Public-Private Partnerships in Urban Bus Systems
An Analytical Framework for Project Identification and Preparation

Alejandro Hoyos Guerrero and Abel Lopez Dodero
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ALEJANDRO HOYOS GUERRERO AND ABEL LOPEZ DODERO
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Abbreviations

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<td>AMVA</td>
<td>Área Metropolitana del Valle de Aburra (Colombia)</td>
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<td>API</td>
<td>application programming interface</td>
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<td>BRT</td>
<td>bus rapid transit</td>
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<td>CAPEX</td>
<td>capital expenditures</td>
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<td>DART</td>
<td>Dar es Salaam Bus Rapid Transit (Tanzania)</td>
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<td>DUTP</td>
<td>Dar es Salaam Urban Transport Improvement Project (Tanzania)</td>
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<td>ECA</td>
<td>export credit agency</td>
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<td>EPC</td>
<td>engineering, procurement, and construction</td>
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<td>FONADIN</td>
<td>National Infrastructure Fund (Mexico)</td>
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<td>GCT</td>
<td>generalized cost of travel</td>
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<td>GDP</td>
<td>gross domestic product</td>
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<td>GPS</td>
<td>global positioning system</td>
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<td>GTFS</td>
<td>General Transit Feed Specification</td>
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<td>IBRD</td>
<td>International Bank for Reconstruction and Development</td>
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<td>IDA</td>
<td>International Development Agency</td>
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<td>IFC</td>
<td>International Finance Corporation</td>
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<td>IRR</td>
<td>internal rate of return</td>
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<td>LTA</td>
<td>Land Transport Authority (Singapore)</td>
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<td>MDB</td>
<td>multilateral development bank</td>
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<td>MIGA</td>
<td>Multilateral Investment Guarantee Agency</td>
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<td>O&amp;M</td>
<td>operations and maintenance</td>
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<td>OPEX</td>
<td>operating expenditures</td>
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<td>PFRAM</td>
<td>Public Fiscal Risk Assessment Model</td>
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<td>PPP</td>
<td>public-private partnership</td>
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<td>PROTRAM</td>
<td>Public Transportation Federal Support Program (Mexico)</td>
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<td>public sector comparator</td>
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<td>public transportation authority</td>
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<td>RSF</td>
<td>risk-sharing facility</td>
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<td>SITME</td>
<td>Metropolitan Integrated Transport System (Mexico)</td>
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<td>SITP</td>
<td>Integrated Public Transport System</td>
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<td>Sittsa</td>
<td>Solución Inmediata en Transporte (Mexico)</td>
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<td>SMPZ</td>
<td>Sustainable Mobility Plan for Zaragoza (Spain)</td>
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<td>SMS</td>
<td>short message services</td>
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<tr>
<td>Acronym</td>
<td>Full Form</td>
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<tr>
<td>SOE</td>
<td>state-owned enterprise</td>
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<td>SPV</td>
<td>special-purpose vehicle</td>
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<td>SYTRAL</td>
<td>Syndicat Mixte des Transports pour le Rhône et l'Agglomération Lyonnaise (France)</td>
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<td>TUZSA</td>
<td>Zaragoza Urban Transport (Spain)</td>
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<td>VfM</td>
<td>value for money</td>
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<td>VGF</td>
<td>viability gap funding</td>
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**Glossary**

**Bankability.** Traditionally defined as a combination of risk and remuneration that makes a transaction attractive to a bank or a financier. The PPP Certification Program Guide defines bankability as “the ability of a project to be accepted by lenders as an investment under a project finance scheme, or the ability of the project to raise a significant amount of funding by means of long-term loans under project finance, due to the creditworthiness of the project in terms of sufficiency and reliability of future cash-flows” (APMG International 2018).

**Bus rapid transit (BRT).** A specific mode of bus transportation that involves the use of an exclusive corridor, high-capacity buses, at-level boarding, and payment at kiosks outside buses. In some cases, smart traffic lights prioritize buses over private traffic.

**Corridor.** A geographic area, usually linear, used by one or various transportation modes.

**Fleet management.** A variety of technologies and methods that operators use to plan and optimize bus fleet operations and maintenance.

**Public-private partnership (PPP).** A long-term contract between a private party and a government entity for providing a public asset or service, in which the private party bears significant risk and management responsibility, and remuneration is linked to performance.

**Special-purpose vehicle (SPV).** A separate legal entity created for a specific purpose. The specific purpose is traditionally related to the fulfillment of a concession contract’s obligations. An SPV allows the concentration of all project-related risks in a vehicle, which, in turn, is also isolated from risks associated with its stakeholders. This separation eases risk allocation and mitigation and allows the vehicle to be used for getting financing at rates exclusively related to the project’s risk.

**Transportation users’ welfare.** Economic utility, which can be measured using the generalized cost of travel, including the financial cost (transportation fare), but the cost of time is often much more important. The cost of time will depend on actual time spent and on how transportation users value this time. How users
value their time depends, in turn, on various factors, such as if the user is in a vehicle, transferring, or waiting and how comfortable the trip is.

**Urban bus public-private partnership.** An urban bus project that includes one or several PPPs that cover, for example, distinct project components. This report uses a broad definition of PPPs that includes general private sector participation.

**Urban bus project.** An urban bus project may involve the reform of just one corridor or of an entire citywide bus system. It may be financed in full by the public sector or include one or several PPPs or other forms of private participation.

**Urban bus system.** A bus system that serves an urban area and its immediate environs in an integrated manner. An urban bus system may serve all or part of a city or metropolitan area. It is distinct from interurban or regional systems.

**Value for money.** “The optimum combination of whole-of-life cost and quality of the good or service to meet user's requirement” (Her Majesty’s Treasury 2006). The World Bank policy on procurement states, “The principle of value for money means the effective, efficient, and economic use of resources, which requires an evaluation of relevant costs and benefits, along with an assessment of risks, and non-price attributes and/or life cycle costs, as appropriate” (World Bank 2016).
Overview and Key Messages

Cities around the world are struggling to improve their public transportation systems in the face of rapid urbanization, rising air pollution, and ongoing fiscal constraints, among other challenges. How can they best accomplish this daunting task? This analytical framework seeks to support public transportation practitioners and authorities in the process of identifying appropriate technical solutions to improve urban mobility and, specifically, in the process of proposing arrangements for private sector participation.

RATIONALE

Many cities have sought to replicate the urban bus public-private partnership (PPP) structures that succeeded in specific contexts (all of them in Latin America) at the beginning of the 21st century. Such PPPs are often assumed to be the correct approach, regardless of local context. But this assumption has led numerous reforms of urban bus systems around the world to fall short of their goals. The early success of TransMilenio Phase I in Bogotá, Colombia, or of Metrobús L1 in Mexico City could not be repeated in other cities even in these very same countries. Similarly, subsequent interventions that sought to replicate successful bus PPPs, whether in the same region (Panama, Peru, Chile) or elsewhere (the Philippines, South Africa, Tanzania, Vietnam), did not achieve the expected results.

This analytical framework focuses on two main reasons for the underperformance of recent urban bus reforms:

• The overuse of a PPP-oriented project structure, including in contexts where PPPs are simply not feasible, and the influence of this structure on the identification and adoption of technical solutions (prompting a bias toward solutions that involve new infrastructure).

• Where PPPs are indeed feasible, the use of project structures that do not necessarily respond to local contexts and needs.

The complex, multifaceted nature of urban bus systems—and, thus, of efforts to expand or streamline them (hereafter referred to as “urban bus projects”)—calls for the careful and holistic planning of technical solutions, project structures,
and risk allocation and mitigation strategies. Flaws in the early definition of a project structure can lead to suboptimal risk allocation and business models. Two difficult issues in particular must be carefully addressed at the early stages of a project: (a) the modeling of project demand and (b) strategies to deal with incumbent operators. These issues also have an impact on risk assessment and management strategies.

**STRUCTURE**

The analytical framework outlines specific challenges likely to be encountered at the planning and preparation stages of an urban bus project. Focusing on the initial planning stage, part I (chapters 1–4) guides planners in the selection of optimum technical solutions for their goals and context, based on a realistic analysis of the proposed project’s details and the strengths and weaknesses of various forms of private participation. For those planners who decide that private participation is appropriate for their project, parts II and III (chapters 5–11) help to define bankable project structures that respond to local needs and contexts and minimize risks accordingly.

