAR and PUTRA rail systems in Kuala Lumpur went through painful bankruptcies before eventually being nationalised by the government. The Bangkok BTS Skytrain system has likewise met with considerable financial difficulties in attempting to cover both the system's operations and the repayment of capital.

Advantages of PPP financing

From a government perspective, and particularly a developing-nation government perspective, the allure of PPP financing is quite clear. For a private company to promise a new mass transit system with no government cash contributions is an attractive proposition. A PPP can also bring with it managerial and technical expertise not normally accessible to many cities. Overall, the principal reasons a city may pursue a PPP are:

- The government may have a borrowing limit or other limitations in accessing long-term debt financing for large infrastructure projects;
- The government may not have the technical capacity to develop a good BRT system on its own, and may want to turn over the entire project development to a single private entity
- The government may want to share the risk of project failure with private sector entrepreneurs in order to better ensure project success.

While getting a low-interest loan from the World Bank or a regional development bank may ensure lower costs of capital, and better contracting procedures, it may be that the municipality cannot secure the political approval necessary from the national government to obtain an international loan. The municipality may also face legal limitations to turning directly to the capital markets or private banks for loans, or it may have already exceeded its legal borrowing limits. In such a case, the municipality might be willing to de facto give up a future revenue stream, such as toll revenue, land sale revenue, or land development rights along a BRT corridor, or might be willing to absorb a future debt obligation to a private company. If such circumstances exist, private financing should be considered as an alternative to project abandonment.

Designing a BRT system, preparing the contracts, negotiating with existing bus operators, and managing the entire project is not easy to do well, particularly in the reasonably short span of a single municipal administration. There are plenty of cases where public control over BRT projects have led to poorly designed and administered systems. Any problems with possible private infrastructure financing of BRT therefore must be weighed against the likely

outcome of public sector infrastructure financing in a specific context.

The most successful BRT projects benefited from an extremely enlightened Mayor and highly talented public administrators. This ideal condition rarely exists, however. Many developing country municipalities find it extremely daunting to handle a project of this magnitude and political and technical complexity. In reality, building the technical capacity within the municipality may be less costly than the concessions given to a PPP investor, and such in-house control may be more in the public's interest. However, if the capacity simply does not exist and cannot be readily attained, a PPP structure could be a reasonable alternative.

Proper management of any public sector initiative requires the careful balancing of private risks with private profits, and public risks with public profits. Because government incentives sometimes differ from those of public transport users, a case specific assessment will need to be made as to whether a commercial framework for project development will result in a better project than if largely political motives govern the project's design. If contracts are negotiated that protect the public interest with enforceable penalties for violation of contract, it is conceivable that a private concession for BRT infrastructure could be structured in a way that protected the public interest as well as a project with purely public investment, if the private financing creates an incentive for the BRT operations to be profitable and provide a good service.

Disadvantages of PPP financing

Applying PPP infrastructure financing to BRT projects faces some issues specific to BRT and some general issues that face most PPP infrastructure projects. The main issue with applying PPP to BRT infrastructure specifically is that BRT systems generally reconstruct an entire corridor in a way that affects not only the bus services but also mixed traffic, cyclists, and pedestrians and others not using the BRT system, and usually also involve improving water, drainage, and other infrastructure. For metro systems, the infrastructure being constructed is generally only used by the metro system. The total construction costs for BRT therefore tend to include very

important investments that are not absolutely necessary to the profitability of the BRT system but are critical for maximising the social benefit of the project. How to structure such a contract for a BRT project has yet to be resolved. There are some early discussions of BOT projects for the construction of “complete streets” but so far not in the context of a BRT system.

The remaining issues are generic to PPP infrastructure projects. The legitimate civic goals that could theoretically be accomplished through PPP should be balanced against the cautionary tale presented by the actual historical record of PPP in toll road and mass transit projects, where some problems have emerged. Such problems could also be encountered in a BRT project utilising PPP financing. Some of the difficulties encountered with PPPs have included:

- Inability of the government to protect the public interest in contracting;
- Only allows the most lucrative public transport corridors to be developed;
- Potentially results in reduced equity in terms of system coverage and fare levels;
- Potentially increased actual project cost to the taxpayers;
- Potentially less focus on quality of service;
- Political and regulatory risk to investors.

The main problem with PPP in infrastructure, and BRT would be no exception, is that to do it well requires a high level of sophistication in drafting and negotiating contracts, a highly

Box 17.1:

The Johannesburg Gautrain

In late 2005, the South African government approved the development of a heavy urban rail system for the Johannesburg area, as well as a link between Johannesburg and the capital of Tshwane (also called Pretoria). A “PPP” structure was highly touted by project developers as way to reduce public investment and public risk. However, in the case of Gautrain, the reality was a project with the vast bulk of the investment costs and the demand risk given to the taxpayer.

Since the project’s conception, the budget has increased by a factor of over three to R 25 billion (US\$ 3.3 billion) for a system that only provides a single corridor through Johannesburg. While the project’s success depends on high levels of mode switching from cars to rail, the risk of these projections fall almost entirely on the South African taxpayer. The private consortium thus enjoys the benefits of guaranteed government backing in case the ambitious passenger estimations are not realised. The Gautrain also is an example of using the “PPP” term to sell the project to the public. Private sector contributions from the Bombela consortium is expected to only total R 2.2 billion (US\$ 367 million), or less than 10 percent of the total. In return for this 10 percent investment, the consortium receives a 15-year operational concession along with demand guarantees from the government.

Fig. 17.23
The Gautrain PPP gets underway in Johannesburg.

Photo by Lloyd Wright



transparent decision-making process which reduces the risk of significant graft, and a legal system able to enforce contract violations. Of course, if these elements are in place, private investment into BRT infrastructure is probably not necessary. However, if a municipal government is sophisticated, transparent, and reasonably free of graft, many of the potential problems with PPP can be contained through careful contracting, sufficient public scrutiny and oversight, and transparent competitive bidding procedures.

PPP financing for infrastructure will quite often actually increase total financing costs. It is fairly typical for government officials to tell the public

that the private investor will pay for a public transport system with no financial burden to the taxpayers. However, the reality can be a series of hidden costs that actually amount to a higher interest rate than if the system was financed through other means. The municipality will likely be giving the private investor a long concession period in order to recover the investment. A long concession period reduces the municipality's control of the system and creates a loss of competitiveness over the operational concession. Systems like TransMilenio reap significant benefit from a structure that permits multiple operators competing within a single system. The proposed Gautrain system for the Johannesburg area of South Africa provides a striking example of how the "PPP" name has been used as a marketing tool to gain project approval but within a framework that puts the bulk of the costs and risks on the public sector (Box 17.1).

In a PPP, it will be likely that a single operator has complete control. Sole source contracts are likely to have more serious long-term consequences in terms of maintaining reasonable and equitable fare levels. Inflated construction costs are perhaps the least dangerous, for while they will increase the construction costs, these are a one time cost and need not necessarily be passed to passengers in the form of higher fares.

Usually, the parties willing to invest in a PPP or BOT structure are construction companies, vehicle manufacturers, public transport operating companies, real estate developers, and private banks. The primary motive for these private investors is frequently not the profits earned by the consortium itself, but rather from the lucrative no-bid financing, vehicle procurement, construction contracts, or side real estate developments. This loss of competitive tendering for financing, construction, and vehicle procurement will tend to increase project costs, and hence the real total financing costs. If a bus manufacturer was to lead a PPP, there could be considerable impact on long-term fare prices due to a non-competitive vehicle procurement process.

Being locked into a long-term concession contract with a single operator also carries with it the risk of being unable to replace an operator in the case of poor quality service. Since customer satisfaction may be a secondary objective to net

profit, service quality and customer care can suffer. An investing firm that is making most of its income from property development may in fact seek to minimise expenditures on public transport operations. However, to an extent these concerns can be mitigated by explicit penalties in the operating contracts. Further, in most cases, passenger volumes and therefore customer satisfaction will have an impact on the financial returns, even for non-transit revenues such as property development.

Hidden costs may also appear in the form of guarantees contained within the PPP contract. In some countries there are no laws requiring that the concession contract be a public document, and details of these guarantees may not surface until years later when the taxpayer may be called upon to absorb unfulfilled passenger revenues. Some PPP-type agreements contain language guaranteeing the investor a minimum passenger ridership, or government guarantees on loans, or operating subsidies, or a flat capital subsidy. The private investor thus has an incentive to present inflated passenger demand estimates relying on questionable modelling practices that are not certified by a credible technical authority. The level of financial risk that the taxpayers would be exposed to in the case of demand guarantees for a BRT project would likely be less than for a metro project, but the risk would nonetheless exist.

As has been noted by the successful example of Hong Kong, PPPs can imply an inherent limit to the network coverage provided by the public transport system, if a municipality insists on only financing projects where the full cost recovery form of a PPP is viable. Since in this case only the most lucrative corridors will provide an adequate return to the private investor, these corridors are the only ones constructed. Key origins and destinations from the customer's perspective may not be serviced if these areas lie outside the densest sectors of the cities. In turn, such origins and destinations may only be serviced by a lower-quality bus service, and thus implying a necessary transfer whenever a customer wants to access destinations along the main rail corridor. The "cherry-picking" of the most lucrative corridors by the PPP infrastructure also means that other public transport

options are at a distinct disadvantage in creating a full network with a sustainable customer base. However, if the services financed under the full cost recovery PPP financing system are fully integrated with other systems financed using different financing methods, this problem can be avoided.

The fare levels required for an adequate private sector return may also be at odds with public objectives of maximising public transport usage and overall social equity. The fare level that maximises revenues is rarely the fare level that maximises passenger use. As public transport use has positive externalities (less congestion, less pollution, etc), it is socially optimal to maximise ridership, but financially optimal to maximise profits. The Las Vegas Monorail was launched in July 2004 through a PPP-type financing arrangement with a private consortium. The system immediately ran into difficulties with both low ridership numbers and mechanical problems. The strain of capital repayment and operational losses has put the Las Vegas Monorail Company (the private sector firm) in possible jeopardy. In December 2005, the monorail company increased a one-way fare from US\$3 to US\$5. This move did lead to an increase in overall revenues, but conversely actually reduced the total number of passengers utilising the system.

By contrast, a publicly-developed system may place more emphasis on such issues as: 1.) Fare affordability; 2.) Benefits to low-income groups; and, 3.) Network coverage to all major sectors of the city and especially to low-income areas. It is possible that contractual agreements within a PPP could achieve some of these objectives, but the mixed objectives of private revenue maximisation and public policy maximisation can be difficult to reconcile within the constraints of a system only utilising private investment for infrastructure.

Finally, because such consortiums frequently make their money not from the operations itself but from the financing, construction, vehicle procurement contracts, or real estate developments, the consortium may allow the concession company to go bankrupt if problems arise. The firm will be essentially disposing of the non-performing public transport system. In this scenario, the debts of the bankrupt consortium are transferred to the government and ultimately to the taxpayer. However, the assets of the companies that won the lucrative construction and procurement contracts cannot be touched. The bankruptcy of both the STAR and PUTRA rail systems in Kuala Lumpur represents a classic example of this type of asset manipulation (Box 17.2).

Fig. 17.24
The PPP structure of the Las Vegas Monorail system has come under the strain of operational problems and poor passenger numbers.

Photo courtesy of iStockPhoto



In some instances, capital costs can be reduced through concessionary financing or grants from developed-nation governments and private firms. The concessionary funds are provided as a means to promote the exportation of developed-nation products such as vehicles, information technology, and consultants. Concessionary terms can also be an effective technique to lock a city into a particular technology. The financial concessions may even be recouped later as the particular city extends the system. The Mexico City metro system, the Medellín (Colombia) urban rail system, and the Delhi metro system have also benefited from finance provided by,

respectively, France, Germany, and Japan at concessionary interest rates. Unfortunately, in the cases of Mexico City and Medellín the cost of extending the current rail system is prohibitively expensive since the concessionary terms are no longer available. Thus, some cities can become victim to a sort of “Trojan horse strategy” in which an initial corridor is provided at a reduced cost. However, once the city is locked into a particular technology, the price of future corridors returns to the higher standard rate.

It has also occurred that private investors have been hurt by governments unwilling to honour contractual obligations. In São Paulo, the Mayor

Box 17.2: PPP bankruptcies in Kuala Lumpur

The PUTRA grade-separated LRT system went into operation in September 1998 with high expectations to help slow the city’s increasing dependence on private vehicle travel. With the PUTRA LRT Company (Projek Usahasama Transit Ringan Automatik Sdn Bhd) providing part of the investment in exchange for concession rights, the Malaysian government felt that the project represented a cost-effective option for the city.

However, after only three years of operation, the system had run up debts of over US\$ 1.4 billion. All the contractors and vehicle suppliers involved in PUTRA came away with large profits despite the system’s operational problems. Further, since the PUTRA LRT Company only contributed a 5 percent investment, the loss from the bankruptcy was minimal.



Unfortunately, Kuala Lumpur’s public transport problems were not exclusive to the PUTRA system. Another elevated rail system, known as the STAR Line, also had come under financial pressures. Like the PUTRA system, STAR was also based on PPP financing through a firm called Syarikat Transit Aliran Ringan Sdn Bhd. The STAR system was the first LRT to operate in Kuala Lumpur when it was launched in December 1996. After its first five years of operation, though, over US\$ 200 million in debt had been incurred.

With such losses becoming unsustainable, in December 2002, the Malaysian Ministry of Finance completed nationalisation of both the PUTRA and STAR systems. Thus, while the private developers slipped away with their profits in tact, the Malaysian taxpayer ended up bearing the debts left behind.



Fig. 17.25 and 17.26

The bankruptcies of the PUTRA and STAR rail systems in Kuala Lumpur meant that

the taxpayer and not the private operating firms absorbed the onerous debt levels.

Photos by Lloyd Wright

successfully convinced a private bus operator to invest in bus infrastructure in exchange for a monopoly concession in one corridor. The private operator agreed to build some new bus shelters and provide good-quality street furniture and other amenities. This arrangement did not include construction or maintenance of the roads, nor was it a full BRT system, but it could have laid the groundwork for such investments in the future. In the end, the municipality did not enforce the company's monopoly, and they could not win any compensation from the city for violation of the contract. This dispute led to rioting on the part of the bus company's employees. This experience has soured the idea of PPP in BRT infrastructure provision in Brazil, where it is perceived by some that the Brazilian courts find it difficult to enforce contracts with public entities.

Based on the issues identified in this section, *PPPs often prove to be a more costly financing option than traditional public financing*. A PPP can carry the risk of increasing operating costs, inflating fare levels, and delivering sub-optimal service provision. However, despite these problems, private sector investment in infrastructure is certainly an option to at least merit consideration during the development of a financing plan. Intelligently drafted contracts hold the potential to at least mitigate some of the worst problems associated with PPPs.

17.3.4.3 Advertising

Stations, terminals, and public transport vehicles will likely all come in contact with

thousands of customers each day. Since these customers are essentially a captive audience during much of their waiting and travel time, advertisers have not lost sight of the commercial potential within mass transit systems. The selling of advertising space to private firms can be a lucrative income opportunity for public transport systems (Figures 17.27 and 17.28). While advertising is unlikely to finance the majority of a new system, it may provide an income stream that can cover as much as 10 percent of a system's infrastructure costs.