**METHODOLOGY**

The analytical framework supports users in several elements of planning and preparing urban bus projects, based on a careful analysis of their specific contexts and various alternative solutions to the problems they face. In so doing, the framework builds on international experience, predominantly in Latin America and in PPPs focused on streamlining the provision and operation of fleets, most of them involving bus rapid transit (BRT) or citywide system reforms. This focus reflects the market, since BRT is, in principle, more suitable for PPPs, and Latin America is the cradle of BRT PPPs, which it then exported to the world. A sizable percentage of the world’s cities that have implemented BRT are in Latin America (55 of 171), and the region’s relatively mature projects compose 60 percent of total global BRT capacity (BRT+ Centre of Excellence and EMBARQ 2019).

The analytical framework assumes the existence of incumbent private operators. Its recommendations for how to engage them may be ignored in cases where they are not relevant.

**HOW TO USE THIS DOCUMENT**

This analytical framework has two very specific purposes:

- Help planners to identify the best technical solutions for their urban mobility goals. Specifically, it helps them to assess whether private participation—most often structured as a PPP—is feasible and the best alternative for project delivery. It also lays out alternative solutions in case a PPP is decided against.
- Guide readers in planning a project that will best capture the potential benefits of a PPP and minimize the risks, if a careful analysis of the context indicates that a PPP is a suitable mechanism for one or several components of
a planned reform. Even when a PPP is not feasible, the document can help to structure limited arrangements for private sector participation, where this is a good option for specific elements of a project.

The planning exercises outlined here are meant to begin at any time during a project’s planning or early preparation stages (figure O.1).

The document is organized as follows. Part I focuses on the planning stage and the main features of urban bus PPPs. Chapter 1 outlines the general challenges of attracting private sector investment in urban bus systems and considers the pros and cons of PPPs in particular. Chapter 2 leads readers through an exercise identifying the objectives and limitations of key stakeholders—information that is sure to be useful throughout the entire PPP project cycle. Chapter 3 points out examples of solutions to improve urban mobility that do not involve a PPP; it is intended to help planners decide on an optimum technical solution, even in those cases in which a PPP is not feasible. Chapter 4 guides readers through an assessment of whether their project meets the minimum requirements for structuring a successful urban bus PPP (based on widespread international experience). Once this assessment is complete, planners can then (a) confirm the feasibility of a PPP for delivering an identified technical solution; (b) identify barriers and risks that need to be addressed to proceed with project preparation; or (c) look for alternatives, should a PPP not be feasible.

The space between part I and part II of the analytical framework constitutes a turning point. If planners have completed the planning exercises outlined in part I and decided that a PPP is not the optimum choice for their urban bus project, then there is no need to proceed further in the analytical framework. Avoiding a dead end will save significant transactional costs, among many other benefits.

For readers who decide to pursue a PPP, part II moves past the planning stage to offer support during a project’s preparation stage. At the heart of the analytical framework, chapter 5 guides the preparation of a risk matrix and discusses the allocation of system functions between the public and private sectors as part of

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**FIGURE O.1**

The four stages of the public-private partnership project cycle

- **Planning**
  - Identification
- **Preparation**
- **Structuring and procurement**
- **Implementation**

**Activities supported by the Framework**

*Source: Adapted from APMG International 2018.*
the risk allocation process. The risk matrix supports the assessment of various opportunities for private sector participation. Planners who complete the risk matrix can better identify funding sources, financial instruments, and other essential elements of an operation concession. The analytical framework is not comprehensive, but it does include references to additional resources and tools. Chapter 6 outlines the risks that merit special attention, while chapters 7 and 8 review how risks are allocated and planned for, which serves as the basis for subsequent analyses and informs the next steps of the preparation stage.

Part III extends deeper into the preparation stage, helping planners polish the project structure stemming from the finalized risk matrix. Chapter 9 outlines examples of various project structures and discusses how risks and functions are allocated in each of them, using the guidance provided in part II. Practitioners may use several risk management strategies to improve their structure. Chapter 10 provides a list of funding and financing mechanisms that may be used to support the identification, analysis, and inclusion of needed instruments in the project structure. Reconsidering funding sources and financing mechanisms may result in adjustments to risk reallocation and new mitigation mechanisms.

Finally, chapter 11 defines the essential elements of an operational concession contract—that is, those elements most critical for achieving project objectives. This chapter does not lay out how to draft a concession contract for operation. However, thinking about how the risk matrix relates to these essential elements may help to correct structural imbalances. By the end of a project’s preparation stage, the essential elements of the concession contract should be aligned with the risk and function allocations.

Once planners have defined a project’s structure, following the steps outlined here and with the aid of other tools, they are ready to enter the structuring phase. PPP transaction advisers will oversee the drafting of bidding and legal documents; refine technical, financial, and legal analyses; and guide the project through the procuring process until financial closure.

Many chapter sections end with references to practical tools and further reading materials. Depending on the nature of the content, chapters include guiding questions to help users process the concepts, templates, and instructions outlined.

The analytical framework is not comprehensive; it is based on relevant case studies and is intended to be used in combination with other tools and references. It does not support all of the activities necessary to undertake project identification and preparation. It is not possible to foresee all possible risks or mitigation strategies. That said, the document points out a good number of them and suggests further reading on how to manage, mitigate, and measure their impact. A substantial literature addresses procurement, contract management, contract development, and other essential guidance relevant to PPPs (see, for example, APMG 2018; PPP Knowledge Lab n.d.; World Bank Group and PPIAF n.d.).

**KEY MESSAGES**

Given the number of failing urban bus PPPs, the world over, this framework encourages practitioners and planners to think carefully about their specific contexts before adopting this now very popular, yet complex, model.
Planners are encouraged to consider a range of technical solutions that might make a PPP unnecessary. They are also guided in understanding a few key requirements before considering a PPP.

If, after careful analysis, a PPP is considered the best delivery model, the analytical framework provides support in preparing an optimal project structure. Based on case studies from around the world, the document delivers several key messages:

- **Safe, clean, and affordable urban public transportation is achievable.** It is possible for cities to create sustainable transportation solutions for their growing populations, but doing so requires careful and holistic planning, analysis, and examination of lessons learned from around the world. Critically, the resources required to make a careful plan cost less than unsustainable congestion levels and associated losses in productivity, transportation costs, health, and environmental sustainability.

- **Sustainable urban transportation systems depend on the appropriate articulation of private sector participation.** Private participation in urban transportation services, and bus systems in particular, is popular the world over. But as populations and motorization rates grow, so does transportation demand. Even well-planned systems find themselves in trouble and in need of public subsidies. The appropriate allocation of key risks to the private sector can help systems to adjust to changes in demand.

- **There is no one-size-fits-all solution.** Successful urban bus PPPs have included the appropriate technical solutions for the context (taking into consideration the objectives and restrictions of key stakeholders). The optimum technical solution for a particular context in large part depends on the objectives that planners seek to realize.

- **A PPP is a means of delivering a solution, not a goal or a technical solution in itself or a financing mechanism.** Planners should carefully select technical solutions that are suitable to project objectives, given the context, without setting limits based on the delivery mode (for example, a PPP). In some cases, to accommodate a PPP, planners’ objectives have shifted from improving urban bus services overall to simply saving costs or achieving greater efficiency. While these more modest goals are indeed worthwhile, the goals should influence the delivery mode—not the other way around.

- **Urban bus projects have specific features that make structuring a PPP and achieving bankability more challenging than for other infrastructure-related projects.** Urban bus transactions are usually relatively smaller than those in other sectors. Given their nature (numerous modular components and the need to integrate technical definitions with risk and function allocations), urban bus projects are more complex to structure, and the existence of incumbent operators with different features may elevate the risks and transaction costs in the eyes of potential investors.

- **The financial instruments of multilateral development banks can help urban bus PPPs to achieve financial closure.** Such instruments, including partial guarantees, can help to mitigate the effects of high perceived risk. Similarly, multilateral development banks (MDBs) can finance government contributions to cover the viability funding gap of socially profitable projects. Also, MDBs’ participation includes technical assistance that supports project structuring, the achievement of development objectives, and the management of social and environmental risks.
• **Urban bus PPPs have limitations, which shape how projects are structured.** The main limitations include their ability to generate revenue or to use operating revenue to pay for project components as well as the nature and experience of potential private partners. These factors lead most urban bus PPPs to focus private participation on the provision and operation of rolling stock.

• **Public authorities wishing to attract private investors must learn to think like them.** What changes (legislative, institutional, regulatory) can be made to eliminate avoidable risks, thereby easing investors’ fiduciary duty to minimize these?

• **Mitigating risks also mitigates costs.** Where risks are reduced up-front, projects are more attractive and more affordable—a virtuous circle.

• **New technologies bring both challenges and opportunities.** At the municipal and national levels, successful planners are using new technologies and innovations even as they recognize the important role of incumbent operators and tried-and-true operating modes.

• **Urban bus PPPs have experienced common issues leading to sustainability problems.** These issues include (a) problems with project definition and design; (b) problems with risk allocation; (c) planning flaws, including demand overestimation; and (d) lack of appropriate integration and articulation at the urban level.

• **Unbundling the provision and operation of fleets helps to solve the common problem of operators’ lack of access to finance.** Having a solvent private partner providing the fleet may reduce financial costs associated with fleet provision, but requires careful planning to ensure proper fleet maintenance.

• **Electric buses are a clean solution that brings new partners to PPP structures, but using them requires very careful technical planning.** Though still expensive, electric buses are a promising technology to reduce emissions. Utilities are in a good position to manage some of the risk involved and can provide some infrastructure and capital.

• **Funding the private provision of infrastructure with tariffs is seldom an option.** Bus project revenues often struggle to cover operations and maintenance costs. Private provision of infrastructure requires fiscal capacity and makes sense only when a market failure in the financial markets hinders the ability of solvent entities to access funding or when infrastructure provision can be bundled with operations to reduce inherent risk.

**NOTES**

1. Appendix A describes the case studies analyzed in this document.

2. For instance, using equity provided by equity funds may mitigate governance risks. If an operator’s corporate governance is subpar, experienced investors with equity in the project may step in and help the operator to become better organized, thus mitigating this risk. In another example, an operator faces a huge technological risk when buying electric buses. If the buses are financed through an operating lease with an experienced provider, this mitigates the risk, since an experienced partner will help with planning and maintenance. In another example, private vehicles may be charged for their use of certain high-volume roads to encourage the use of public transportation. These fees not only provide revenue but also mitigate the risk that demand for bus services will be lower than expected.
REFERENCES


Initial Considerations

This part outlines the key features of urban bus system reforms that include arrangements for private sector participation. It also offers planners support as they consider whether or not private sector participation is right for one or several components of a proposed project.
Cities around the world face similar challenges in implementing projects to improve urban bus services; in many cases, the private sector’s participation promises key benefits. Fiscal constraints and lack of capacity or flexibility in the public sector leave room for private actors, which often are more efficient and have lower operating costs. Where private actors are already involved in the operation of transit or paratransit (that is, informal) services, their place must be considered in any system reform. The design of a successful reform effort will include mechanisms to support the transition of private actors to those functions that are the most suitable, given their particular strengths and weaknesses.

**WHAT IS A PUBLIC-PRIVATE PARTNERSHIP IN URBAN BUS SYSTEMS?**

An especially popular form of private sector participation in public transportation is the public-private partnership (PPP). Many cities in low- and middle-income countries have sought to attract private sector investment by structuring PPPs, as was done in the first-generation urban bus reforms of the 1990s. The prospects of such investment have spurred the growth of companies associated with bus rapid transit (BRT)—such as bus manufacturers, consulting services, and tech firms—which have quickly begun to understand and adapt to new trends in transportation. But financing and banking services have not developed as quickly as the industry. Only a few banks are offering loans to urban bus operators, and many projects have found it difficult to attract private investments or achieve bankability. Three interrelated issues explain this challenge: (a) difficulties dealing with incumbent operators; (b) the relative complexity of urban bus projects, which are characterized by various components that can (and often are) handled by different entities; and (c) the relatively small size of urban bus projects (which often do not require infrastructure investments).

One of the most overlooked elements of structuring urban bus PPPs is dealing with incumbent operators. In many cases, an urban bus reform project targets a
service already provided by the private sector. For example, it may seek to formalize the private provision of a particular service to improve efficiency and overall quality. On the one hand, incumbent operators may ensure profits by ignoring labor regulations, avoiding taxes, and neglecting maintenance and fleet renovation. Relatively unorganized incumbents that have low standards of corporate governance may easily increase a project’s governance risks. On the other hand, well-organized incumbent operators may oppose any change to the status quo and stoke opposition that delays the project. In both cases, improper management of incumbents creates the risk of increased informal competition with the system after the reform. These and other examples help to explain why an assessment of incumbent bus operators, their market structures, and their access to finance is so important.

Various successful solutions have involved incumbent operators to different degrees, depending on the market. For instance, if incumbent operators are assigned responsibility for the provision of fleets but lack access to finance, this situation jeopardizes both their own financial sustainability and that of the project. In the absence of measures to mitigate or better manage commercial, political, and regulatory risks, access to finance remains limited. Also, local financiers of the transportation sector may not be ready to lend under project finance arrangements. Today, many banks feel more comfortable lending to a traditional operator than to a special-purpose vehicle (SPV).\(^1\)

Myriad interrelated decisions specific to urban bus services—regarding functions, components, and risk management strategies—add an additional layer of complexity to the process of structuring an urban bus project, increasing either transaction costs or the risk of a suboptimal structure. When designing an urban bus PPP, it is important to consider all project components and divide responsibility for them between the public and private sectors. Components are traditionally defined using six categories: design, finance, build, operate, maintain, and, eventually, transfer. A road or an energy plant typically has one component. A bus project, by contrast, is modular and complex, and the application of these categories to each component must be considered in the design of the PPP structure. For example, a bus project may or may not include stations, terminals, stops, lanes, a fare collection system, monitoring systems, buses, signaling, control centers, and so forth. In addition, each of the defined components may be built and operated by either the public or the private sector. Also, private sector participation may be articulated as one or a combination of several SPVs or service providers. Finally, the definition of risk mitigation mechanisms and relations among agents may require a reconsideration of project components. For instance, depending on the local transportation authority’s responsibility for monitoring operations, information systems for fleet management and control may or may not be needed, which implies an interrelation between technical definitions and risk allocation and mitigation strategies.

All these factors call for an integrated approach to project planning, in which each component is slotted for public or private provisioning and associated financial mechanisms and concession elements are carefully considered. Also, it is critical that incentives in the project’s design maximize efficiency and mitigate risks to achieve bankability at a project level.

Urban bus PPPs usually focus on leveraging private capital for fleet provision, which limits the size of the transactions involved. The ability of most urban bus PPPs to leverage private capital is limited to the rolling stock for several reasons. First, most private actors are experienced in delivering only those components
that they have previously offered. In traditional bus systems, private operators provide and operate fleets (under license and operation agreements), while the public sector provides infrastructure. Second, typical operating revenue barely covers the costs of operations and maintenance (O&M) in most systems, and the public sector likely faces fiscal constraints that limit its ability to expand private provision to other components (this is especially true in low- and middle-income countries). Although the market for fleet provision is voluminous, the average size of a fleet provision transaction pales in comparison with deals in other sectors dependent on large infrastructure. Banks are not able to justify the high transaction costs involved, or they face difficulties (including lack of capacity) assessing project-specific risks.

The nature, complexity, and structure of urban bus PPPs relate to the features of project components. The components most often provided, financed, or operated under urban bus PPPs reflect traditional patterns of private sector provision. Table 1.1 generalizes the diversity of components in an urban bus project, including whether the different tasks (design, build, finance, operate, maintain) of the delivery model are almost always public (− −), usually public (−), usually private (+), or almost always private (+ +). Beyond this generalization, from left to right, the table shows a parallel gradient in (a) each component’s suitability to generate or capture revenue, (b) its traditional provider, and (c) the degree to which its operations feature the private sector’s competitive advantage (over the public sector). All the tasks related to delivering individual project components add complexity to the legal and financial structure of projects. Each task under each function can result in independent contractual arrangements. Similarly, all components require funding, and user fares are not enough. On the one hand, the costs of lane infrastructure, especially when not used exclusively for public transportation, are seldom charged to users (regardless of whether they travel in private vehicles or public transportation). On the other hand, the provision and operation of rolling stock are commonly funded totally or partially with user fares. Meanwhile, the project requires all components to achieve financial closure.