The contracting of advertising rights can be accomplished through several different mechanisms. The public transport system can tender a concession to a private firm to manage system advertising for a set period of time. This private firm would have to abide by the advertising limits set forth in the contract. The private firm's payment to the municipality can either be in the form of a pre-determined amount or as a percentage of the advertising revenues. Alternatively, the private firm could fulfil its commitments through the direct provision of infrastructure. In this case, the firm takes the responsibility for constructing and maintaining a portion of the system's infrastructure in exchange for the advertising rights. In many bus systems, advertisers pay for bus shelters through which they obtain exclusive advertising access (Figure 17.29). Since the quality of the environment reflects how the advertising message is perceived, the advertising company has an incentive to maintain the shelter (or at

Fig. 17.27 and 17.28
Advertising such as utilised on the Kuala Lumpur PUTRA system (left photo) and the Bangkok Skytrain (right photo) can be effective revenue sources, but can also act to diminish the aesthetic nature and legibility of the transit system.

Photos by Lloyd Wright



least the part with the advertising message). For this type of arrangement to be successful, though, a carefully crafted contract is essential. Otherwise, the result can be a system that is quite effective at disseminating a marketing message but less effective at providing a public transport service.

In all cases, the commercialisation of the system must be done with a great deal of caution. Commercial signage should be discretely done, if at all, or it will risk degrading the visual and aesthetic quality of the system. When commercial signage overwhelms stations and vehicles, customers are then less able to distinguish signage relating to system use. The general despoiling of the aesthetic quality of the system can lower the image of the system, which is directly related to customer satisfaction and usage. Visual degradation can also lead to increased incidences of graffiti, vandalism and other criminal activities. Advertising messages delivered through audio and video messages may provide entertainment for some, but these messages can also be a significant distraction to customers wishing to read or study.

17.3.4.4 Merchandising

Merchandising the system brand can be a small, but steady revenue source that also brings with it other promotional advantages. The sale of system t-shirts, model stations and vehicles, and other souvenirs can in fact provide a reliable revenue stream. The marketability of the system relates back to the quality of the initial marketing impression (system name, logo, etc.) as well as the degree of social pride attained through the delivery of a high-quality product. Both the Bogotá and Curitiba systems make use of merchandising for both revenue and promotional reasons (Figures 17.30 through 17.33).

While the amount of revenue generated from merchandising activities is likely to only be a small percentage of total revenues, merchandising may help generate other forms of income. For example, merchandise with the system's brand name and image can do much to increase system awareness. In turn, this improved image and awareness can contribute to increased ridership.

Public transport agencies should move quickly to anticipate demand for products bearing their



Fig. 17.29

The advertising firm has an incentive to maintain the lighting at this bus shelter in Bogotá since the lighting directly affects the delivery of the message.

Photo by Lloyd Wright

brand and image. Otherwise, pirated products can quickly fill the market. The popularity of the Bogotá TransMilenio system was not lost upon street vendors who quickly delivered plastic toy articulated vehicles to the market. While such entrepreneurship can be a positive sign, it can also create issues over product quality and intellectual property rights. If the uncontrolled private sector merchandising leads to low-quality products bearing the system's name, then ultimately the value of the brand can be harmed. In response, TransMilenio eventually legally curtailed the sale of the street products and issued its own line of higher-quality goods.

17.3.4.5 Telecommunication rights

A new public transport system will likely traverse some of a city's most valuable properties. The reconstruction of the BRT right of way is generally a unique opportunity to improve all sorts of infrastructure, such as water, electricity, and telecommunications. Granting telecommunications companies the right to put telecommunications lines and services in the corridor potentially can help underwrite the infrastructure development costs.

Fig. 17.30, 17.31, 17.32,
and 17.33

*Clothing, umbrellas,
office supplies, toys, and
games are just a few
of the merchandising
products offered by
TransMilenio.*

Photos courtesy of TransMilenio SA



As the information age of mobile telephones and internet communications has erupted onto the scene, companies providing these services sometimes lack the ability to cost-effectively deliver their product due through the existing street infrastructure. The array of water, sewer, electricity, and existing telecommunication infrastructure that consume limited above-ground and below-ground space makes adding new lines costly and difficult. Municipalities may be particularly reluctant to permit telecommunications firms to dig up the streets. The ensuing disruption to traffic can harm a city's economic functionality as well as erode public goodwill.

The construction of the median busway presents a unique opportunity for telecommunications firms to deliver crucial infrastructure along a centrally-located corridor. For example, the construction of a new busway may make for the ideal opportunity to lay a fibre optic communications line. As the busway lanes and/or median

are being prepared, this construction period could be a low-cost time for other additions to communications services and public utilities.

In many metro systems, air rights are being sold to mobile telephone companies wishing to make their service accessible while customers are in the underground system. Without special receivers and transmitters located in the subway tunnel, mobile telephone services are not possible inside the system. Since most BRT systems only operate above ground, there are no restrictions on mobile telephone access. However, in cases where BRT systems temporarily traverse underground or shielded areas, there may be some prospect for service agreements with mobile providers.

Any addition of telecommunications infrastructure must be carefully planned in conjunction with the public transport infrastructure. Ease of access for repair work should be a prime consideration. A problem with the telecommunica-

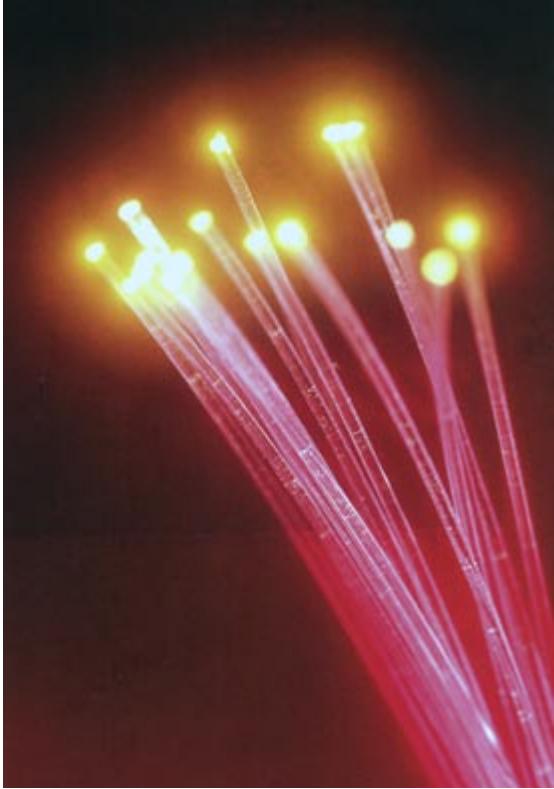


Fig. 17.34

Selling rights to telecommunication lines, such as fibre optic systems, can be a business opportunity for some BRT systems.

tions line should not require disruption to the busway services. Thus, the telecommunications line should probably not be placed underneath a busway lane. Instead, the busway median or even the lane divider would be a more accessible location.

17.3.5 Infrastructure financing examples

Despite a relatively short history of implementation, BRT has been implemented through a wide variety of financing mechanisms. Local, national, international, and private sector sources have all played a role in system financing. This section briefly highlights the experiences to date.

17.3.5.1 Bogotá

As one of the world's most sophisticated BRT projects, Bogotá's TransMilenio is also amongst the most costly. With the project's first phase costing approximately US\$5.3 million per kilometre and the second phase requiring nearly US\$13.5 million per kilometre, the Bogotá system tested the viability of financing a world class system within a low-to-medium income nation.

Since the supporting Mayor, Enrique Peñalosa, had only three-years in office to implement the project's first phase, there was not a great deal of time to align extensive international financing. Thus, TransMilenio's Phase I relied principally upon the project team's ability to find local and national funding sources. Fortunately, the required local and national financing requirements did not represent an insurmountable obstacle.

The details of local financing for Bogotá Phase I are as follows:

- **Local fuel surcharge (46 percent):** Colombian national law allows City Councils to impose a surcharge on petrol. In 1997, the maximum a municipality could charge was 25 percent. However in Bogotá, the City Council had set this surcharge at only 10 percent. When Enrique Peñalosa was elected Mayor, he convinced the City Council to take the surcharge to its maximum, and earmarked the extra 15 percent to the construction of a new mass transit system. In 2003, President Uribe raised the maximum surcharge to 30 percent and Bogotá has already increased it to this new level, assuring resources for the future phases. Other Colombian cities are doing the same, especially those with BRT planning and implementation underway.
- **General local revenues and de-capitalisation of the municipal electricity company (28 percent):** In 1997, the Municipal Electricity Company was 51 percent owned by the municipality and the rest was privately held. At that time, the company had an excess of cash, and decided to de-capitalise itself. Some of these sources financed TransMilenio infrastructure.
- **World Bank credit (6 percent):** This was an initial credit given to the City of Bogotá (with the authorisation of the national government) to build a low-grade busway on "Calle 80" (80th Street). The World Bank allowed a change in the loan terms in order to use this credit for TransMilenio infrastructure.
- **National Government (20 percent):** Mayor Peñalosa signed an agreement with the national government to help finance the system. For Phase I, the national government contribution only accounts for 20 percent of the infrastructure costs, but for the upcoming

phases the national government is expected to finance 60 percent of the costs.

With the successful implementation of the project's Phase I, a wider diversity of financing sources have become available to subsequent phases. In fact, it has been the success of TransMilenio that has driven additional interest from sources such as the international development banks. The World Bank has become a major investor in Phase II of TransMilenio and has gone on to finance BRT projects elsewhere in the developing world, including other cities of Colombia.

17.3.5.2 Santiago

Santiago is the first city attempting to use PPP financing for BRT infrastructure. Most other private sector financing of BRT systems to date has been applied only to vehicles and fare collection equipment. The Santiago BRT system, called Transantiago, is hoped to overcome the city's infamous air quality and traffic congestion problems. Unfortunately, the launch of Transantiago has been beset with severe operational problems that resulted in four ministers being sacked.

In the case of Transantiago, the private sector operators are financing 69 percent of the Phase I infrastructure costs and 100 percent of the vehicles and the fare collection equipment. Construction of Phase I began in 2005. The system

opened with some of Phase I completed in February 2007. The public sector is contributing US\$103 million to Phase I infrastructure while the private sector is contributing US\$229 million. The Phase I infrastructure is being applied to a total of 81 kilometres of which only 22 kilometres will be segregated busways.

Transantiago is a bit different from a full BRT system. The system will extend to most parts of the city during Phase I through feeder services, which will be somewhat similar to the existing bus services. The trunk vehicles will operate both on and off the busways. All fare collection will be conducted on-board the vehicles. Thus, Transantiago is able to create a fairly broad city-wide network with a minimum of infrastructure investment. The trade-off is a lower-speed service than a full BRT system and a less-metro like performance overall.

If successful, Transantiago may do much to prove the viability of PPP financing for BRT applications. The challenge for Transantiago's private operators is to gain sufficient fare revenues to cover the system's operating costs while simultaneously repaying the initial investment. The current fare level for bus services in Santiago is a flat rate of 320 pesos (approximately US\$0.53). This fare level is somewhat higher than many developing-nation cities, and thus may help Transantiago's operators achieve a successful PPP.

17.3.5.3 Brazilian systems

Despite Brazil's fame in delivering some of the first BRT systems, there has been no national grant funding to support BRT development. By contrast, extensive national grant funding has been made available for the subway systems of Brasília, Rio de Janeiro, and São Paulo. This discrepancy has been a source of ongoing political contention, and there are possibilities that the law may change. However, with the decentralisation of financing in Brazil, the national government has played a much less pronounced role in urban financing in general since 1988.

When BRT was first developed in Curitiba in the 1970s, Mayor Jaime Lerner was developing a system with few precedents, so the financing was difficult to secure, and the municipality had to rely on its own resources. With the success

Fig. 17.35
Transantiago is attempting to become the first BRT-type system to make use of PPP financing for infrastructure. The system's start-up has been plagued by severe operating problems.

Photo by Lloyd Wright



of the project, the Inter-American Development Bank (IADB) agreed to provide the financing for Phase II.

Brazil's national development bank (BNDES) is increasingly an option for cities developing BRT. In fact, the BNDES is also financing projects outside of Brazil when the vehicles utilised are manufactured in Brazil. The BNDES is currently supporting several of the new corridors within the São Paulo Interligado system. Historically, São Paulo has had BRT corridors under both the control of the municipality and of the state (*i.e.*, province), depending on which government body financed the project. To date, there has been no shared financing between local and state agencies, and thus coordination problems are a serious issue.

17.3.5.4 Mexico City

The BRT system in Mexico City opened in 2005, and the system currently carries approximately 250,000 passengers a day (Figure 17.37). Because of a financial crisis several years ago, the cost of obtaining international loans in Mexico can be quite high. For this reason, the Federal District of Mexico (*i.e.*, the city), when it paid for the BRT system's infrastructure, took out commercial loans from private banks. Such commercial loans are actually less expensive than World Bank loans, especially after the national bank BanObras adds all its national charges.

The State of Mexico (*i.e.*, provincial level) has also sought to develop BRT corridors. However, the State is currently so heavily indebted that commercial loans are not possible. A financial structure around three components was proposed to avoid the limitations due to the State's indebtedness. First, the municipalities in the State of Mexico through which the busway will pass still have viable credit. These municipalities may contribute roughly 30 percent of the infrastructure costs through either loans from commercial banks or from World Bank loans channelled through BanObras. Second, another 30 percent of the infrastructure costs may be financed through a special loan facility at BanObras. Third, the possibility is being explored of using the projected farebox revenues to back a bond issued by an investment bank. The



constituent municipalities and BanObras would be responsible for guaranteeing the bond issue. Thus, due to the State's debt status and a refusal to employ tolls on new motorways in the area, the interested parties are utilising a great deal of creativity to find a suitable financing structure.

17.3.5.5 African cities

As of April 2006, the new Dar es Salaam BRT system, the Dar Rapid Transit System (DART), is in the process of developing its financing package. The most likely scenario for financing the BRT infrastructure is a combination of World Bank loans and other development bank and bi-lateral loans to be repaid out of future revenues of the Road Fund (the national gasoline tax revenue), matched by current road funds and some modest municipal and sub-municipal (district) funds from parking fees and other general revenue. Currently the estimated cost of Phase I is around US\$60 million for a 23 km system, and the World Bank, using its low interest IDA window, is promising to fund around US\$40 million, leaving a US\$20 million financing gap.

Options for filling this gap are being explored while the final cost calculations are being completed. One such option is the Danish International Development Agency (DANIDA), which is already financing major road projects in Tanzania in conjunction with the European

Fig. 17.36
São Paulo's Interligado system is receiving financial support from the Brazilian national development bank (BNDES).

Photo by Gerhard Menckhoff

Fig. 17.37

Financing for the Mexico City “Metrobus” was largely obtained through loans with commercial banks.