<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>LANE INFRASTRUCTURE</th>
<th>SIGNALING AND TRAFFIC LIGHTS</th>
<th>TERMINALS AND STATIONS</th>
<th>DEPOTS AND WORKSHOPS</th>
<th>ROLLING STOCK</th>
<th>PROJECT-SPECIFIC FARE COLLECTION SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Design</td>
<td>– –</td>
<td>– –</td>
<td>–</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Build</td>
<td>– –</td>
<td>– –</td>
<td>–</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Finance</td>
<td>–</td>
<td>–</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Operate</td>
<td>– –</td>
<td>–</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
<tr>
<td>Maintain</td>
<td>– –</td>
<td>–</td>
<td>+</td>
<td>++</td>
<td>++</td>
<td>++</td>
</tr>
</tbody>
</table>

Suitability to generate or capture revenue during operation
Private sector competitive advantage or experience in provision
Traditional private provision of component


Note: – – = almost always public; – = usually public; + = usually private; ++ = almost always private.
The Analytical Framework

The methodology proposed in this analytical framework allows planners to calibrate different degrees of risk transfer, terms, and performance obligations in ways that may or may not fall under the standard definition of a PPP. The modularity and flexibility of urban bus projects allow for different degrees of private sector participation, ranging from pure public provision and operation to the full transfer of risks, with many options in between. The World Bank’s PPP Reference Guide defines a PPP as “a long-term contract between a private party and a government entity, for providing a public asset or service, in which the private party bears significant risk and management responsibility and remuneration is linked to performance” (World Bank 2017). Figure 1.1 indicates where the definition of PPP falls on the spectrum between pure public provision and unregulated private provision. The methodology proposed in this document is based on the allocation of risk and function that is typical for PPPs. However, it can also be used to define structures that are close to a PPP but fall outside the definition, such as O&M contracts in which the degree of risk transfer is lower than that required under a PPP. The methodology is particularly useful when allocating risks and functions where the structure requires the creation of one or several SPVs.

The analytical framework uses the terms PPP and concession interchangeably, except when it comes to discussing legal instruments. Some regulatory frameworks distinguish (a) PPPs in which public subsidies are permitted from (b) pure concessions, in which public subsidies are not allowed and the project becomes bankable and financially sustainable only with users’ revenues. This document groups PPPs and concessions together, under the rationale that both fall under the same conceptual framework, independent of the use of subsidies. When discussing legal instruments, concession refers to a concession contract.

Finally, when we refer to urban bus systems, we mean systems with a certain degree of formalization. Broadly speaking, the document refers to two types of transportation interventions: (a) projects requiring significant infrastructure investments (BRT PPPs) and (b) partial or citywide reforms involving

### FIGURE 1.1

Delivery models, by the degree of risk and cost transferred to the private sector

<table>
<thead>
<tr>
<th>Analytical framework</th>
<th>PPP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public operation</td>
<td></td>
</tr>
<tr>
<td>Fleet operation and management contract</td>
<td></td>
</tr>
<tr>
<td>Fleet provision and operation</td>
<td></td>
</tr>
<tr>
<td>Licensing</td>
<td>Unregulated private operation</td>
</tr>
</tbody>
</table>

**Cost plus > gross cost > net cost**

**Long term > short term**

**Level of risk transferred to the private sector**


*Note: This figure provides a stylization of different arrangements for the provision of public transportation services, from pure public provision to unregulated private provision. Depending on the level of risk transferred to the private sector, some fleet provision and management contracts may be considered a PPP. While this document focuses on the planning and preparation stages, some elements may also be useful for setting up operation and management contracts as well as for setting conditions under licenses. PPP = public-private partnership.*
conventional bus systems and a sectoral reorganization of operating companies. In both cases, an authority is in charge of enforcing compliance with a pre-defined level of service along defined routes, enforcing taxes and labor laws, and setting standards for fleet maintenance and renovation. By contrast, many far less formal urban transportation structures in the world depend exclusively on user fares. Some of these systems consist of paratransit, or informal, nonregulated transportation services. Others operate under licenses or permits that only define the routes on which the licensee can operate or define a certain level of service (rarely monitored and enforced).

THE PUBLIC-PRIVATE PARTNERSHIP PROJECT CYCLE

The PPP project cycle has four stages. As shown in figure 1.2, the PPP cycle starts with a planning and identification stage, in which practitioners identify a potential solution to a given problem and consider a PPP as a potential delivery model. If the authorities decide that a PPP is suitable, they start the preparation stage.

FIGURE 1.2
Key elements of the public-private partnership project cycle, by stage

<table>
<thead>
<tr>
<th>Planning and identification</th>
<th>Preparation</th>
<th>Structuring and procuring</th>
<th>Implementation and management</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Main activities</strong></td>
<td><strong>Main activities</strong></td>
<td><strong>Main activities</strong></td>
<td><strong>Main activities</strong></td>
</tr>
<tr>
<td>• Identify technical solution</td>
<td>• Refine scope</td>
<td>• Confirm appraisal</td>
<td>• Approve final designs</td>
</tr>
<tr>
<td>• Discuss economic and financial feasibility</td>
<td>• Determine legal, technical, and economic feasibility</td>
<td>• Finalize technical designs</td>
<td>• Oversee construction</td>
</tr>
<tr>
<td>• Discuss delivery model, including PPP screening</td>
<td>• Assess PPP feasibility (VfM)</td>
<td>• Finalize contract structures and drafts</td>
<td>• Monitor performance</td>
</tr>
<tr>
<td><strong>Expected outputs</strong></td>
<td><strong>Expected outputs</strong></td>
<td><strong>Expected outputs</strong></td>
<td><strong>Expected outputs</strong></td>
</tr>
<tr>
<td>• Conceptual technical solution</td>
<td>• Refined project scope and design</td>
<td>• Project designs</td>
<td>• Any arising change to contract document</td>
</tr>
<tr>
<td>• Preliminary concept of economic and financial feasibility</td>
<td>• VfM analysis</td>
<td>• Final financial plan</td>
<td></td>
</tr>
<tr>
<td>• Concept for proposed delivery model</td>
<td>• Preliminary PPP structure, business model, and implementation roadmap</td>
<td>• Bidding documents, including draft contracts</td>
<td></td>
</tr>
<tr>
<td><strong>Expected outcome</strong></td>
<td><strong>Expected outcome</strong></td>
<td><strong>Expected outcome</strong></td>
<td><strong>Expected outcome</strong></td>
</tr>
<tr>
<td>• Green light for preparation</td>
<td>• Green light to move to structuring</td>
<td>• Contracts awarded</td>
<td>• Project in operation</td>
</tr>
</tbody>
</table>

Source: Adapted from APMG International 2018.
Note: PPP = public-private partnership; VfM = value for money.
This second stage consists of (a) more detailed project scoping; (b) an assessment of the legal, economic, and financial feasibility of the project; (c) a confirmation of PPP viability; and (d) an implementation plan. The implementation plan guides the structuring and procuring stage. This third stage consists of the actions enabling project execution. It includes drafting bidding documents and contracts and finalizing designs. Structuring and procuring are completed by the time the last stage—implementation and management—starts.

The analytical framework is meant to be used by practitioners and authorities that are considering setting up an urban bus PPP. Specifically, it supports elements of the first two stages of the process. Planners may start using the analytical framework at any time during the planning and identification stage or at the beginning of the preparation stage. As noted in the overview, part I helps planners define or review the feasibility of the technical solutions being considered and whether a PPP is both feasible and the best option for delivery (stage 1 and some elements of stage 2). If it is, parts II and III help planners define a preliminary project structure (stage 2).

**COMMON CHALLENGES OF URBAN BUS PUBLIC-PRIVATE PARTNERSHIPS**

The first PPPs supporting BRT systems had notable success—at least initially (later many required subsidies to stay afloat). The success of private sector provision in projects like TransMilenio Phase I in Bogotá, Colombia, or Metrobús Line 1 in Mexico City, Mexico, inspired cities around the world to replicate the model, which did not perform as well as it did in these early instances (box 1.1).

**BOX 1.1 The rise and fall of the bus rapid transit PPP**

After the successful implementation of a bus rapid transit (BRT) system in Curitiba, Brazil, in 1974 and the Trolleybús in Quito, Ecuador, in 1995, the implementation of TransMilenio Phase I in Bogotá, Colombia, in 2001 popularized BRT as a successful solution for urban mobility. A public-private partnership (PPP) was considered to be the appropriate delivery model. The success of Metrobús in Mexico in 2005 consolidated this idea. The contexts of these projects shared many similarities: oversupply and inefficient competition in the market, leading to low-quality (though frequent) services; high operating costs; and problems related to the operation of buses in mixed traffic (road safety, congestion). The projects’ success demonstrated the benefits of market competition, strong institutional planning, and enhanced monitoring capacity. Benefits included lower costs, rationalization of fleets, and an increase in vehicle capacity (which compensated for the costs of formalization). New infrastructure also led to improved speed (which compensated for the decreased frequency of higher-capacity buses and the need for more transfers). The implementation of state-of-the-art technological systems for fare collection and operations management helped to mitigate the risks associated with cash management and improved planning and monitoring capacity. The presence of a special-purpose vehicle (SPV) for system operations under a PPP arrangement helped to manage project risks, control operations, and ease the process of fleet rationalization.

continued
The Challenges of Private Sector Participation in Urban Bus Systems

The early success of BRT PPPs has also influenced how cities approach the restructuring of conventional bus systems, a point that merits special consideration. Urban transportation planners who remained hesitant about the BRT PPP model just had to look at the proven successes of Bogotá and Mexico City, which did not require subsidies for their operation and were leveraging private sector financing. Little by little, the BRT PPP plan was replicated in cities across the globe: as of early 2019, BRT systems were operating in 170 cities, carrying more than 30 million passengers a day. Most of these systems were in Latin America and the Caribbean, especially those that were privately operated. Moreover, some governments started applying key elements of the model to reforms of traditional bus systems (such as reorganization of the fleet, use of an SPV for operation, implementation of technological systems for fare collection and fleet control, and investment in infrastructure).b

Their early successes aside, many of the BRT systems in low- and middle-income countries today are facing sustainability problems. A BRT system is a technical solution that provides a level of capacity and service somewhere between a conventional bus system and a metro (subway, light rail), for a much cheaper cost. However, to be successful, a BRT system requires just enough demand to justify a trunk corridor, but not so much demand that the system cannot absorb it. The patterns of demand should allow for long enough trips in the system’s exclusive corridors to justify, from the perspective of the generalized cost of travel, the extra transfers and waiting times associated with trunk-fed systems. In some cases, changes in external factors have had a negative effect on BRT systems. Individuals’ increased access to private vehicles, including motorcycles, and the growth of informal transportation modes have affected BRT demand. As a result, some cities have yet to see the forecasted levels of demand, prompting financial sustainability problems or the need for subsidies. In other cases, demand was underestimated, and the BRT system was soon overcrowded. Implementation problems have included transportation authorities’ lack of capacity to plan, manage, and monitor the new systems and operators’ difficulties in adapting their organizational or technological solutions.

Sources: World Bank compilation with reference to BRT+ Centre of Excellence and EMBARQ 2019; Dodero, Casello, and Molinero 2011; EMBARQ 2010; Flores-Dewey and Zegras 2012; Rodriguez et al. 2017; Vuchic 2005.

a. In 2012 the Institute for Transportation and Development Policy developed “the BRT standard” to evaluate how close the technical design of a project was to a given concept of the BRT; it also defined five essential technical characteristics and some best practices. However, evaluating a project by a given standard is no substitute for evaluating its suitability to a given context and in light of the overarching objective of improving urban mobility.

b. Colombian Decree no. 3422 2009 for Strategic Transport Systems (the legal framework for receiving national support for systems in cities with a population between 250,000 and 600,000) explicitly includes among its objectives “rationalizing [a] fleet,” implementing an electronic fare collection system, and consolidating a business organization for the operation. Similarly, Mexico’s Public Transportation Federal Support Program (PROTRAM) requires access to national nonreimbursable funds, a business reorganization of the public operators under an SPV, and a minimum 34 percent private sector participation in capital expenditures.

c. Excluding TransMilenio and the system in Medellín, demand in Colombia’s urban bus systems—including those that had undergone reform—fell 33.7 percentage points, on average, from 2005 to 2017 (DANE 2018).

The early success of BRT PPPs has also influenced how cities approach the restructuring of conventional bus systems, a point that merits special consideration. On the one hand, some of the conditions of a generic urban bus reform are very favorable for PPPs: demand for services is high (scale), network effects are present (and thus the possibility of cross-subsidies), and the visibility—and political relevance—of a transformation is high. On the other hand, where reforms expand service to relatively less-dense areas with less demand, the operating cost per passenger-kilometer rises. In all cases, managing incumbent operators is challenging. Many heterogeneous groups are typically involved in bus
operations, and disrupting the status quo can be difficult. Finally, planning transportation operations—and a PPP—requires public sector capacity.

Countries have had widely differing experiences with urban bus PPPs. Santiago de Chile’s Transantiago big-bang reform had a chaotic inauguration; services were gradually improved only after several renegotiation processes. Bogotá’s Integrated Public Transport System (SITP) resulted in bankrupt operators and a decline in service quality. In contrast, Seoul’s big-bang reform succeeded, as did São Paulo’s (where it was combined with a gradual reform of certain system elements). However, despite their very different contexts, approaches, and outcomes, all these recent interventions share a common element: the need for public subsidies.²

Many urban bus reformers have imposed conditions or included components in their projects that did not advance key project objectives. Sometimes with the aim of complying with the requirements of a PPP, sometimes for lack of planning, many projects have included elements that were not essential, or even proved detrimental, to project objectives. These elements included requirements such as the need to (a) operate with completely new assets, not taking advantage of existing assets in the system (including, for example, the existing bus fleet or yards); (b) incorporate expensive technological solutions; (c) modify the organization of incumbent operators or bring in a new operator; (d) design service levels according to demand levels, prioritizing financial sustainability over quality of service; and (e) include transportation infrastructure that was not justified by the context (such as segregated lanes for operating in a trunk feeder model). Box 1.2 presents the main reasons why governments pursue a PPP.

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**BOX 1.2**

**A public-private partnership: Three reasons why**

Many projects have embraced the public-private partnership (PPP) as a financing mechanism or an instrument to foster the reorganization of local industry. But a PPP is just a public sector strategy to deliver a good or service. Governments typically pursue a PPP in the hopes that it will allow them to accomplish the following:

- **Transfer up-front costs.** PPPs allow public agencies to transfer a significant amount of their up-front costs to the private sector. This is only relevant where the public sector faces constraints on its liquidity or access to finance. It is important to distinguish liquidity shortages or financial constraints from fiscal constraints. Both private and public entities require fiscal space to fulfill the financial obligations related to a project. PPPs can help generate funding or overcome issues related to short-term constraints in liquidity or access to finance when lack of access to finance is due to market or regulatory barriers, but the authority does have borrowing capacity. However, a private party will rarely enter into a long-term agreement with an authority that cannot borrow due to long-term solvency or fiscal space constraints. In all scenarios, the public agency needs the fiscal capacity to repay the loan or comply with obligations to the private concessionaire.

- **Improve the efficiency of a project’s design, implementation, or operations.** A private entity may be in a better position to implement or operate
When it comes to transferring costs, the success of urban bus PPPs depends on the financial position of the private concessionaire and the ability of the project to generate revenue. Unfortunately, the perceived risks of most urban bus PPP structures are too high to ensure bankability. Therefore, under the most common structure, a private operator provides the fleet and the public sector provides the infrastructure. Several projects have experienced cost overruns or faced implementation challenges because the operator lacked access to finance. This is particularly common when the structure relies on incumbent operators to provide services. Projects that feature the competitive selection of operators, infrastructure, or providers have mitigated this risk by including financial requirements in the bidding process. Despite some exceptions, experience shows that most projects are not financially self-sustaining and require sources of funding in addition to operating revenues.

Similarly, projects have achieved more efficient implementation thanks to capable and experienced concessionaires. When it comes to efficiency, the private sector may have a competitive advantage in both the provision and implementation of technological components as well as in operations. The public sector has extensive experience in the provision of urban roads; specific requirements for BRT (like lane infrastructure) are addressed at the design stage. Again, setting up the right requirements for the concessionaire of an operation mitigates the risk of working with an inexperienced one.