Photo courtesy of Volvo Bus Corporation



Union. Additionally, the Japanese Bank for International Cooperation (JICA) and the German Bank for Reconstruction (KfW) are also possible sources of support.

For the proposed BRT projects in Dakar (Senegal) and Accra (Ghana), the most likely sources of financing are new World Bank loans, coupled with grant funding for project preparation from the Global Environmental Facility (GEF). In Dakar, the French Development Agency (AdF) has shown potential interest in financing the project.

17.3.5.6 Jakarta

Jakarta’s BRT system, called TransJakarta, has relied exclusively on local government funding. For the system’s initial phases, all infrastructure, vehicles, and fare collection equipment have been funded by the DKI Jakarta Government. DKI Jakarta is a special administrative district with the status of a province, although there is a minimal sub-municipal government structure within Jakarta. The Regional Parliament voted on and approved the financing. For TransJakarta’s first phase a total of only approximately US\$10 million was expended on the system’s infrastructure. The low initial investment level reflected lack of confidence in the project, and the deferral of other corridor improvements like improved footpaths until after the basic BRT

system was functioning. As political support has grown, annual investment into the system has increased.

Phase II, which was completed in 2006, cost roughly \$70 million, also included some improvements on the first corridor. Jakarta’s reliance on its own funds in part reflected its desire to not adhere to international competitive bidding rules, and in part based on tense relations between the Governor and the World Bank over unrelated issues.

17.3.5.7 India

Indian cities and the national government have shown much favour to PPP-type investments with regard to mass transit systems. For example, the Delhi metro system was financed with a 40 percent contribution from the national government, 40 percent from the Delhi local government, and 20 percent from private investors. Much of the governmental financing for the Delhi metro was actually provided by the Japanese Bank for International Development (JBIC) since Hitachi supplied the rolling stock and consulting contracts were awarded to Japanese firms.

The current policy of India’s national Ministry of Finance is to restrict government-subsidised contributions to 20 percent for any Build-Operate-Transfer mass transit or highway concession.

The remaining financing must come from either provincial and municipal governments or the private sector.

The new national policy towards PPP-financing has tried to bring some control to the ongoing free-for-all amongst specific transit technology promoters. Various competing plans for BRT, MRT, monorail, and a locally-developed “Skybus” are all being aggressively promoted by private interests across the country. Until recently, the lack of coherent planning guidelines and financing criteria has resulted in confusion. In Hyderabad, the government issued a competitive tender for a Build-Operate-Transfer project to provide mass transit services in three critical corridors. Expressions of interest were received from monorail companies, the Delhi Metro Rail Corporation, and other private investors, but no decision has been made on any of these proposals. Despite Hyderabad officials showing early interest in BRT, the lack of an existing consortium of BRT-related companies to promote the project has meant that the option may not have a chance there.

Currently, there are several BRT systems still moving forward in India: Ahmedabad, Bangalore, Delhi, Indore, Jaipur, and Pune. In Delhi, the Delhi Government has approved the financing of the first High Capacity Bus System (HCBS) corridor over an 18-kilometre stretch. The Delhi government has allocated roughly US\$30 million of general budget revenues to finance the construction. It has also given approval for numerous other additional corridors. Currently, disputes between the traffic police (which are under the control of the national government) and the Delhi Government continue to delay implementation.

Ahmedabad has in part given attention to the BRT option since national government support for a metro system is unlikely. As a relatively low-income city, Ahmedabad is investigating the potential of a PPP arrangement with private sector firms interested in BRT, but the most likely scenario is that for the 10-kilometre Phase I project the initial infrastructure financing will be paid by the Ahmedabad Municipal Corporation, using funds passed on to it from the State government of Gujarat. The profitability of the proposed system is insufficient to finance any



Fig. 17.38

The limited funding expended on Jakarta's Phase I infrastructure was provided by the Provincial government, DKI Jakarta.

Photo by Karl Otta, courtesy of the GTZ SUTP Photo CD-ROM

infrastructure from farebox revenues. In addition to any private sector sources, Ahmedabad is also investigating financing support from the World Bank, Asian Development Bank (ADB), and JBIC.

17.3.5.8 Chinese cities

To date, four existing bus systems in China might be broadly defined as BRT or busway systems: Kunming, Shejiazhuang, Beijing, and Hangzhou. Several others, including Jinan, Chengdu, and Guangzhou, are in the detailed planning stages.

Kunming

It was the lack of financing that made Kunming change its original plans to build a light-rail transit (LRT) system. Instead when the State Development Planning Commission did not approve the LRT funding in 1998, Kunming had to look at BRT as a more realistic option. Plans for the LRT system were already well advanced through the assistance of the Municipality of Zurich and the Swiss Development Corporation. Thus, the LRT plans simply served as the basis for the BRT system.

Kunming opened the first 5 kilometres of exclusive center lane busway in 1999 on Beijing Road, the major North-South arterial. In August of 2002 the city added 11 kilometres of exclusive busway down Dongfang Road, the main East-West corridor. The total existing

system cost approximately RMB 40 million (US\$5 million). Approximately half of the infrastructure investment paid for the bus shelters, and this entire cost has been covered by advertising revenues alone.

Prior to the construction of the BRT system, bus operations and bus procurement were subsidised by the government. However, with the completion of the BRT system, this subsidy has been removed as it is no longer necessary. However, the fares are regulated at 1 RMB (US\$0.13) per trip regardless of the distance or the type of vehicle, and all vehicles are owned by a public bus company. The revenue generated is not sufficient to significantly upgrade the quality of the vehicles, let alone to finance the expansion of the BRT infrastructure.

Shejiazhuang

The infrastructure in Shejiazhuang was paid for as part of a loan from the World Bank. The World Bank loan went to the national ministry of finance, which in turn loaned the money to a municipal corporation in Shejiazhuang. The building of the BRT was treated as a standard public works project.

Beijing

In Beijing, the cost of the initial phase was RMB 38 million (US\$4.75 million). The road infrastructure is being funded directly by the Beijing government. The vehicles, stations, and pedestrian infrastructure are financed by the BRT Company. Of the five shareholders in the BRT Company, two are private firms. For

future expansion, some of the financing options being considered for Beijing include pollution charges on private vehicles, congestion charging, and parking fees.

Hangzhou

In Hangzhou, the new BRT system has been financed by a municipal-owned company under the construction commission; the firm is called Hangzhou Urban Construction Assets Management Co. Ltd. Phase I of the BRT system required approximately RMB 150–RMB 200 million (US\$19 million–US\$25 million) for a system of 28 kilometres. This amount includes infrastructure construction and vehicles procurement. Some 40 percent of this cost, or approximately US\$9.6 million, is for the purchase of vehicles.

The first phase is regarded as a test, so the government will provide 80–90 percent of the financing. The other 10 to 20 percent will come from the General Bus Company, which is also owned by the Hangzhou Urban Construction Assets Management Co. Ltd. The system will be operated by the public bus company, General Bus Company, which will provide 10 percent to 20 percent of the vehicle procurement investments. There will be no bank loans for the first phase of the system.

17.3.5.9 US cities

The BRT systems developed to date in the US (Boston, Las Vegas, Los Angeles, Miami, Orlando, Pittsburgh) have been financed with a combination of national government subsidies and municipal and state bonds. Some 2 percent of the national gasoline tax revenues are earmarked for urban mass transit, and these revenues are administered by the US Federal Transit Administration (US FTA). US FTA has provided some capital grants for the BRT projects undertaken to date. Federal public transportation money for infrastructure in the US is largely controlled by congressional earmarks, leaving the US FTA minimal discretionary spending authority. The rest of the financing is generally the responsibility of state and municipal governments. State and municipal governments in the US finance most capital projects through bond issues. These financial instruments are less used in developing

Fig. 17.39
In Beijing, the local government financed the system's infrastructure while a consortium of shareholding firms purchased the vehicles.
Photo courtesy of Kangming Xu





countries, but they are gradually spreading to emerging markets. Prague (Czech Republic) and Krakow (Poland) have recently issued municipal bonds for urban mass transit projects.

17.4 Financing equipment (vehicles, fare system, etc.)

“When I was young I thought that money was the most important thing in life; now that I am old I know that it is.”

—Oscar Wilde, playwright and novelist, 1854–1900

The financing of BRT equipment such as vehicles and fare collection systems depends in part on the general operating economics of the system. If the system collects sufficient fare revenues, then these items can be amortised through the private operating companies. In general, successful BRT systems, such as Bogotá and Curitiba, have been able to finance vehicles through fare revenues. By contrast, if for some reason passenger numbers are not sufficient or if the city wished to maintain relatively low fares, then it is also possible to capitalise equipment. In this case, the financing would more likely resemble public infrastructure financing with a significant public sector contribution to the financing.

17.4.1 Financing vehicles

17.4.1.1 Vehicle costs

Vehicle costs are affected by a wide range of factors. The cost of the vehicles will first be related to vehicle size, the quality and power of the engine, the level of emissions controls, and the type of propulsion system. Features such

as the interior design and safety standards will also play a role. If vehicles have to be imported, which is frequently the case in the initial stages of a BRT system, shipping costs and the local tariff and tax treatment of the vehicles becomes extremely important. On top of this, the financing costs of vehicle procurement can be highly variable. Table 17.4 summarises approximate cost levels for different vehicle types, exclusive of shipping, tariffs and taxes.

Not all BRT systems invest in new vehicles. Some systems simply use the existing vehicles, or refurbished vehicles, especially in the case of feeder vehicles. The Transantiago system plans to make extensive use of existing vehicles for many of its corridors. However, in general, higher-end BRT systems will begin to modernise the vehicle fleets. New vehicles can be particularly important in attracting car owners into the new system.

The number of vehicles required will depend on the length of the corridors, the average speeds

Table 17.4: Approximate cost levels for vehicles

Vehicle type	Cost (US\$)
Diesel, standard sized (constructed in developing nation)	US\$30,000–US\$75,000
Diesel (Euro II or III), standard sized	US\$75,000–US\$130,000
Diesel (Euro III), articulated	US\$180,000–US\$250,000
Diesel (Euro III), bi-articulated	US\$325,000–US\$450,000
CNG or LPG, articulated	US\$250,000–US\$350,000
Hybrid-electric, articulated	US\$275,000–US\$400,000
Fuel cell, articulated	US\$800,000–US\$1,300,000

Fig. 17.40 and 17.41
Most US BRT systems, such as Orlando (left photo) and Miami (right photo), have been financed through a combination of municipal and state bonds as well as national government grants.

Photos by Lloyd Wright

achieved, and the required frequency and capacity. Chapter 8 (*System capacity and speed*) of this guidebook provides the calculation methodology for determining the number of vehicles required for a BRT corridor.

17.4.1.2 Financing options

In cities generating sufficient fare revenue, the private concessioned operators will likely assume responsibility for purchasing the vehicles. Having the private operators own the vehicles also helps to set the right incentives with regard to vehicle care and maintenance. If the corporate entities responsible for operating the vehicles also own the vehicles, then it is likely that maintenance will be done in a more diligent manner.

Operator resources

While BRT systems can be highly lucrative in the medium and long term, the existing operators rarely have the upfront capital required to finance the vehicles. However, some upfront capital contribution should be required from the cash resources of the operators to ensure that the operator faces real financial risk in the venture. Existing operators often operate in difficult economic conditions constrained by set fare levels and poor network synergies. These firms may carry little capital and in some cases may be heavily indebted. Frequently bus operators are not really firms but simply individual owner-operators, which are in turn controlled by bus “enterprises” with few capital assets other than de facto regulatory control over lucrative routes. These enterprises and individual owners frequently have no or very limited credit history, and thus cannot not access standard bank loans. That does not mean, however, that they don’t have any investment capital. In Bogotá, the consortiums formed to bid on TransMilenio operations grew out of informal bus enterprises which did not have ready access to formal credit but did have access to investment capital.

It is critical for the government to thoroughly research the financial strength of the bus enterprises that are being invited to bid to become BRT operators so that a realistic assessment can be made about how much help they need in securing financing for the bus procurement. Thus, the starting place to analyse operator financing options is likely to be the operators’ own

resources. In some cases, the enterprises may possess quite a lot of cash revenues, and owner-operators have at least their existing vehicles as assets. Some operators may possess a bus depot area for vehicle parking, and this property may hold value to the new BRT system as a depot area, terminal area, or interchange station.

While the existing vehicles will likely not be of a quality standard for a new BRT trunk corridor, the older vehicles may hold value for feeder services. Even if the vehicles are not of use even for feeder services, vehicle scrappage may hold special value. In Bogotá, operators must destroy four to eight older buses for every new articulated vehicle introduced. The idea is to avoid these older, more polluting vehicles from simply being moved to another part of the city or to another city. Additionally, it is also a mechanism for ensuring that the owners of the old buses are compensated for the loss of value of their bus assets by the new bus enterprises. This practice is frequently important in lower-income countries where frequently many members of the middle class and even government officials have their private investments tied up in a few buses or minibuses. In order to obtain the required number of certified scrapped vehicles, operators may actually compete to find old buses to destroy. Thus, the older vehicles may actually hold a significant value to the companies wishing to operate in TransMilenio.

In most cases, though, the bus operators will have insufficient cash and collateral to pay cash for all the new vehicles required for the BRT system. Securing bank financing for newly created operating consortiums is frequently a challenge and should not be put off or the system will be built but have no vehicles to operate on it. Nevertheless, even with the lack of a credit history, credit can usually be secured under certain circumstances from the following:

- Vehicle manufacturers;
- Bi-lateral export-import banks;
- International Finance Corporation (IFC);
- Commercial banks.

Vehicle manufacturers

Vehicle manufacturers have an obvious vested interest in ensuring that the BRT system is successfully launched. In the case of the large, international manufacturers, such as Daimler-



FUNDING SUPPORT FROM GOVT. OF JAPAN FOR HIGH TECH ITEMS	
	(in millions JPY)
GENERAL CONSULTANCY	5,742
TUNNELING	3,719
ROLLING STOCK	37,960
AUTOMATIC FARE COLLECTION	2,291
SIGNAL & TELECOMMUNICATION	14,285
TRACTION	3,404
OTHERS	16,013
TOTAL	143,414



Fig. 17.42 and 17.43
The development of the Delhi Metro has been made possible due to the funding infusion from the government of Japan. In return, a Japanese technology supplier, Hitachi, has been awarded contracts for the system.

Photos by Lloyd Wright

Chrysler, Marco Polo, Scania, and Volvo, these companies sometimes provide the necessary financing. Companies like DaimlerChrysler have their own financial services branch to facilitate the procurement of buses. The financial services branch of vehicle manufacturers have much greater familiarity with the industry, the value of the product, access to resale markets for the vehicles in case of a default, and have other advantages as a credit provider for vehicle procurement. These companies may also have important relationships with bi-lateral lending agencies, and may be willing to provide credit guarantees that enables the operators to access other forms of commercial credit. The operators can and should use the competitiveness between the various vehicle manufacturers as leverage to shop for the best financing deal. This financing, however, ties the buyer to a specific manufacturer. Some of the new bus manufacturers emerging in China and India may eventually provide good vehicles at much lower costs, but they currently lack the financial servicing options.

Bi-lateral export-import banks

The home countries of the vehicle manufacturers may also hold a vested interest in ensuring their national products are used in the new system. In such cases, national export-import banks may step in to provide the required guarantees and financing. Rail system manufacturers such as Siemens and Hitachi have long benefited from national lending support to ensure developing nations select their products. Through lending of the German Bank of Reconstruction (KfW), Siemens has successfully been awarded large contracts for the urban rail systems in Bangkok. Through the assistance of

the Japanese Bank for International Cooperation (JBIC), Hitachi has successfully penetrated many Asian city markets including the Delhi metro system (Figures 17.42 and 17.43).

BRT systems are beginning to benefit from some of the same access to bi-lateral development banks. The Brazilian national development bank, BNDES, has financed Brazilian buses for Bogotá. Likewise, the Colombian national development bank has worked to enable financing for Colombian BRT vehicles to be utilised in Ecuador (Figure 17.44). In addition to requiring that the vehicles are manufactured in the home country, the export-import banks may place other stipulations on the loan. For example, the Brazilian development bank also required that the Bogotá operating companies secure vehicle insurance from Brazilian sources. This insurance requirement imposed additional costs on the operators, but ultimately the deal was arranged.

International Finance Corporation and regional development banks

The International Finance Corporation (IFC), the private sector lending arm of the World Bank, may be another option that private operator consortiums may consider for financing equipment like vehicles. An advantage of using the IFC is that it would provide the credit to the vehicle provider that won a competitive bidding process, rather than restricting the offer of credit to a specific vehicle manufacturer. The IFC's mandate is to provide loans, equity, and structured finance in order to build the private sector in developing nations. While the IFC has yet to finance a BRT project, the organisation has given serious consideration to proposals, and its involvement is likely in Dar es Salaam.



Fig. 17.44
Through a loan from the Colombian national government, vehicles made at this plant in Bogotá have been exported to Quito (Ecuador).

Photo by Lloyd Wright

Perhaps the greatest difficulty from the perspective of the IFC is the relative size of a typical BRT project. Since the IFC normally prefers to manage loans of US\$20 million or greater (in order to reduce administrative costs), the bulk procurement of BRT vehicles for a typical developing-nation city may be below this amount. Thus, the very cost-effectiveness of BRT can in some instances work against its ability to interest certain types of investment. As part of the World Bank Group, the IFC may be able to offer credit terms that are better than those available through commercial lending institutions. However, whether or not the IFC actually offers an interest rate advantage will greatly depend on local conditions.

Many of the regional development banks, such as the ADB, the IADB, and the EBRD, are also allowed and even encouraged to make loans to the private sector, and also have private sector lending windows. These banks may provide smaller loans, and should also be explored regarding financing of the vehicle procurement.

Commercial banks

Commercial banks should be the first target for operators developing their financing strategy.

Securing commercial bank financing of BRT vehicles has been challenging though ultimately successful even without municipal or national credit guarantees. Unfortunately, since BRT is a relatively new concept, commercial lenders may be wary of participating in such a project. Alternatively, the commercial bank may attach an unusually high risk factor with such a new concept that will result in a very high interest rate, or require a full or partial guarantee from the municipality as a condition of the loan. Once the municipality provides a full credit guarantee, the municipality has absorbed the full financial risk of the project, something that should be avoided.

One mechanism to potentially gain a commercial bank's confidence in the project would be to invite the bank to participate in the consortium controlling fare collection. In such a scenario, the bank will have greater confidence in the revenue flows and thus will be more likely to extend the loan.

As noted above, the Phase I operators for Bogotá had little credit worthiness to access standard financing options. The Mayor did not want to offer a guarantee to the operators following the principal that the potential for profit should be balanced with the apportionment of financial risk. Their operating contracts with the city partially exposed the companies to demand risk. If the demand was below projections, the city was able to reduce the amount of vehicle kilometres, and as the operators were paid by the vehicle kilometre, this eventuality would adversely affect annual revenue. This possibility was partially mitigated by measures in the contract which allowed for the extension of the concession agreement in case demand was below projections. Despite the personal appeals of the Mayor, the Colombian commercial banks refused to finance vehicle procurement for these operators under these conditions. Thus, the Phase I vehicles were financed through the Brazilian national development bank, which had more familiarity with BRT and had the additional incentive to help the Brazilian vehicle manufacturing industry. However, with the success of Phase I, the concessioned operators in Phase II were able to gain greater access to loans from local commercial banks.



Fig. 17.45
In Phase I of TransMilenio, the Brazilian development bank (BNDES) was the principal financing entity for the procurement of vehicles by the private operators. However, with the success of the system, commercial lenders have now played a more active role.

Photo by Lloyd Wright

In Curitiba, by the time the BRT system was built, the private bus operators had already been formed into formal sector bus operators during an earlier round of bus sector reforms in the early 1960s. As such, these bus companies already had a relationship with private banks and had been operating profitable companies for many years. Curitiba's BRT system awarded the operating contracts for each trunk line to the same bus companies that had for more than a decade had a monopoly over bus operations in the same corridor. As such, the private bus companies had more investment capital of their own, and more ready access to bank loans. When Curitiba recently decided to upgrade to Euro III bi-articulated vehicles, for which there is only one supplier (Volvo), the cost was prohibitive even for these well-established operators. At this point, the private operators have turned to loans from BNDES, the national development bank, to finance the vehicle procurement.

Public financing of vehicles

Finally, public financing of BRT vehicles is also an option, although it should often be seen as the option of last resort. Public financing can create incentive problems regarding vehicle maintenance and long-term care. As noted earlier, the party that both owns and operates the vehicle has a clear incentive to maintain

the vehicles at a high level. A publicly-owned vehicle operated by a private company can be a recipe for poor maintenance and care. To an extent, these problems can be mitigated by a well-drafted contract that stipulates specific due diligence regarding maintenance and care. It can also be mitigated by having the private bus operator procure the vehicle but have the municipal public transport authority pay the operator at a rate per bus kilometre that is high enough to cover the cost of the vehicle procurement, even if the municipality is losing money on the service. In this way, the property right is transferred to the private operator and the maintenance incentive remains. The functionality of this approach depends much of the nature of the contract and the ability to enforce its contents.

Another disadvantage of public vehicle procurement is the risk of misappropriation or even corruption. The selection of a particular vehicle manufacturer or vendor may be accompanied by illegal payments to public officials. This situation obviously comprises the integrity of the entire project as well as undermines the quality of the final product.

Besides public ownership of vehicles, public sector involvement may also take the form of credit guarantees. In this case, the public sector is not directly providing the capital for the vehicles but rather is guaranteeing full or partial

repayment in case of an operator loan default. These guarantees should also be avoided, but may be necessary in order for a lending institution to do business with an operator that has little innate credit worthiness. From the government's perspective, this arrangement can carry a fair amount of risk since a large liability could suddenly be forced upon the government. However, government-backed guarantees may be the only way some lenders may consider a project with actors of low credit worthiness. In some countries like China where the banks are directly controlled by the government, the requirement of a guarantee is less of an issue since the lenders are state banks and hence carry with them an implicit government guarantee.

Quito has largely provided public financing of vehicles for its three BRT corridors: 1. Trolé line; 2. Ecovía line; and 3. Central Norte line. In the case of Quito, public financing was a result of the operators' limited capital resources and the uncompetitive nature of the system's business structure. Quito did not competitively tender the two corridors that are operated by private companies (Ecovía line and Central Norte line). Instead, the existing operators on these corridors were given automatic concessions to the corridors. The lack of a competitive bidding process has limited the leverage of the local government over these operators.

Since the operators held out against contributing financing upfront for the vehicles, the municipality purchased the vehicles with the intent

to sell them over time to the operators through fare revenues (Figure 17.46). Unfortunately, since the operators control fare collection, there has been a lack of transparency in the remuneration of fare revenues. The operators claimed that due to insufficient demand, there were no remaining funds that could be applied to the vehicles. Only after five years of operation in September 2006, the operators of the Ecovía line finally purchased the vehicles at a greatly reduced price. As the Quito example demonstrates, public procurement of vehicles is wrought with a number of complications and incentives that can run counter to effective administration.

Government vehicle procurement is often quite common in the first phase of a project when other lenders may be uncomfortable with taking a risk on a new technology. In Jakarta, the Phase I of TransJakarta, the vehicles were procured by the DKI Jakarta government from general budget revenues, even though the service was turned over without a competitive bid to a consortium of the existing bus operators. In Phase II, the private operators invested in the vehicles, but again the contract was awarded without a competitive bid to a monopoly consortium comprised of the existing operators.

In Delhi, very few new buses (a total of six) have been included in the first phase of the High Capacity Bus Project, and these six new buses have been purchased by the Delhi Government. In Ahmedabad and Dar es Salaam no decision has yet been taken, but some form of subsidy for the vehicles may be required.

In China, the prevalence of public bus companies has prompted most existing projects to utilise public funds in vehicle procurement. In the case of Beijing, a BRT operating company was created at the project outset. This company is 46 percent owned by the Beijing Bus Corporation, a publicly owned monopoly bus provider. The Beijing vehicles cost approximately RMB 2.2 million (US\$275,000), including tax. In Hangzhou, Jinan, and other Chinese cities, the first phases of the BRT systems are all moving forward under the auspices of BRT companies owned by public bus companies, with the vehicle procurement being financed by the municipality and the bus company, with some

Fig. 17.46
On Quito's Ecovia line, the municipality used public funds to purchase the vehicles for the private operators.

Photo by Lloyd Wright



marginal involvement of private investment being considered. In Guangzhou, where bus services were first deregulated in China, the BRT system is likely to be an open system with the new vehicles being procured by the existing assortment of public, private, and joint-venture public private bus operators.

Ideally, these systems will eventually shift vehicle procurement to private operators in future project phases. As governments and lenders become more experienced with BRT economics and profitability, then the scope for private sector involvement should increase.

17.4.2 Financing fare collection and ITS equipment

17.4.2.1 Financing fare collection equipment

The financing of fare collection and fare verification equipment depends much on how these costs are treated in the overall BRT business plan. If the equipment is considered part of the system's infrastructure, then it would likely be financed in a similar manner as other infrastructure components. If the equipment is expensed, though, then the financing burden would likely fall upon either the vehicle operating companies or an independently concessioned fare collection company.

The decision to capitalise or expense fare collection and fare verification equipment will likely rest with the potential fare levels and the cost of the fare collection technology. If the projected fare levels cannot accommodate amortisation of the fare equipment in addition to the other operating costs, then it is likely that the fare equipment will have to be included as an infrastructure item and financed accordingly. Most low-income nations will likely fall under this scenario since achieving a universally affordable fare level will be a major political objective.

Alternatively, in cities where higher fare levels are possible, then fare equipment might be accommodated within the operational cost structure. In this case, the financing options are largely the same as those of vehicle procurement: 1. Private operators; 2. Manufacturers; 3. Export-import banks; 4. Commercial banks; and, 5. Public sector. In the Seoul busway system, the concessioned fare company, called

the Korea Smart Card Company, financed the smart cards and much of the required fare equipment. This investment is recouped through a percentage charge on each fare transaction.

Likewise, the concessioned fare collection company on the Bogotá TransMilenio system financed the smart cards and fare equipment through its share of the fare revenues. The company receives approximately 9 percent of the fare revenues. In the cases of Seoul and Bogotá, the base fare levels of approximately US\$0.80 and US\$0.50 respectively, provides scope for this type of distribution to the fare companies. In lower-income cities, the ability to repay fare system costs through the fare revenues may be more limited.

17.4.2.2 Financing ITS equipment

Equipment related to applications of Intelligent Transportation Systems (ITS), such as real-time information displays, are most typically considered part of system infrastructure. ITS equipment is thus typically financed in the same manner as other infrastructure components. One exception to this rule is ITS equipment on-board vehicles. In this case, the ITS is just one part of the vehicle and would be financed as part of the vehicle procurement process.

Some systems have rather creatively financed ITS equipment through private sector means, usually through advertising revenues. The private firm will agree to provide, operate, and maintain the real-time information display in exchange for the right to also broadcast intermittent advertising messages on the displays. Thus, the display will switch between providing system operating information and marketing messages for private products. The obvious disadvantage of this arrangement is the reduction in value to customer who must wait through advertising messages before receiving the pertinent travel information. The LRT 2 system in Manila has employed this approach with its real-time displays on station platforms (Figure 17.47). The advertising messages will appear for 15 seconds while the next train information will only briefly appear. A customer may have to wait through several cycles before obtaining the desired information.

17.5 Financing for upkeep and maintenance

“Another flaw in the human character is that everybody wants to build and nobody wants to do maintenance.”

—Kurt Vonnegut, novelist, 1922–2007

Although maintaining the system’s infrastructure and component pieces may seem a far off concern at the outset of a BRT project, planning the financing of system maintenance should be well considered at the earliest stages. In many cases, the appropriate plan for financing system maintenance will involve embedding requirements within operator and manufacturer contracts. Thus, if maintenance stipulations are not considered early in the contracting process, the opportunity to optimise incentives for effective system maintenance can be lost.

A poorly maintained system will quickly undermine customer confidence and patronage as well as potentially affect system safety. Even after just a few years, weather and wear can act to cause infrastructure deterioration. Identifying a maintenance financing source at the earliest stages helps a city to proactively address an issue that has long-term ramifications on a system’s success.

17.5.1 Infrastructure upkeep and maintenance

The timing of BRT upkeep and maintenance will vary depending on the nature of the system component. In terms of basic upkeep, activities such as vehicle and station cleaning will commence from the first moments of operation. Landscaping along the routes will require

attention on a regular basis from the outset. The need for equipment and infrastructure repair and/or replacement will vary depending on usage conditions and the quality of the initial installation. Unforeseen material problems can occur early in the system operations. For example, deterioration of roadway or station infrastructure may occur due to local climatic conditions that were not considered in the original design.

17.5.1.1 System cleaning and upkeep

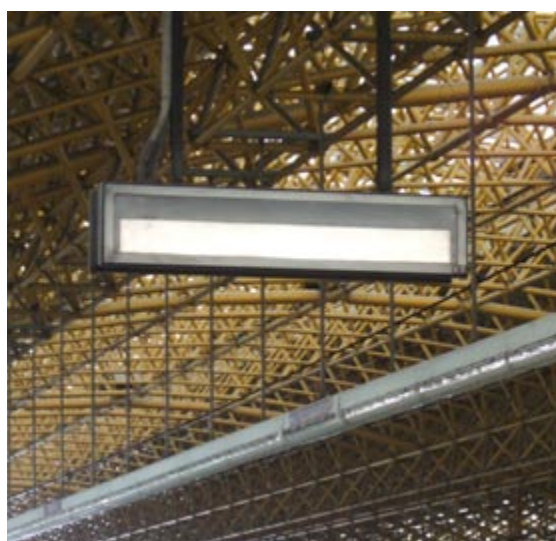
Most likely, a different financing strategy will be developed for basic cleaning and upkeep than for repair and replacement actions. Basic cleaning and upkeep are more closely related to on-going operational activities. Thus, one possible funding source for these activities is fare revenues. In this case, either the system’s public management company or the consortium of private system operators would finance and manage the cleaning activities from their share of fare revenues. Clearly, though, financing cleaning activities from fares will act to increase required fare levels. However, it is likely that cleaning activities are just one small part of overall operational costs and thus should not add appreciable pressure to fare levels.