Efficient risk allocation is at the core of project finance. It is critical to ensuring the concessionaire's access to finance, whereas its lack has posed a stumbling block for numerous projects. Properly structured projects minimize risks and achieve bankability. There is a level of risk that is not acceptable for financiers and cannot be compensated for by a higher financial rate. If the perceived risk of a project is over this threshold, the project is not bankable. Numerous urban bus PPPs face this problem. Anecdotally, banks in Colombia and Mexico reportedly feel more comfortable directly financing the company that owns an SPV than the SPV itself. A bank's preference for providing corporate financing to an operator or SPV shareholder over a project finance plan lending to the SPV may indicate inefficient risk allocation.³

Sources:
Based on French Development Agency 2009; World Bank 2017; World Bank Group, PPIAF 2012.
A PPP is not an instrument for creating fiscal space or fostering the reorganization of the transportation sector. When deciding whether to use a PPP, policy makers too often consider irrelevant concerns. For example, the government needs fiscal space whether the provider is public or private. A PPP may create value and reduce costs. However, except when a project is self-sustaining, these reduced costs will translate into an obligation for which the public sector requires fiscal space. Second, and specific to transportation, governments often see PPPs as an opportunity to reorganize the sector by restructuring incumbent operators and creating an SPV or making room for the entry of an external operator (alone or in association with incumbents). However, an authority does not need a concession for these purposes. Permits or licenses, for example, may be used to encourage sector reorganization and greater supervision. For instance, while issuing permits or licenses, the government can require operators to maintain a single farebox for fare collection and agree on a jointly planned operation in compliance with specific requirements for a particular level of service (in relation to frequency, speed, stops, routes, and schedules) as well as reporting mechanisms (see appendix A for the example of Medellín, Colombia).

Replicating successful project structures—without paying proper attention to the local context or even project objectives—has too often led to suboptimal allocation of risks and functions. One of the advantages of a PPP is that it allows for efficient risk allocation. Mitigating risks and allocating them to the party most able to bear them help to minimize the overall project risk borne by an SPV. In theory, the SPV can borrow and benefit from low risk premiums in a project finance plan. In practice, doing so requires an assessment of the capacity and appetite of financiers and the risk associated with the sector. As noted, some local banks may refuse to lend to an urban bus SPV and prefer to lend to its shareholders (operating companies with a credit history). Other banks may not have a sophisticated methodology for assessing the risks of urban bus projects and may systematically apply the same risk premium to all projects. Therefore, making the operator responsible for fleet provision without considering its access to finance is a suboptimal strategy for allocating risk. Similarly, projects have run into problems by not adapting remuneration plans to demand or by making authorities responsible for project elements they do not have the capacity to undertake.

Demand models consistently overestimate demand, and projects are rarely articulated at an urban level. The overestimation of demand has led many projects to fail or falter. While the first corridors in Bogotá and Mexico City allowed for shorter travel times that justified additional transfers, the application of the solution in other contexts did not always have successful outcomes. In addition, many cities have planned projects without realistically considering how to deal with incumbent operators. Projects have also put too much emphasis on planning a specific corridor, without adequately considering how this corridor would be integrated with existing modes in the area or the rest of the system. This oversight may result in surprises when expanding or integrating the system and does not maximize the welfare of public transportation users. See appendix C for relevant tools.

NOTES

1. For example, Sittsa (Solución Inmediata en Transporte) is a concessionaire for the operation of the World Bank–financed BRT project in Tijuana, Mexico. Sittsa, which is owned by some of the city’s traditional operating companies, started transferring buses as well as the
loans associated with them to SPV stakeholders. Banca Mifel, the financier for the buses, reportedly is happy with the new arrangement. Interviews with financial agents in Mexico and the experience of other World Bank–supported projects in Latin America are consistent with this observation.

2. The case of Medellín in Colombia represents somewhat of a natural experiment. After dividing the city into nine areas for the purposes of integrating conventional buses into the system (publicly operated metro, BRT, cables, and trams), an initial bidding process in two of the areas resulted in US$20 million in annual operational subsidies. For the rest of the areas, the city followed a different approach (without reorganizing incumbent operators or issuing permits), achieving superior results. Business agreements achieved better levels of service, including with regard to frequency of service, implementation of fare collection systems, incorporation of a corporate image, use of clean bus technology, and provision of other services to users. They also avoided the overlapping of services (penny wars) and did not require subsidies. Chapter 3 discusses legal alternatives to a PPP, and appendix A provides more details on the experience of Medellín in Colombia and other cases mentioned throughout this report.

3. In some cases, the local financial markets lack the capacity to close pure project finance deals and may feel comfortable with more familiar corporate finance arrangements.

4. This was the case among many local banks lending to urban bus projects in Mexico, as reported in interviews with the authors.

REFERENCES


Project Stakeholders and Objectives

The stakeholder analysis undertaken at a project’s planning stage (that is, stage 1 of 4) should not be confused with the market sounding that is conducted during the structuring and tendering phase (stage 3) (table 2.1). Figure 1.2 in chapter 1 presents all four stages. This chapter focuses on the planning stage. A proper market sounding cannot be done at the planning stage because the level of uncertainty surrounding the project structure at this stage and a general lack of data and definitions may put off potential investors (APMG International 2018).

Early in the planning stage, planners map key stakeholders and identify their objectives and—also important—their restrictions. Before drafting a conceptual project structure, planners would do well to have interviewed and gained a clear sense of the objectives and restrictions of key stakeholders. Understanding these variables will help planners build coalitions to support the project, adapt its design to address stakeholders’ priorities as much as possible, and assign responsibility for project functions and risks. Table 2.2 provides an example of this exercise.

<table>
<thead>
<tr>
<th>TABLE 2.1 Elements of stakeholder analysis: Stage 1: Planning vs. Stage 3: Structuring and Tendering</th>
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<tbody>
<tr>
<td><strong>STAGE 1: PLANNING</strong></td>
</tr>
<tr>
<td>• Adequacy and correctness of the financial assumptions used in the feasibility assessments (for example, projected escalation in construction costs)</td>
</tr>
<tr>
<td>• Acceptability of the proposed risk structure at its current level of development</td>
</tr>
<tr>
<td>• Acceptability of the proposed financial structure at its current level of development</td>
</tr>
<tr>
<td>• Capacity of potential private sector bidders to form strong consortia to bid for the project</td>
</tr>
<tr>
<td>• Capability of bidders to deal with any significant technical challenges in the project</td>
</tr>
<tr>
<td>• Proposed project timelines</td>
</tr>
<tr>
<td>STAKEHOLDER</td>
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<tr>
<td>-------------</td>
</tr>
<tr>
<td><strong>Community members</strong></td>
</tr>
<tr>
<td>Potential public transportation users</td>
</tr>
<tr>
<td>Private transportation users</td>
</tr>
<tr>
<td>Residents and businesses in project implementation area</td>
</tr>
<tr>
<td><strong>Public entities</strong></td>
</tr>
<tr>
<td>Public transportation authority</td>
</tr>
<tr>
<td>Mayor, subnational government</td>
</tr>
<tr>
<td>National authority</td>
</tr>
<tr>
<td>Public financial entities, development agencies</td>
</tr>
<tr>
<td><strong>Private sector</strong></td>
</tr>
<tr>
<td>Incumbent operators</td>
</tr>
<tr>
<td>Other transportation operators (informal, taxi)</td>
</tr>
<tr>
<td>Potential bidders or suppliers (operators, bus manufacturers, infrastructure companies)</td>
</tr>
<tr>
<td>Potential investors or financiers</td>
</tr>
</tbody>
</table>

Note: n.a. = not applicable.
Some objectives will be common to all stakeholders; others will be specific to some groups. Some stakeholders might have opposing objectives. Common objectives typically involve improvements to transportation operations, including (a) reduced transportation costs, (b) reduced transportation-related global and local emissions, (c) reduced noise, (d) reduced congestion, and (e) improved road safety. Exclusive objectives depend on the specific interests of each stakeholder group and, where competing, will need to be balanced against one another by project planners. For instance, public transportation users will be interested in making transportation more affordable. They will also seek to maintain or improve service stops in their particular locales. A transportation authority may be interested in maximizing the quality of service, while the city or metropolitan area government will be interested in keeping user fares low. Incumbent operators, as well as other transportation service operators, will seek to maintain or improve the size of their business and their level of income. Private financiers and suppliers will focus on repayment. Meanwhile, businesses along transit routes will want increased access for their goods or services and minimal disruptions during project development.