Alternatively, infrastructure cleaning activities could be an activity entirely managed from the public sector side. This activity could then be funded by general tax revenues, just as street and footpath cleaning are currently funded and managed. In this case, the funding for cleaning and upkeep could be generated either from the general fund or from a dedicated stream tied to a transport-related revenue (*e.g.*, congestion charging, parking fees, licensing fees, etc.).

Additionally, some cities have turned over responsibility for station cleaning and upkeep to private firms through arrangements over advertising rights. Firms that are awarded advertising rights within the system essentially pay or partially pay for these rights through cleaning responsibilities. To an extent, these firms do have a vested interest in maintaining clean and attractive areas since the station environment will affect the value of their advertising product. In some cases, such as the functioning of lighting systems, there is a direct correlation to the effectiveness of the advertising and the quality of the infrastructure.

Fig. 17.47
The information displays on the platforms of the Manila LRT 2 system force customers to see advertising messages before providing pertinent travel information.

Photo by Lloyd Wright



17.5.1.2 Infrastructure repair and replacement

Infrastructure repair

Even for infrastructure components with a long lifetime, there will be routine maintenance activities requiring periodic attention. Stations will require painting or re-application of weatherisation coatings every few years, depending on the local climatic conditions, levels of exposure to exhaust emissions, etc. Runways may develop surface defects or “potholes” even prior to full repaving is required. Vehicle seating and interiors will become inadvertently damaged from wear and tear well before the vehicle’s ten-year lifespan is completed. Some levels of vandalism, such as graffiti, should be expected on an ongoing basis. For each of these scenarios, repair responsibility should be explicitly assigned to an entity well in advance of the project launch. Likewise, the financing of these routine repair activities should be pre-determined.

The Phase II contracts of TransMilenio represent a well-planned model for addressing on-going infrastructure maintenance needs. In

this case, maintenance is explicitly included as a responsibility within the original construction contract. Thus, the firm responsible for building the runways or the stations also has maintenance responsibilities over the expected lifetime of the infrastructure. This contractual arrangement holds several advantages over other forms of maintenance financing. First, the original contractors have a significant incentive to provide quality infrastructure at the time of construction. Since the same contractors will have maintenance responsibilities, they will want to make sure that long-term maintenance costs are minimised through quality construction. Second, the cost of maintenance is explicitly known at the project outset and is bundled within the total infrastructure cost. While this requirement may increase upfront capital expenditures, it does reduce the likelihood for maintenance to be ignored until it becomes a critical problem. The key to making this type of arrangement successful lies in the details of the construction contract. Penalties for poor-quality or untimely repair work should be clear in order to create the right set of performance incentives.

Alternatively, infrastructure repair activities could be managed by the public agency overseeing the BRT system or by the city’s public works department. In this case, infrastructure repairs would be funded in much the same way any other public infrastructure. The repairs could be enacted by public employees or by private contractors. Some of the standard financing mechanisms for this type of repair work include:

- Local tax revenues;
- Dedicated tax revenues (from road charging, congestion charging, parking fees, licensing fees, etc.).

Another option is to give infrastructure repair responsibilities to the private operating companies on the particular corridor. Originally, the public entity overseeing BRT corridors in São Paulo, charged operators 15 percent of fare revenues in order to finance system maintenance. However, since the public entity was doing a poor job of maintaining the busways, a new contract was established in which the operators took over direct responsibility for maintenance. In exchange for assuming the maintenance costs of the corridors, the operators were given a



Fig. 17.48

Ensuring a sustainable financing source for system upkeep and cleaning is essential to achieving good customer satisfaction, as shown in Bogotá.

Photo by Lloyd Wright



Fig. 17.49
Without a dedicated maintenance fund for dealing with problems such as graffiti, the quality of a system can quickly deteriorate.

Photo by Lloyd Wright

longer concession period. Since the state of the busway can directly affect the cost of maintaining the vehicles, the public entity decided it was the right incentive to give the operators control over system maintenance. However, there are several drawbacks to this approach. First, the maintenance costs are effectively increasing the required fare levels for customers. Second, the longer concession period given to the operators reduces the public entity's control and flexibility over managing the corridor.

Infrastructure replacement

Most BRT infrastructure should be designed to endure years if not decades of use. A well-designed station may be physically sound for 30 to 40 years. Runways will likely have a considerably lower lifespan, depending on local conditions and the materials utilised. An asphalt runway in a system using heavy vehicles and in a city with high rainfall may only last a few years. A concrete runway should last considerably longer, but as the Phase I experience of TransMilenio has demonstrated, failure can occur in a much shorter period of time.

Complete replacement of an infrastructure component (e.g., stations, terminals, and runways) should be given a projected timeframe at the outset. If a component will likely require replacement within a medium term period (less than seven years), then some early indications

of financing should be projected. Thus, the financing of runway replacement should be explicitly addressed at the time of its original construction. By contrast, for infrastructure components that will likely endure for 30 years or more (stations and terminals), there is no pressing reason to detail future financing requirements. By the time the replacement comes due, financial and system conditions will likely be significantly different so any projections would be quite speculative. Nevertheless, even for long-term replacement, some general financing strategies should be articulated and noted at the project's outset.

In general, the financing of component replacements should mirror financing options for the original infrastructure. These financing options include:

- Local, provincial, and national general tax revenues;
- Dedicated tax revenues (from road charging, congestion charging, parking fees, licensing fees, etc.);
- Commercial loans;
- Loans from development banks;
- Public-private partnerships.

Since the replacement period will follow a long operational track record, the financial community may be more interested in providing support. There will be less risk involved in financing an existing system with a known customer base than a new system with no certainties of success. Thus, the number of financing options for replacement infrastructure can well exceed the options available at the time of initial construction.

17.5.2 Equipment upkeep and maintenance

17.5.2.1 Vehicle maintenance

Mechanical maintenance

Ideally, the mechanical maintenance of a vehicle should be the responsibility of the same entity that owns and operates the vehicle. The owners have several strong incentives to maintain the vehicle at a high level. First, a well-maintained vehicle will operate more efficiently and thus minimise costs (e.g., fuel costs, spare part costs, repair costs, etc.). Second, a well-maintained vehicle will also retain a higher resale value once its BRT life is over.

Obviously, maintenance problems can inherently arise if the firm driving the vehicle is not the same as the firm owning the vehicle. In this case, the driver will likely take little care in maintaining the vehicle since the maintenance costs will fall upon someone else. For this reason, public vehicle ownership with private operating companies frequently results in poor vehicle life, although contractual conditions can mitigate these impacts to an extent.

Particularly in the beginning of a project when maintenance experience with a new bus type will be limited, it is generally a good idea for the bus owner to secure a service contract from the vehicle manufacturer, and to require representatives of the vehicle manufacturer to be on hand full time at the depot to ensure rapid vehicle repairs and ongoing maintenance. Vehicle failure at the initial stages of the project can be highly politically damaging and should be mitigated as much as possible. While the purchase price will likely be somewhat higher in order to accommodate the additional maintenance responsibilities by the manufacturer, it is generally well worth it in the initial stages until experience with the maintenance of the new bus type is developed. Some of the operators in the Bogotá system have entered this type of maintenance agreement with the vehicle supplier (Figure 17.50).

Cleaning and upkeep

Most often, the cleaning and upkeep of the vehicle is also the responsibility of the private company which owns and operates the vehicle. Contractual conditions within the company's concession agreement can make sure that the right incentives are in place to motivate a clean vehicle environment. Penalties for litter or lack of repairs can properly motivate the operators to maintain a clean vehicle. In the best performing BRT systems, operators will clean the interior of the vehicle after each corridor run and will wash the exterior at the end of the vehicle's shift.

In some systems, the responsibility for vehicle cleaning could fall upon the public company overseeing the system. This situation could especially be the case if the public company had some ownership role in the vehicles. However, as stressed earlier, this type of arrangement can be difficult to manage and can produce lower-quality results in terms of performance.



17.5.2.2 Fare and ITS equipment

The maintenance responsibility for fare equipment and Intelligent Transportation Systems (ITS) depends upon the contractual arrangement related to equipment ownership and management. In systems such as TransMilenio, where the concessioned fare company both procures and manages the equipment, then the responsibility will likely fall upon the private concessionaire. The reasoning is identical to that of vehicles; from an incentive standpoint, it is best for the equipment owner to take responsibility for maintenance issues.

However, if the fare equipment is owned by the municipality, then the fare operating company may not be in the best position to handle repairs and maintenance. The fare concessionaire may not feel comfortable taking responsibility for repairing equipment that it does not own. An improperly repaired machine may create warranty problems with the manufacturer and thus spark legal issues regarding responsibility. Thus, in some cases, or for some types of repairs, the actual owner of the equipment (*i.e.*, the municipality) may be best placed to take responsibility. For simple cleaning and upkeep, the concessioned fare operating company would likely be in the best position to take the lead.

As mentioned, the manufacturer of fare equipment and ITS equipment may also be involved in maintenance and repair work, especially

Fig. 17.50

The operating company Si 99 in Bogotá implemented a maintenance contract with Mercedes Benz, the manufacturer of the vehicles. Si 99 gains the maintenance experience of Mercedes while also minimising its own inventory of spare parts.

Photo by Lloyd Wright

when related to items under warranty. Since manufacturers may be unable to respond immediately to a failed system, contingency plans for back-up equipment should be firmly established. Fare collection or ITS equipment concessionaires may have responsibility over simple, quick repairs while the manufacturers will likely be responsible for more serious problems, provided the equipment is still under warranty at the time of the problem.

In all these cases, the actual responsibilities for maintenance and upkeep should be stated explicitly upfront through contractual arrangements. With clearly defined contracts, each party is able to appropriately assign cost estimates for their own responsibilities.

17.5.3 Security and policing

Security systems and personnel for mass transit systems can be financed in different ways, depending on the underlying philosophies and organisational structures involved. In some instances, security is financed just as any other operating cost. Alternatively, policing costs can be handled separately from the local or national police budget. Chapter 16 (*Operating costs and fares*) has already set out the merits of each approach.

18. Marketing

“We’re obviously going to spend a lot in marketing because we think the product sells itself.”

—James Allchin, former Microsoft executive, 1951–

Bus Rapid Transit is not just another bus service. However, communicating this effectively to the public is not an easy task. The negative stigma of existing bus systems is a formidable barrier to overcome in selling the BRT concept. In most parts of the world, the words “public transport” have the same connotation as some other public goods such as “public restrooms”. In other words, public transport is something that is not clean and not particularly nice, and should only be endured when truly necessary.

The right marketing campaign can help put BRT in a new light for the customer. Branding the system with an identifiable name, logo, and slogan can do much to place the new public transport system as a premium product choice for all. The marketing strategy should identify each of the appropriate mediums of communication, such as direct outreach, print, radio, and television, and devise a means to propagate the system’s message. Different marketing strategies should be tailored for each of the major target audiences, including existing public transport users, motorists, schools, and businesses.



Fig. 18.1

As the message in this bus shelter in Johannesburg indicates, the status and image of most bus services is poor in much of the world.

Photo by Lloyd Wright

All the best technical planning can be undone if the system is not presented appropriately to the general public. This chapter seeks to present the basic principles in outlining a marketing plan for the new public transport system. The topics discussed in this chapter are:

18.1 System name

18.2 System logo and slogan

18.3 Campaign strategy

18.4 Public education campaign

18.1 System name

“Make it simple. Make it memorable. Make it inviting to look at. Make it fun.”

—Leo Burnett, advertising executive, 1891–1971

The system’s name is one of the first decisions that will be taken on the new system since the project diffusion should be coupled with a specific name. Creating the right branding identity helps create the right image in the customer’s mind.

18.1.1 Naming options

There are a range of different strategies that can be taken in terms of creating an appropriate system name. Some of the different qualities that a new system name can exude include:

- Sophisticated
- Modern
- Serious
- Rapid
- Efficient
- Elegant
- Convenient

- Comfortable
- Social
- Fun and playful

The right identity will likely be the one that achieves to maximise ridership, especially with key constituent groups. Cities that have successfully implemented BRT have developed marketing identities that set their product apart and excite the public's imagination.

Some systems, such as the Beijing BRT system, have elected not to create any marketing name at all. This decision means an opportunity has been lost in terms of creating a new identity for public transport in the city. Likewise, some cities choose fairly rudimentary names that merely provide a technical description of the system. Despite all the creativity that went into the Curitiba system, it is rather blandly called the Rede Integrada (the Integrated Network). While the name is accurate and descriptive, it perhaps lacks a flair that could better position the system in the minds of the public.

In many instances, avoiding the term “bus” can be part of a strategic plan to re-position the new public transport service in the market. The word “bus” can often carry a negative connotation, especially in cities where the existing bus service is of poor quality. Thus, the choice of “Metrobus” as the system name in both Mexico City and Quito may not maximise the opportunity for a new identity. Further, inclusion of the word “bus” can be restrictive in case the brand later expands to include other modes (e.g., rail services, taxi services).

By contrast, terms such as “metro” or “rapid transit” can engender a very positive public image. For example, the developers of the proposed BRT system in Barranquilla (Colombia)

have chosen the name “TransMetro”, which helps to invoke an image of modernity, quality, and sophistication (Figure 18.2). Likewise, the new system in Guayaquil (Ecuador) is known as “Metrovía”.

Acronyms, such as BRT and MRT, should probably be avoided. An acronym will probably not have much meaning to a customer, and is thus in some ways a lost opportunity in terms of attaching an image around the system. Systems such as the MRTA in Bangkok and MRT in Hong Kong do not necessarily spark much meaning with the customer. Of course, in some cases, the acronym can double as a short word that holds relevant meaning. The Metropolitan Area Express or MAX in Las Vegas is an example of an acronym that works well in terms of holding a secondary meaning.

System names often work best when they carry a special local meaning, rather than just mimic some generic transport term. For example, system names such as TransJakarta (Jakarta) and Transantiago (Santiago) make use of the city's identity within the name. Bogotá's TransMilenio was developed at the beginning of the 21st Century and thus incorporated a word that notes the new millennium. Likewise, referring to the new century also brings about notions of modernity. Of course, names placed around a specific date or period must be careful not to be outdated in the future.

With the success of Bogotá TransMilenio system, many other cities have simply adopted a form of the word “Trans”. However, while there is value in associating a name with something successful, this also much merit to creating something fresh and new. Various cities have also taken a name from a variation of the word “rapid”, with Passo Rápido in São Paulo and Metro Rapid in Los Angeles.

The system name can be based upon a characteristic of the local environment. Thus, relating the name to a river, lake, or mountain can be appropriate, such as the proposed name for the Cartagena system, TransCaribe. Alternatively, the name of an indigenous animal can work quite well. The name of an animal that is fast or cute or both can be quite effective since it can serve both for the system name as well as a system mascot. Animals can be quite popular

Fig. 18.2

The proposed new system in Barranquilla (Colombia) uses the word “Metro” as part of its system name.



with young riders who can be important first movers in getting the entire family to use the public transport system. An animal or cartoon character can also be effective in personalising the system, and thus make it more than just a transport service (Figure 18.3). If the name evokes a sort of affectionate feeling, then there can be significant advantages in terms of creating public acceptance and ownership.



Fig. 18.3

In Aichi (Japan), a toy mascot is given the driver's seat in a driverless bus system with full optical guidance.

Photo by Lloyd Wright

A successful name in conjunction with a successful service can ultimately make the system a symbol for the city. The London Tube and the New York Subway are in many ways iconic symbols for their cities that in some ways are tourist attractions in their own right.

In tourist oriented cities or cities with a mix of cultures, a name that works in multiple languages should be considered. For this reason, shorter names tend to do well. The proposed Johannesburg system has developed the name of “Rea Vaya”, which translates to “We are Going”



Fig. 18.4

Johannesburg has created a name that works well across the variety of languages in South Africa.

Logo courtesy of the City of Johannesburg

in a local language (Figure 18.4). However, this name is also short enough and easily pronounceable that it works effectively with visitors as well.

Within Johannesburg's system branding, the city has also incorporated the city's shortened name of “Joburg”. Use of such nicknames can be effective in creating a personal affection for the system.

18.1.2 Process for name development

The creative inspiration for the system name and other marketing components (e.g., logo and slogan) can from any one of many sources. A municipality should make full use of the creative talents around it to develop its marketing approach.

Of course, assistance from a firm experienced in marketing and public relations can help to ensure all options and issues are considered. Public relations firms can help identify any potential problems with the marketing choices as well as lend advice on how to determine the appropriate name and logo. Marketing firms can also provide an array of different name options that may form the basis of the choice. The use of experienced marketing and branding firms in the process will ensure that the new public transport system receives as much professional advice as any consumer product going onto the market.

Fig. 18.5

Simulation of a focus group session during a training workshop in Montevideo (Uruguay).

Photo by Lloyd Wright



However, some of the best experts in terms of choosing the right branding are the future users of the system. Focus groups with perspective customers can be used to test name ideas as well as brainstorm on possible names. A focus group involves bringing together a random and representative sampling of the target audience to test out new concepts (Figure 18.5). In many cases, a public relations or marketing firm can help manage the focus group sessions.

Focus groups can also be conducted with other distinct groups, such as communications professionals, planners, and engineers. Each group can hold the potential to bring forward a different perspective. One technique for holding a focus group session is presented in Box 16.1.

Box 18.1: Three-step focus group session

Step 1. Brainstorming

Open session in which as many suggested system names are generated as possible. Facilitator can help by suggesting names that address particular themes (fast, clean, etc.), concerns (security, comfort), and transport concepts (prefixes or suffixes such as trans-, metro-, express-, etc.). The key ideas behind the brainstorming session is developing a diverse set of options without criticising or evaluating the ideas presented. The brainstorming sessions can be held with public officials, marketing firms, as well as the general public.

Step 2. Focus group opinions

The system names generated in Step 1 are then placed before carefully selected focus groups. These groups will go through the names and give reactions and opinions. The focus groups will select a list of their five most favourite system names.

Step 3. Evaluating the final names

The initial group will meet again and decide on the final name, based on the report from the focus group and the name “finalists”. This group may also simply narrow the list to a few names to be given to political leaders for the final decision.

Source: Adapted from Pardo, 2006

Likewise, contests to develop a name and logo can be a creative and participatory way of bringing the public into the process. A contest with a substantive prize (such as a one-year public transport pass) can generate considerable excitement and interest in the new system.

Additionally, the system name and logo is certain topic area in which the political leaders, such as the Mayor, Councillors, and other public officials, can play an active role. In fact, the final decision on the system name should be made at the highest level of decision making for the system.

18.2 System logo and slogan

“You now have to decide what ‘image’ you want for your brand. Image means personality. Products, like people, have personalities, and they can make or break them in the market place.”

—David Ogilvy, advertising executive, 1911–1999

18.2.1 System logo

Beyond even the name of the system, perhaps the most recognisable and identifiable aspect of a system is its logo. The ideal logo will provide customers with instant recognition of the system’s purpose, quality, and location. The logo will appear on station signposts, system vehicles, as well as all outreach materials such as web sites and flyers.

The logo will likely consist of an image within a particular shape and colour scheme. The logo may also invoke wording, such as the system name and possibly, at times, the system slogan. In fact, great care should be taken to ensure that the system name and logo are complementary with one another.

The logo can take upon a variety of forms, including abstract shapes to defined images that directly relate to the system name. Brisbane’s simple red Busway logo is seen throughout the system (Figure 18.6). Signposts with this logo and colour scheme allow potential patrons to easily identify the location of a station.

The colours utilised within the logo and the physical system should also be carefully considered. Colours can both influence public receptiveness to the system as well as reinforce the system’s meaning to the city. For example,

Bogotá chose red as the colour for both the buses and the logo. The idea was to equate the TransMilenio system to the life-blood of the city with the BRT corridors representing the life-giving arteries. This concept was even extended to the system's advertising campaign in which the circulatory system for the city was likened to that of the human body.

Other cities select colours that relate to a local flag or other identifiable attribute of the local environment. It must also be taken into account that colours generate different reactions in people. For example, psychological studies suggest that orange will make people walk faster, while a pale blue will make them feel calm. The Manila Metropolitan Development Authority (MMDA) chose to paint many of the sidewalk areas and other parts of its public space the colour pink. The Chairman of the MMDA, Bayani Fernando, felt that the pink colour would have a positive and calming influence on the population.

Figure 18.7 provides various examples of different system logos.



Fig. 18.6
The ubiquitous logo for the Brisbane system allows for rapid customer identification of station locations.

Photo courtesy of Queensland Transport



Fig. 18.7
Examples of system logos

Fig. 18.8

"Wherever life takes you!" is the tag line that accompanies promotional material for the Ottawa public transport system.



Unlike a system name or logo, the slogan or tag line can change with each new marketing campaign. The system name is intended as a permanent feature. The logo is likewise somewhat permanent, although it may be modernised and updated from time to time. However, the slogan will likely be tailored to the particular marketing emphasis of the moment. A campaign will likely run for a better of 6 months to 24 months, depending the budget available and the initial reception from the campaign's effectiveness.

18.2.3 Copyright protection

The new system's image, brand name, logo and slogan should be protected by trademarks and copyrights, as it will be an important asset for the system. The copyright should be held by the public authority and not by any of the related private sector firms, such as the operators or the marketing firms. If contractual conditions should later change, it is vital that rights to the system image remain in the public sphere.

A successful system will likely generate some imitation. For example, various businesses in Bogotá have adapted the name of TransMilenio in order to cash-in on the system's fame (Figures 18.10 and 18.11). Likewise, within a week of opening the Metrovía system in Guayaquil, other businesses were already expropriating the system name (Figure 18.12). As is often said, imitation is a form of flattery. Others will only try to expropriate the system's name if the name is perceived to have substantial value. The image would not be expropriated in this manner if it was not highly valued by the public.

To some extent, small-time borrowing of the system name should not be a significant concern, and in fact, can aid in marketing the system. However, if an outside firm is making a significant gain from the use of the name or image, or if the outside usage of the name or image could lead to a degradation of the system's perception amongst the public, then legal action should be taken. Thus, in general, the borrowing of the system's name and image should be avoided since their unauthorised use can ultimately damage the system's public esteem.

Illegal borrowing of the name or image can be a particular concern with merchandising. As noted in Chapter 17 (*Financing*), merchandising



Fig. 18.9

This marketing announcement for the Lo Angeles Orange Line highlights the time savings aspects of the service.

Image courtesy of the Los Angeles County Metropolitan Transportation Authority

18.2.2 System slogan

Creating a public recognition of the system can also be bolstered by a slogan or tag line that accompanies the name and logo. The message from such a slogan may highlight an aspect of the system that is of particular value to the targeted audience (Figures 18.8 and 18.9).

For example, the message may stress the time saving aspects, the level of convenience and comfort, or the modernity of the system. Above all, the slogan should be inspirational in motivating customer usage of the system. Some sample slogans include:

- Rapid transit for everyone;
- The fast way across the city;
- Relax and leave the driving to us;
- Not just another bus;
- Wherever life takes you;
- Connecting people to life;
- When you need to get there;
- The easy way to work;
- You'll never be late again.



Fig. 18.10

A toy TransMilenio roams the streets of Bogotá as an amusement ride for children.

Photo courtesy of Oscar Diaz and Por el País que Queremos (PPQ)



Fig. 18.12

As the Guayaquil Metrovía system opens, so too does the "Metrovía Delicatessen". The expropriation of the system name for commercial purposes can be a concern of the system authorities who should seek copyright protection for the system name.

Photo by Lloyd Wright

t-shirts, toy vehicles, and other items with the system name and logo can be a non-insignificant source of system revenue. If other private companies take the lead in doing this type of merchandising, then the system is forfeiting revenues. At first, street vendors sold many TransMilenio toy vehicles until TransMilenio itself took action to intercede and finally begin merchandising efforts itself.

Joint marketing efforts with corporate or other organisational partnerships can be an effective way to broad the reach of the system's message. For example, the favourable response to the TransMilenio system and its positive image among the general public sparked a lot sponsorship and cross marketing interest within the business community. A prestigious bank for



Fig. 18.11

The TransMilenio name holds so much value that it is expropriated for other uses, such as TransMiperro ("Transport My Dog") which is a company that provides exercise for domestic pets.

Photo courtesy of Activity Dog-TransMiperro

instance, offered a generous advertising budget to promote the system in exchange for permission to display its support for landmark ventures like TransMilenio in its official logo.

18.3 Marketing campaign strategy

"Business has only two functions—marketing and innovation."

—Milan Kundera, novelist, 1929—

The system name and image are just the outward representation of the overall branding and marketing effort. These tools should be supported by a comprehensive marketing campaign strategy that is directed towards achieving multiple objectives:

- Maximise interest and ridership in the system;
- Overcome doubts and concerns related to the system;
- Target different messages to specialised customer groups.

The marketing strategy will likely have initial educational elements as well as various long-term components. At the outset, the strategy will attempt to educate users about the new system and entice citizens to give it a try. At later stages, the strategy may play upon the initial successes as well as target groups that may lag behind in terms of usage (e.g., motorists).

18.3.1 Stakeholder analysis

As was done at the beginning of the planning process with the communications plan, a

stakeholder analysis is a logical starting point for developing a marketing strategy. Chapter 6 (Communications) provides a more detailed explanation of a stakeholder analysis.

In general terms, there are three stages to developing a stakeholder analysis:

1. Stakeholder identity;
2. Stakeholder positions;
3. Stakeholder strategy.

18.3.1.1 Stakeholder identity

Initially, the marketing team should attempt to understand the various segments that make up the potential public transport market. Some of the distinct customer groupings will include:

- Existing public transport users (bus users, rail users, etc.);
- Existing car users;
- Work-place commuters;
- Business professionals;
- Students (primary, secondary, tertiary) and parents;
- Persons with day-time errands;
- Women;
- Disabled persons.

In addition to these fairly broad consumer groupings, there may be specific organisations that are related to the particular market segment. For example, there may be a bus riders union that acts to protect the rights of public transport users. There are likely to be school and university officials, as well as parent

associations, who have an interest in the safe access to facilities for children and young adults. The Chamber of Commerce will have an interest in making sure employees have access to an efficient

18.3.1.2 Stakeholder positions

The segmentation process completed in the first stage of this exercise will help to recognise that different market groups will have different concerns and priorities. Each group will likely hold a different opinion on public transport. There are thus different types of “levers” that may either represent an obstacle to usage or represent an opportunity to sell.

For example, women may highly value the level of security within a system. This concern often means that women will not utilise a system, especially in the evenings. By understanding this concern, the marketing team may elect to highlight the various security elements of the new system (*e.g.*, security personnel, lighting, security cameras) when presenting the system to this audience.

As discussed in Chapter 6 (Communications), this segment of the process involves determining the concerns of each stakeholder group in relation to the use of public transport. Focus group sessions can be a useful technique to illicit the concerns and priorities of each stakeholder group. Bringing together a sampling of the potential stakeholder group and facilitating an honest and open exchange can be quite illuminating for the marketing team.

18.3.1.3 Stakeholder strategies

By understanding the needs and constraints of each market segment, tailored marketing strategies can then be designed and employed. This third part of the process is where the team begins to devise particular outreach strategies. The team will also begin to make decisions about which groups should be prioritised within the marketing budget.

The focus group sessions are a good place to begin testing individual strategies. For example, different types of messages may be tried in order to overcome concerns about system security, or sample messages regarding travel times and comfort may be attempted.

Fig. 18.13

By understanding the daily travel concerns of students and parents, it may be possible to position the new system as an affordable and safe option for a key constituency.

Photo by Lloyd Wright



Table 18.1 outlines some of the potential messages that may be appropriate for different market segments.

At some point, some decisions will be made regarding priorities within the marketing budget. Obviously, ensuring system acceptance from the core constituency of existing users, students, and commuters will be key to the financial sustainability of the system. However, it can also be worthwhile to put some efforts into influential market leaders, such as business professionals. These influential leaders can do much to enhance the system's image through their participation. Further, attempting to attract existing car users will deliver multiple city-wide benefits in terms of environmental and congestion improvements as well as social integration. Catering to business professionals will also tend to force system developers to aim for a quality level that will be positive for all users.

18.3.2 Campaign tactics

“Mix a little foolishness with your serious plans; it's lovely to be silly at the right moment.”

—Quintus Horatius Flaccus, Roman poet, 65–8 BC

The market segmentation process and the development of particular strategies will next lead to the individual tactics required to carry out the strategies. These tactics will vary considerably depending upon the targeted audience, the concerns and priorities of that audience, and the resources available.