Planners should identify stakeholders’ restrictions, especially as these relate to their capacity or willingness to deliver on the project’s objectives. For instance, the city government may be concerned about perceived negative effects on a specific group of transportation service providers or may want to minimize the loss of jobs. The national government may impose some limits on emissions, propose a particular vehicle technology, or require minimum private sector participation. Similarly, incumbent operators may have a deal with a bus manufacturer or an operational structure that makes it cheaper to buy buses from a specific firm. Similarly, financiers may feel more comfortable lending to an existing operator than to a special-purpose vehicle or, on the contrary, may not be able to lend to incumbent operators. It is critical to assess the capacity of incumbent operators in relation to corporate governance, operations, and access to finance. Similarly, local financiers may not have the capacity to assess specific project risks, or local markets may not be deep enough to provide financing beyond a certain tenure.

REFERENCES


Beginning with the goal of improving urban mobility, planners should, first, clearly distinguish between the reform objectives and the means to achieve those objectives and, then, look for the best means to their ends. For instance, structuring a successful public-private partnership (PPP) may be a good option to achieve more efficient service provision, improve risk allocation, or leverage private sector funding. All of these objectives can be a means to achieve transportation reform, together with the objectives of reducing externalities related to transportation congestion or providing improved public transportation services to boost productivity. Depending on the objectives and the context, a PPP may not be the best delivery model or conditions may not allow for its implementation. International experience shows that framing an intervention as a PPP when it is not the best alternative may lead to inferior results or even fail to meet project objectives.

A reform that does not improve public transportation services for users has a high risk of failing to meet other objectives (Hoyos Guerrero 2019). Making users happier ensures that the public transportation service will be used. From a financial point of view, having more users means more operating revenues, which are often required to leverage private sector resources and ensure long-term sustainability. From an economic point of view, having more users also means more benefits from the project—that is, improved productivity, fewer people using private cars, less congestion, less noise, and less pollution.

This chapter describes three objectives to consider while planning to improve the welfare of transportation users. Notably, none requires a PPP:

- Reducing the generalized cost of travel (which, in turn, depends on transportation financial costs)
- Reducing overall travel times
- Improving service quality (waiting times, transfers, general comfort; see chapter 10 for details).

To achieve these objectives, this chapter looks at three areas: (a) technology-related improvements, (b) infrastructure-related improvements, and (c) legal instruments. For each of the three areas, the analytical framework lists technical solutions that do not require structuring a PPP. It would be useful to consider these options during the planning process as part of efforts to
identify the most efficient solution. Some of these solutions may not necessarily be comprehensive; they may be complementary or first steps in the gradual process of a deeper systemwide reform. Understanding complementary or alternative solutions has particular benefits in a context where the requirements for a successful PPP are not present. Again, what follows is not an all-inclusive proposal; it is a brief description of examples to illustrate the existence of alternatives in three different areas and to keep the problem-solving process open to outside-the-box options.

**SUPPORT PRIVATE SECTOR INITIATIVES TO PROMOTE USER-FRIENDLY TECHNOLOGIES**

Technologies that support informal public transportation providers in large cities are not new, but they have developed especially rapidly in the past few years across different systems (Mehndiratta and Rodriguez 2017). The literature suggests that these technologies have a positive impact on the quality, reliability, and transparency of overall transportation services (see, for example, Behrens, McCormick, and Mfinanga 2015; Eros et al. 2014; and Williams et al. 2015). Cell phone apps that allow users to review individual buses, bus companies, or bus lines in real time have been shown to improve punctuality, courtesy, and safety. Apps that allow users to pay for their bus fares via phone reduce uncertainty around tariffs. Moreover, these improved informal transportation services are often used by the poorest of the poor and thus play an important socioeconomic role.

Private operators of conventional bus services in cities such as Manila, Mexico City, and Nairobi have mapped bus routes, allowing app developers to access the data and create tools that provide users with information about transportation services and schedules. Project planners may use these same apps to access high-quality information about the cities’ systems. In Nairobi, apps like Magic Bus help commuters use smartphone short message services (SMS) to pay for seats, while another allows them to rate the professionalism of drivers. These tools are also changing how providers function, especially as the costs of these technologies drop. Both in Africa and in Latin America, there are many cheap off-the-shelf solutions, ranging from simple automatic vehicle location services to more sophisticated fleet management systems. Incentivizing these demand-driven business-to-business initiatives opens three main areas of opportunity for public transportation authorities, which are outlined as follows.

**Improve users’ experience**

Route mapping and crowdsourcing in real-time conditions help informal bus users know the best routes and choose highly rated services. They also may help reduce waiting times.

Users can book trips and pay fares via SMS or phone apps, thus improving convenience and reducing the chances that drivers will charge different fares (and the chances that they will discriminate against certain users based on their appearance or gender). As an additional benefit, this technology helps bus owners forecast their routes and earnings.

Apps that allow users to rate drivers help the market self-regulate, pushing out underperforming operators. Identifying the most dangerous drivers and the
least safe buses reduces the asymmetry of information in real time, as users can, at the tip of their fingers, choose safer buses and push those that need repairs to a lower price point or even out of the market.

**Improve operators’ capacity and performance**

Better information allows for better planning and fleet management on the part of operators and may eventually encourage operators to join together to integrate service plans, even without the transportation authority’s regulation.

Similarly, new payment systems reduce the need for cash management and reduce the risks associated with cash incomes. They can improve access to finance.

**Improve institutional capacity for planning and monitoring**

If properly used, access to digital maps of actual public transportation routes can help authorities improve the process of planning conventional bus services.

In addition, authorities can take advantage of existing automatic services, such as vehicle location or fleet management, to request data from private operators that allow for better planning, defining, and enforcing of routes and levels of service.

**IMPLEMENT PUNCTUAL INFRASTRUCTURE-RELATED INTERVENTIONS**

It is possible to achieve many of the common objectives of urban bus PPPs by implementing only certain strategic elements of a plan. Very often, undertaking a systemwide, disruptive reform is not required. This section discusses successful examples of this kind of selective intervention.

**Reserve entire streets for public transportation during peak hours**

This measure consists of designating a street (or a section of a street) for use only by public transportation during hours when demand is greatest. This is a very low-cost measure because it only requires implementing proper signaling and demarcation and then notifying users. An example can be found in the city of Temuco, Chile, where the designation of eight blocks allows public transportation to move faster through the most congested part of the city. The area is monitored by smart cameras that record infractions.

**Designate public transportation lanes of shared roads**

The allocation of one (or more) circulation lanes for public transportation has proven to be quite effective, improving the speed of buses by up to 40 percent. One example is the Bus-Only Track Plan in São Paulo, Brazil (photo 3.1).

**Physically segregate public transportation lanes**

Exclusive public transportation lanes are physically segregated from mixed traffic. These exclusive lanes are often positioned in the middle of a road. Some have passenger platforms to the right, so they can be used by any public transportation vehicle, not only those with doors opening on the left. One example are the bus rapid transit (BRT) lanes in Buenos Aires, Argentina (photo 3.2).
PHOTO 3.1
Bus-only lanes of shared roads in Madrid, Spain


PHOTO 3.2
Exclusive, physically segregated lane for bus rapid transit in Buenos Aires, Argentina

Source: Tim Adams, https://www.flickr.com/photos/36217981@N02/15321899523, CC BY 2.0.
Prioritize public transportation in central business districts

In order to encourage the use of public transportation through city centers, it is recommended that the access of private modes of transportation—such as motorcycles, private cars, motorcycle taxis, and taxis—be restricted. An example is the Plan Centro in Santiago, Chile.

USE LEGAL ALTERNATIVES TO ENFORCE AN IMPROVEMENT IN BUS SERVICES

When transportation authorities are looking to encourage reorganization of the sector or to improve their oversight of bus services, there are several good alternatives to structuring a PPP. As discussed in chapter 4, sectoral reorganization and the creation of a special-purpose vehicle should not be among the primary reasons to use a PPP. Individual instruments like permits and licenses (whose definition will vary depending on the legal framework) have proven to be powerful tools in restructuring private operators' organizations and enforcing better levels of service and monitoring capacity (see appendix A for the example of Medellín, Colombia).