Table 18.1: Potential marketing messages for market segments

Market segment	Potential messages
Students	Availability of special discounts Highlight technological aspects such as payment with mobile phone Social atmosphere of system Ability to study while using the system
Parents	Security aspects Safety aspects Cost-effectiveness of system
Business professionals	Work or relax while commuting Travel time savings Technological aspects of new system High-quality image of new system (status issue) Savings in the wear and tear on the personal vehicle Comfort and convenience Cost savings
Women	Safety and security issues Frequent off-peak services that cater to errands
Existing public transport users	Improvement in system quality Travel time savings
Disabled persons	Easy use features of systems

18.3.2.1 Approaches to stakeholder persuasion

Modern marketing techniques have increasingly looked upon the field of psychology as a basis for understanding personal decision-making processes. It is one thing to simply inform a person of a new public transport option, it is quite another to convince a person to change behaviour. An individual may undergo many stages of realisation before moving from contemplating a new transport option to actually trying out the new system. It may take further

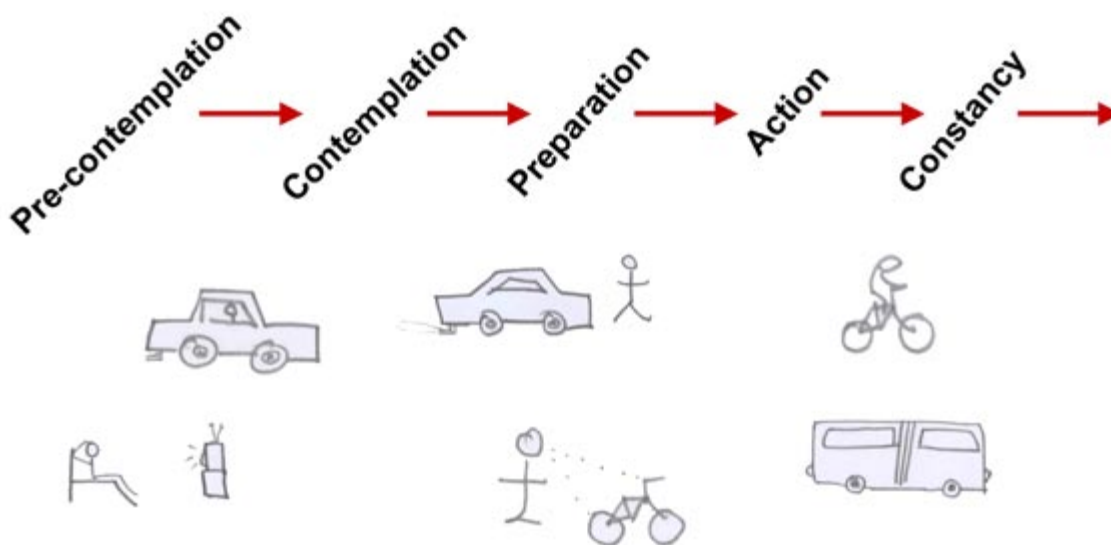


Fig. 18.14
Potential customers will likely move through many phases of understanding before actually making a commitment to a new transport option.

Illustration by Carlos Pardo

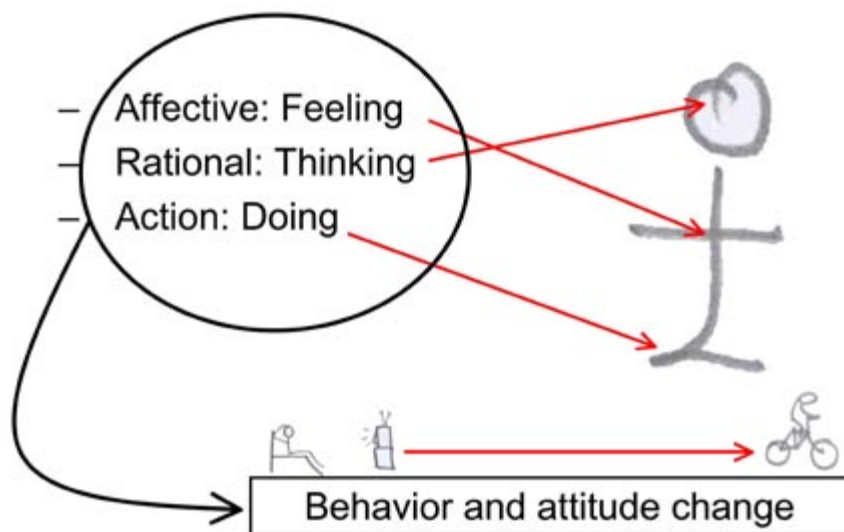


Fig. 18.15
By drawing upon a person's affective, rational, and active components, one can help stimulate behavioural change.

Illustration by Carlos Pardo

conditioning and persuasion to move the person to a long-term commitment to a new form of mobility (Figure 18.14).

Many different techniques are available to help persuade individuals and targeted market segments to consider a new option. In general, there are three “channels” which are typically used to motivate personal change: Thinking, feeling and acting (Figure 18.15). These three degrees of personal involvement represent a stepped approach to realising behavioural change (Pardo, 2006).

Thinking: Logical arguments

The first (and the most common) approach towards changing someone's view of a transportation mode's effectiveness and sustainability is to explain the benefits of more sustainable mobility options through logical statements. Rational arguments over the cost and speed of a new travel option can help to capture a person's attention and interest. A range of materials, including reports, presentations, photos, and videos, can help disseminate the logical arguments.

Feeling: Affective persuasion

Other than rational and logical arguments, emotional responses are also part of a human being's attitude towards their physical environment. In this case, people feel good or bad in a certain place or with a certain mode of transport. In most instances, people feel better when riding a car, since it is more comfortable and they think it is the best option for all. There is also an emotional element to the status related to car ownership and usage (e.g., “you are what you drive”).

However, the attraction of the private car is not insurmountable. Customers may be persuaded towards public transport if they feel it is healthier, more socially friendly, and better for the natural environment. Additionally, a high-quality public transport system can begin to compete directly with the notion that a private car derives a higher status. Instead, if the car is associated with pollution, congestion, and alienation, then the entire concept of status related to transport can be reversed. If public transport is equated to better self-worth and a more beautiful city, then the person's affective response could be quite strong.

Practice: Public transport usage

Finally, the third channel to change personal behaviour and attitude toward transportation is the development of practices that promote sustainable transport. A major obstacle is getting persons to try the public transport once. Thus, offering a free travel period, such as the first weeks of operations is one option. Holding car-free days is another. Finding creative ways to personally engage the public with their travel options can help to overcome the initial barrier that often prevents persons from even considering public transport. In a perfect scenario, thinking and feeling are setting the ground for sustainable transport practice, and people who have been exposed to all three channels should be convinced, persuaded and act accordingly.

18.3.2.2 Developing the outreach product

The creative process to produce a marketing message or advertisement varies with each marketing professional. The basis, though, should be the stakeholder analysis and an identification of the themes that will be important to key target audiences.

The copy (*i.e.*, text) of the message, the imagery, the voice, and the colours all should form a complementary package of ideas (Figures 18.16 and 18.17). Typically, a professional public relations or advertising firm should be employed to develop outreach products. Nevertheless, the in-house project team should also contribute to this process by providing ideas and feedback.



Fig. 18.16
Marketing outreach material for the São Paulo Interligado BRT system.

18.3.2.3 Events

Public transport is a concept intrinsically entwined with the quality of public space. The best mechanisms for promoting public transport are thus perhaps those that actively involve the citizen in the urban environment. Special events are opportunities to encourage the actual participation of the potential new public transport user.

Shows and entertainment

The civic pride exuded in the Bogotá TransMilenio system has meant that it has become a focal point for a range of public and private activities. These activities may actually not have any direct relation to public transport, but they can be effective in drawing new people to the system.

Special events such as fashion shows have been held inside the TransMilenio system. Television and radio shows have likewise been undertaken within TransMilenio. Interviews with celebrities are also known to take place against the now famous backdrop of the system. In one case, a couple even decided to hold their wedding reception inside the system (Figure 18.18).



Fig. 18.17
Material from the "TransMilenio: Capital Pride" campaign in Bogotá.

For the promoters of these events, TransMilenio offers a unique opportunity to relate the show or production with the city. For TransMilenio, the hosting of celebrity interviews and high-profile events represents priceless publicity and fame for the system.



Fig. 18.18
A couple decides to hold their wedding reception within the TransMilenio system.

Photo courtesy of TransMilenio SA

Fig. 18.19

Former Bogotá Mayor Enrique Peñalosa takes a TransMilenio vehicle for a test drive.

Photo courtesy of Por el País que Queremos (PPQ)



Public officials

The use of the system by public officials can also do much to draw attention to the system. If a Mayor, Governor, or other official makes regular use of the system, this practice sends an important message that the system is of high quality and that all members of society can be proud to use it (Figure 18.19). In some cases, cities have actively encouraged all public officials to use the system. Fare pass incentives and/or parking fee disincentives can do much to encourage usage.

Car-free days

Car-free days are increasingly high profile events that can be useful in awakening a city and its residents to the possibilities of a different urban environment. The principal premise behind such days is the idea of creating a “pattern break” in which awareness of transport alternatives is promoted.

“By creating a break in the normal pattern of behaviour, CFDs [Car-Free Days] can provide an opportunity for the citizens and the municipality to take a step back and reconsider the development path of the transport sector and whether it takes into account and meets the needs of all people... On an even broader scale, CFDs can serve to spark a dialogue about the future of the city and allow citizens to ask what exactly they envision their city to become in say, 20, 50, and 70 years” (UN-CFD, 2005).

Since 1998 several international campaigns have been initiated to promote car-free day activities. Western Europe has been a leader in the car-free day movement with France launching the first major nation-wide effort in 1998 with 34 cities participating. In the following year, over 90 Italian cities joined French cities in the event.



Fig. 18.20

The marketing identity of the International Car Free Day Campaign.

Image courtesy of the European Commission

In the year 2000, the European Commission’s Environmental Directorate became a member of the supporting consortium and now provides funding to promote the concept of a pan-European car-free day.

The day takes place on 22 September each year and varies in scope depending on the local circumstances. In some cases, the event may be just one street in one sector of a city. In other cases, there is a more expansive effort. The European car free day has also become known by the programme name of “In Town Without My Car!”. Since 2002, the day is held in conjunction with the European Commission’s “European Mobility Week”, which is a week of related activities aimed at raising public awareness on sustainable transport and acting as a focal point for new local initiatives (Figure 18.20).

The date of 22 September is now recognised as the International Car Free Day. While observed principally in Europe, other cities such as Bangkok (Thailand), Bogotá (Colombia), Jakarta (Indonesia), Taipei (Taiwan), and Toronto (Canada) have participated. Table 18.2 summarises the list of cities participating in the 2004 edition of the International Car Free Day (European Mobility Week, 2005).

There are at least two other significant dates in which some municipalities elect to promote car-free activities. “Earth Day” is held each year on 22 April. The first Earth Day was held in the US in 1970. An organisation known as the Earth Day Network uses the Earth Day event as an opportunity to promote awareness of a

range of ecological issues, including the impacts of motorised vehicles. The Earth Day Network encourages cities to mark the day with a pledge to supporting car-free experiments. In 2001, the Earth Day Network led efforts to hold the first car-free days in the US. In 2002, car-free events were held on Earth Day in not just US cities but also in Amman (Jordan), Dushanbe (Tajikistan), Kathmandu (Nepal), Lomé (Togo), and Seoul (South Korea).

Additionally, “World Environment Day” is held each year on 5 June. The activities of this day are coordinated through the United Nations Environment Programme (UNEP). The United Nations’ General Assembly established World Environment Day in 1972, which coincides with the establishment of UNEP. Car-free initiatives are sometimes one of the focus areas encouraged within the framework of World Environment Day.

Shenzhen (China) hosts its own “Green Action Day” in early June in conjunction with World Environment Day. Shenzhen’s inaugurated its event in 2004 and intends to continue into the future. The event in 2005 resulted in an estimated 100,000 residents giving up their cars for the weekday commute (Xinhuanet, 2005). Shenzhen is a special economic zone in China, meaning that the city is a target of significant economic development. Thus, Shenzhen’s experience represents a key example in one of the world’s most rapidly motorising nations.

Some cities have created their own day for car-free activities. The Peñalosa administration in Bogotá (1997-2000) chose the first Thursday of February as the target day. The Bogotá event has become the world’s largest car-free day by a single city since the private vehicle ban covers the entire expanse of the city, which has a population of approximately 7 million inhabitants. The Bogotá car-free day has been legally codified through a referendum. In addition, each Sunday some 120 kilometres of roadway is closed to car traffic (Figure 18.21).

A car-free day is an obvious opportunity to showcase public transport. It may be the only day that many persons will experience public transport since they may have few other mobility options for that day. Thus, every effort should be made to make a successful experience

Table 18.2:
Participating and supporting cities, International Car Free Day 2004

Country	Number of Participating Cities	Number of Supporting Cities
Albania	8	-
Argentina	-	1
Austria	197	-
Belgium	22	4
Brazil	59	8
Bulgaria	69	15
Canada	2	4
Colombia	3	-
Croatia	1	-
Cyprus	-	1
Czech Republic	25	7
Denmark	1	1
Estonia	1	1
Finland	15	2
France	33	3
Germany	27	21
Hungary	41	10
Iceland	7	-
Ireland	19	-
Italy	17	3
Japan	-	2
Latvia	1	4
Lithuania	18	-
Luxembourg	12	-
Malta	20	8
Moldova	1	-
Netherlands	-	20
Norway	1	3
Poland	109	-
Portugal	56	7
Romania	36	28
Serbia and Montenegro	6	-
Slovakia	1	1
Slovenia	18	3
Spain	211	1
Sweden	30	33
Switzerland	67	5
Taiwan	2	-
United Kingdom	10	42
Total	1,146	238

Source: European Mobility Week (2005)

Fig. 18.21

Bogotá's weekly closing of streets to cars on Sundays is an opportunity for many to enjoy the city with family members. It is also an opportunity to make use of public transport.

Photo by Lloyd Wright



for first timers to public transport. Unfortunately, because a car-free day encourages a large wave of new riders into the system, the vehicles can get over-crowded. For this reason, care must be taken to ensure that a person's first encounter with public transport is not a negative one with overwhelming numbers of persons. Assigning as many extra vehicles to the peak periods should be considered for any event of this type.

Commuter challenge

In many major cities today, traffic congestion has reached a point where public transport users, cyclists, and even pedestrians can often travel faster than the private car. Despite this reality, the perception of the car as the fastest way about the city remains. "Commuter Challenge" events were created to dramatically demonstrate the time advantage of alternative modes.

A Commuter Challenge event places teams of contestants about the city with the objective of reaching a final destination in the shortest amount of time. The event is partly a friendly race and partly a demonstration. The idea is basically to clock identical commute distances by as many different modes as possible. Thus, a jogger, a cyclist, a public transport user, and a car user all start off from the same origin and race the same distance to a defined final destination. Each tries to manage their commute in the shortest amount time that is legally possible.

Invariably, cyclists and public transport users end up "winning" by arriving ahead of the private vehicles (Figure 18.22). At times, even a jogger can get the best of a car commuter. The whole exercise is quite effective in raising awareness of actual door-to-door travel times. For example, it is often forgotten that a big part of any car commute is finding a parking space. Table 18.3 summarises the results from a Commuter Challenge event in Cambridge (US).

Table 18.3: Results of a 2003 Commuter Challenge in Cambridge (US)

Transport mode	Travel time (minutes)
Bicycle	13.6
Bus	20.2
Car	30.4

Fig. 18.22

In the London Borough of Merton, cyclists and public transport users get the better of car commuters during the 2004 Commuter Challenge event.

Photo courtesy of Paulo Câmara and the London Borough of Merton



18.3.2.4 Social marketing

To date, relatively little attention has been paid to one of the potentially transformative marketing techniques for the public sector. Social marketing, though, represents a package of outreach techniques that have shown much promise, especially in getting private vehicle users to shift to public transport and other sustainable options.

City officials and innovative social entrepreneurs in Australia and Europe have developed a new technique for achieving dramatic changes in mode shares at very low costs. The technique, a form of social marketing, is known as "TravelSmart" in some applications in Australia (Figure 18.23). The idea is to simply give people more information on their commuting options through a completely personalised process, and then facilitating changes in travel behaviour. While the focus to date has been in developed countries, recent successes in Santiago indicate that it may be applicable to higher-income developing economies as well.

The technique involves phone contact with all households in the area, identifying the proportion of respondents who would be interested in making some changes in travel behaviour, and supplying them with information, *e.g.*, public transport timetables, maps of cycling routes, information on local facilities. For a proportion of respondents there are follow-ups with household visits. In some cases the informational work is complemented by improvements suggested through the interviews, such as better access to public transport services, new bus stops, provision of new timetables, and the extension of service hours, but for the most part the technique relies upon people changing their behaviour.

Another concept called "travel blending" uses similar techniques but also has residents complete seven-day travel diaries, which teams later analyze to devise suggestions on alternatives for the participant.

The results to date have been remarkable. In the first trial of TravelSmart in Perth, approximately US\$ 61,500 was expended in consulting costs to conduct the surveys and information provision activities. Of the 380 households targeted, the program produced a 6 percent decrease in auto



use immediately and an additional 1 percent decrease after 12 months. Public transport trips rose from 6 percent of all trips to 7 percent, cycling trips doubled from 2 percent to 4 percent. The results have held even two years after the assistance was delivered. The technique is now being applied throughout Australia and in some cities in Europe. Similarly impressive results are being achieved at extremely low costs.

The consulting firm Steer Davies Gleave implemented a Travel Blending program in Santiago, Chile. The Santiago results suggest that Travel Blending could become part of an effective, low-cost emission reduction package for certain developing-nation cities (Figure 18.24). Steer Davies Gleave report an astonishing 17 percent reduction in car driver trips (as a proportion of participating and non-participating households combined), with a 23 percent reduction in car driver kilometres and a 17 percent reduction in time spent travelling.



Fig. 18.23

The TravelSmart programme uses personalised outreach to help people overcome any perceived obstacles to public transport use. The results from cities such as Perth (Australia) have shown dramatic increases in public transport usage.

Image courtesy of TravelSmart

Fig. 18.24

Travel Blending has proven successful even in high car growth cities such as Santiago (Chile).

Photo by Lloyd Wright

The early results from both TravelSmart and Travel Blending demonstrate a profound conclusion around public transport usage. Many people do not utilise public transport simply because they do not understand it. These social marketing programmes mostly just help people get over the communications and knowledge barriers that prevent them from making the most of their public transport systems.

Travel Blending techniques may be well suited to an active role by NGOs, particularly in the collection of survey data and the development and dissemination of transport alternatives. In many communities, NGOs maintain a close dialog with residents and thus would be well suited to this sort of activity.

18.3.3 Media tools

A range of media tools are available to extend the audience for the particular outreach message. Each medium of communication brings with it different costs and different levels of effectiveness. In general, more costly mediums, such as television, offer the greatest message exposure. Also, mechanisms for personal outreach, such as street interviews, can be effective but costly. However, there are also creative ways of putting across the message without expending significant financial resources.

The choice of communication medium depends upon the cost and expected number of persons to be reached. The types of communication mediums include:

- Television
- Radio
- Newspaper advertisements
- Magazine advertisements
- Web sites
- On-line video (Figure 18.25)
- Billboards
- Flyers
- Street kiosks
- Group seminars
- Personal interviews

The message of the particular advertisement will likely vary by the medium being utilised. Television and radio will reach the broadest audience in terms of numbers, which implies the message used with these mediums will also be fairly broad in nature. By contrast, a presentation to the local parent-teachers association will be much more focussed in the type of content.

Competing against the large sums of that the automobile industry dedicates to advertising can be quite daunting. In the US alone, the automobile industry spends US\$ 21 billion each year in advertising (eMarketer, 2007). This sum is greater than the entire gross domestic product of many nations. In special events alone, auto companies expend substantial resources, as shown in table 18.4.

Table 18.4: US special events spending by the automobile industry

Company name	Amount of spending on special events in US during 2005 (US\$)
General Motors	225 million
Daimler Chrysler	150 million
Ford	135 million
Toyota	35 million
Honda	25 million
Nissan	20 million

Source: IEG

Thus, there may appear to be little that an individual public transport system can do to compete directly in the world of television and special events spending. Nevertheless, as a public service, public transport does have several tools at its disposal not available to others. Public service announcements (PSAs) permit messages related to topics of public interest to be shown without cost on television and radio. In

Fig. 18.25
Video is increasing a powerful force for communicating ideas on public transport.
Image courtesy of Carlos Pardo





Fig. 18.26
Quito markets its future system expansion during a public exhibition.

Photo by Lloyd Wright

many countries, public and private broadcasters are required by law to transmit a certain percentage of their air time with such messages.

Additionally, there are outreach resources that do not involve a significant cost, beyond the initial organisation. Outreach efforts with school children can be particularly effective. By developing materials for dissemination in schools, the public transport system cannot only lay the groundwork for future ridership but school children are one of the best resources for convincing parents. Giving public transport interactive materials to children often means that the children will be telling their parents about the new system.

Kiosks in public venues are a big advantage that public systems hold over the private sector. Cities such as Brisbane and Ottawa have quite effectively made use of information kiosks as a way of introducing the system to the public. Kiosks and displays afford a great opportunity for citizens to ask direct questions about the new system in an easy and comfortable environment (Figure 18.26).

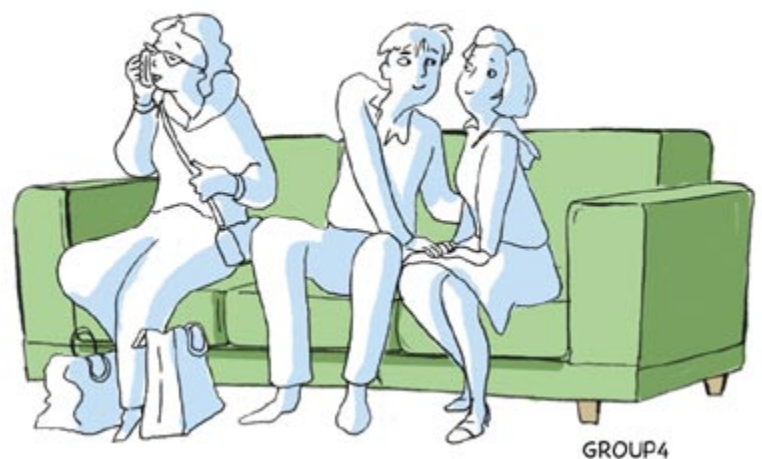
The United Nations Environment Programme (UNEP) in coordination with the International Association of Public Transport (UITP) produced a spot television advertisement in 2005 that highlights the benefits of public transport

use (Figure 18.27). The theme of the advertisement was “The World is Your Home, Look after It.” In addition to stressing the environmental credentials of public transport, the advertisement also utilised imagery of a home sofa to highlight themes of comfort and convenience.

The best advertisement for the system may well be the system itself. The sight of a public transport vehicle whizzing by motorists stranded in traffic is probably the most effective means of communicating the new system. Messages on the exterior of the vehicle can heighten the impact. A message such as “You would be home

Fig. 18.27
The UNEP-UITP advertisement mixes scenes of a home sofa inside a public transport carriage, a message that stresses the comfort advantages of public transport.

Image courtesy of UNEP and UITP.



now if you had taken the BRT” can really make motorists take note. Messages that particularly note the time gained with one’s family and loved ones are often utilised in systems such as TransMilenio to firmly highlight what is at stake with travel time savings.

The marketing messages should not end with just getting a person to try the system. Reassuring the new customer that they have made the right choice is a critical part of the process. Regardless of the product, there is always the spectre “buyer’s remorse” in which a person can regret their choice. Thus, advertisements inside the system can be effective in reassuring the customer that they have chosen wisely. The messages can remind customers about the time and money that they are saving, as well as other benefits such as environmental protection.

18.4 Public education plan

“No matter what your product is, you are ultimately in the education business. Your customers need to be constantly educated about the many advantages of doing business with you, trained to use your products more effectively, and taught how to make never-ending improvement in their lives.”

—Robert G Allen, investment advisor

The initial outreach efforts on the new public transport system will be crucial to setting the right perception with the general public. Further, in order to make the system financially viable from the outset, it will be important to draw sufficient patronage even in the initial weeks and months of the system. To seek with the initial outreach, developing a public

education plan on the system will be key. The public education plan is a component of the overall marketing plan in which the emphasis is on getting the public familiar with the system.

Prior to the new transportation system’s commissioning, the general public must be instructed on available routes, services, fare purchasing, pricing schemes, service attributes, boarding procedures, rules, restrictions, system advantages, etc. Instructions must be communicated using plain language so that users of even the lowest education and poverty levels can understand them. Similarly, instruction should always be available at the poorest localities. Even experienced public transport users in the city may be unaccustomed to the features brought by the new system.

18.4.1 Outreach techniques

The manner of disseminating this information must also be considered. Communicating how the system will function can be accomplished using similar techniques as developed for the overall marketing campaign. The news media, web sites, and direct outreach are all options to be utilised in this initial information blitz. Cities such as Honolulu and Bogotá have effectively utilised direct outreach on the street to get the message across (Figures 18.28 and 18.29). Face-to-face interactions of this type allow people to freely ask questions. Additionally, these encounters permit the promotion efforts to reach individuals and communities who may be inaccessible by conventional means.

The public education process actually starts well before the system goes into operation.

Fig. 18.28 and 18.29
By employing direct outreach teams in cities such as Honolulu (left photo) and Bogotá (right photo), the message of the new public transport system is taken directly to the communities.

Left photo courtesy of the Honolulu Department of Transportation;
Right photo courtesy of Fundación Ciudad Humana (Human City Foundation)



Information kiosks such as those shown in Figure 18.30 are an effective means of reaching out to potential customers at an early stage. The kiosk will likely contain route maps, information brochures on how to use the system, and possibly even models of the stations, vehicles, and other infrastructure. Kiosk staff should be well informed on the various aspects of the system. The development of a list of Frequently Asked Questions (FAQs) can be quite helpful to the outreach staff.

As has been stressed throughout this Planning Guide, there is now an array of outreach and presentation tools that can help officials and the general public better visualise the future system. Visual images are very powerful tools for conveying a message. As can be seen from many documents related to transport projects, there is much advantage in showing examples with photos and graphics, since visual information is better processed, stored and understood by human beings. Also, it has a greater power of evocation and it condenses a high amount of information into a small amount of space. Drawings and renderings permit the public to visualise a future system, which can often be difficult to imagine if only explained in words (Figure 18.31).



Fig. 18.30

This information kiosk in Brisbane helps answer basic customer questions as well as begins the awareness raising process.

Photo by Karl Fjellstrom

Another dramatic method for showing how the system will impact the city is to show before and after images. The comparison of the two situations can do much to motivate citizens to give support to the new vision. The use of before and after images helped the Seoul city government to push ahead with the Cheonggyecheon public space restoration project

Finally, videos, while perhaps the most expensive medium to produce, are also perhaps the most effective in showing a realistic view of the



Fig. 18.31

Visual renderings of the proposed system, as shown here with the Eugene (Lane Transit District) system, can do much to excite the public over the system's potential.

Image courtesy of the TCRC Media Library

Fig. 18.32 and 18.33

Lima built a demonstration station in a central park prior to system launch in order to introduce the system to the public.

Photo courtesy of Fundación Ciudad Humana (Human City Foundation)



future system. Three-dimensional images within a moving sequence allow citizens to actually gain a sense of how the system will operate.

18.4.2 Soft launch

A “soft launch” implies developing some small-scale infrastructure based on the system design and allowing the public to view it. For example, in some cases, a city will construct a demonstration station as well as have new vehicles on display (Figures 18.32 and 18.33).

The demonstration sites may be a public park, a shopping complex, or the public administrative offices. In Lima, a demonstration station and vehicle was placed in a central park of the city. The best site is usually the one that will maximise exposure of the system to the widest possible audience. In some cases, it may be best to place several demonstration sites around the city.

One of the principal purposes of the demonstration site relates to public education on how the system will function. While the demonstration site will likely not actually provide any transport services, it does give residents a tangible example of the proposed system. Allowing residents to practice using the fare collection system reduces future uncertainty that can act as a barrier to ridership. Further, the demonstration also is one of the best means for achieving public excitement over the possibilities of a new system. Citizens can actually see and feel how the new system will change their city and their lives.

Fig. 18.34

An invitation to a TransMilenio launch event.

Image courtesy of Vacastudio



Fig. 18.35

The launch ceremony for Phase II of TransMilenio.

Photo by Lloyd Wright



18.4.3 System launch

The launch of the new system will be the culmination of several years' worth of planning and implementation efforts. Over the course of the initial weeks of the system, an initial impression will likely be reached by the media and the general public.

18.4.3.1 Launch event

The launch event itself represents possibly the single largest media and marketing opportunity the system will ever encounter. Maximising positive coverage of the launch should be the principal priority. The development to press releases and press kits should be completed weeks ahead of the event. Presenting “invitations” to the launch to key individuals is often an effective way of building enthusiasm (Figure 18.34).

The launch event can include both public speaking opportunities as well as entertainment. The public officials who gave the vision and political support to the project should be given an opportunity to express their joy over the project's completion. Likewise, all the individuals who participated in the project development should be recognised for their efforts. Music or other forms of entertainment may also be part of this event in order to ensure a feeling of celebration is reached.

18.4.3.2 Initial service

A new system can first be somewhat intimidating to many people. City residents will be unsure of where the system goes and how to use it. While the barrier to learning about the system may seem to be non-threatening, it is nevertheless a barrier.

One option to make the transition to the new system easy for the public is to provide free public transport services during the initial weeks of operation. This gift of free public transport for a few weeks helps to give people a positive initial impression of the system. The no-cost nature also means that a greater number of persons are will give the system a try-out.

In both Bogotá and Jakarta, people were given free rides in the system during the first weeks of operation. Though it can seem a loss in terms the system's revenue, it has been seen as an investment to capture the largest possible ridership in



Fig. 18.36

In Jakarta, the initial weeks of free service did draw large numbers of curious citizens. However, the initial over-crowding may have also dampened enthusiasm for future use.

Photo by Shreya Gadepalli ITDP

the medium term. If a system has been properly “branded”, users will have the curiosity to know how it will work, where it will go and, in the end, they will decide if they will become users.

However, some care must be taken to ensure that the free initial service does not become too popular to the point of causing crush loading. If severe over-crowding occurs due to the provision of free service, then persons may have a somewhat negative first impression (Figure 18.36). It would be unfortunate if the initial crowding led some persons to conclude that they would not become future customers. Thus, in some cases, it may be best to only offer the free initial trial during off-peak periods.

18.4.4 Start-up glitches

Unfortunately, initial problems with the system are inevitable. A new public transport system in a large city is no small feat, and there are countless small aspects may initially go awry. The flexibility of BRT does allow system developers to often counter problems in little time. Nevertheless, the media and marketing team supporting the launch should be prepared for the inevitable initial problems. In general, honest replies about the issues and how they will be resolved are the best strategy. Clearly stating the remedial actions as well as highlighting the positive aspects of the system is a good strategy for dealing with such situations.