Although the concession contract is the most popular instrument during top-down disruptive reforms, it is not the only instrument for regulating transportation as a public service, and it is less common than other instruments such as permits and licenses (table 3.1). Both options may be defined as follows:

- A **concession** (regulated in a concession contract) is a discretionary act by which a transportation authority confers its rights of exploitation of a service to a separate legal entity. The concession creates a new right, linked to obligations.
- A **permit or license** (which both fall under the broad category of an authorization that also includes a habilitation or an individual concession, each with slightly different legal implications, depending on the country) is a unilateral act of a regulatory authority that allows an entity to exercise an activity, by virtue of a preexisting right. The authorization may require compliance with certain requirements, conditions, or circumstances established by the authority and may also be limited by certain conditions or obligations.

<table>
<thead>
<tr>
<th>TABLE 3.1 Substantive differences between a concession and an authorization</th>
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<tbody>
<tr>
<td>CHARACTERISTIC</td>
</tr>
<tr>
<td>Type of act</td>
</tr>
<tr>
<td>Granting procedure</td>
</tr>
<tr>
<td>Requirement of preexisting right</td>
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<tr>
<td>Effect</td>
</tr>
<tr>
<td>Requirements</td>
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<tr>
<td>Termination</td>
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Although permits and licenses are often found in systems with sparse monitoring or regulation, their legal nature is best used by authorities with the capacity to enforce them. A concession contract is an administrative act through which the authority confers on a natural or legal person the temporary provision of a public service, using assets in the public or private domain. In practice, however, private operators use these very same assets through permits or licenses (and, in some cases, without even them).

**Authorizations**

Authorizations (permits or licenses) may provide the legal framework needed to enable a transportation authority to establish, monitor, and enforce an efficient level of service. Key factors include whether permits or licenses include a definition of requirements, levels and conditions of service, and obligations. To meet broader objectives, not only should authorizations provide for a minimum level and quality of service, but the transportation authority should also have the capacity to monitor and enforce compliance effectively.

**Instruments complementing authorizations**

Where authorities seek to promote sectoral reorganization to ensure a more efficient provisioning of services, permits and licenses may be used in combination with other instruments. Permits and licenses are usually associated with an atomized market structure. But aggregated planning, operation, or fare collection may be included as a requisite for obtaining a permit or license. This requirement can be supported by legal instruments implemented by the private or public sector (depending on local regulations), such as business collaboration agreements. For example, being party to such an agreement may be among the obligations or requirements for obtaining or maintaining a license or permit (see appendix A for the example of Medellín).

Many of these examples can effectively advance the objective of greater urban mobility. The solutions described in this chapter are relatively simple, localized solutions that are completely independent of PPPs.

**REFERENCES**


Understanding the common elements of urban bus reforms that have successfully structured public-private partnerships (PPPs) is critical. A careful review of these critical elements will help planners to identify whether their specific conditions match those required to enable such a delivery model. The key elements of a PPP may be grouped into three categories:

• **Technical elements.** The project must be aligned with its primary objective—that is, improving the welfare of potential users of public transportation. To that end, the technical structure of the project must respond to contextual conditions, including trends in demand and existing services. A reform that does not improve service (by, among other things, reducing the generalized cost of travel, GCT) not only will fail to achieve the core objective of improving mobility but also will suffer from low demand, leading to low operating revenue and financial sustainability problems. This situation is especially true in a context of growing motorization and competition from new alternatives to public transportation. The scope and nature of proposed technical solutions are key to understanding whether a PPP is the best delivery model.

• **Institutional and regulatory elements.** To succeed, any PPP needs an enabling environment, which means a sound legal framework that provides legal certainty. In addition, the authority responsible for managing the PPP must have the capacity to monitor the contracts and fulfill all the responsibilities assigned to it under the PPP structure.

• **Fiscal capacity.** Subsidizing public transportation is a necessity in most city systems with a certain level of formalization. However, the amount of these subsidies is considerably lower than the resources allocated to general transportation infrastructure that, in effect, subsidize the use of private vehicles. Very few bus rapid transit (BRT) trunk corridors have positive net operating revenues; among feeder services, positive operating revenue is even more rare. As bus systems—whether conventional or BRT or operated by the public or the private sector—expand to include less profitable routes, a subsidy is almost inevitable, assuming that the public sector provides the infrastructure. Therefore, the public sector must have enough fiscal capacity to provide infrastructure and subsidize operations.
This analytical framework calls on planners to answer three questions. It is strongly recommended to proceed to project preparation only if the answer to all three is yes:

- Are the technical solutions under consideration the most efficient ones for achieving project objectives?
- Can the public entity afford the project?
- Is there an enabling environment, and do institutions have the needed fiscal capacity?

If planners give a positive answer to each of these questions, authorities can consider structuring a PPP. However, these conditions alone do not ensure that a PPP is the optimal financing and delivery method. This analytical framework aims to help project planners to verify that financing and delivering a project as a PPP will provide value for money over traditional public procurement.

**TECHNICAL ELEMENTS**

Determining the scope and nature of a proposed technical solution is critical when considering whether to use a PPP as a delivery method. Different technical solutions have different investment, financing, and expertise requirements. For instance, delivering a trunk-fed BRT as a technical solution may justify the use of a PPP from the perspective of transferring costs and seeking operational efficiencies among new operators who have proven experience in this specific technology.

Reviewing stakeholders’ objectives and limitations (chapter 2) and considering alternative ways—beyond a PPP—to deliver services (chapter 3) are both useful exercises when considering if an identified technical solution will be best supported by a PPP.

When assessing a particular technical solution, planners should consider whether or not it meets two critical objectives.

**Objective 1: Does the solution benefit public transportation users?**

The primary objective of any urban bus reform should be to promote the welfare of public transportation users. There are two reasons for proposing this objective. The first reason is that any urban bus reform is expected to improve mobility, which improves the welfare of public transport users. The second is that attracting more users to the system would promote the achievement of any other objective.

The key benefit for users is a reduction in their generalized cost of travel. The generalized cost of travel consists of all financial and nonmonetary costs that the user faces when traveling. In the case of city buses, the obvious financial cost is the bus fare—and also the relative costs of other transportation modes, if required to complete the route. Nonmonetary costs are even more important in influencing users’ decisions. The value of time, for one, should be assessed for each stage of a trip, using a slightly different equation for each type of time: (a) access time (from the home to a bus stop, for example); (b) waiting time (at the bus stop until a bus arrives); (c) time on the bus (which will depend on its speed, the traffic around it, and the length of the trip); and (d) transfer time (including additional access and waiting times). The value of time also depends on the level of comfort during all of these stages. Users generally value their
access and waiting times two or three times more highly than time spent in a vehicle. Taking this value into account is critical when planning trunk-fed corridors.

**Objective 2: Does the solution contribute to integration of the overall transportation system?**

Regardless of the reform’s timeline and strategy of implementation, the solution designed should consider the entire transportation system and be consistent with master plans for citywide mobility and land use. Local or partial analyses of transport networks may lead to suboptimal solutions. For example, partial analyses can easily underestimate the cost of feeding passengers into the new service (all else remaining equal, given lower demand density, the operating cost per passenger-kilometer should be higher than that of the trunk services) or undervalue the restructuring of routes along a corridor. When analyzing the entire system, a business scale is generated, which brings the possibility of structuring economically balanced business units (in which the more profitable services compensate for the less profitable ones). This helps planners structure a more robust model with a long-term horizon.

**FISCAL CAPACITY**

**The elusiveness of financial self-sufficiency**

After the success of early BRT PPPs in Colombia and Mexico, most urban bus PPPs were planned as self-sustaining (assuming the public provision of infrastructure); however, self-sufficiency proved impossible for most projects. The operation of some trunk corridors with high demand density and lots of short internal trips may have been sustainable; however, in most cases, only the part of the system directly related to the corridor (including less profitable feeder and other conventionally operated routes) was considered, and the early sustainability quickly vanished. If an entire city system is considered, the system will need subsidies, with few exceptions. Subsidies are needed because the operating revenue generated by the most profitable corridors is lower than the deficit generated by the less profitable services in the rest of the city. Regardless of an operator’s legal structures and arrangements, when planning the financial structure of a project, it is best practice to adopt a citywide perspective. At a minimum, the financial structure must consider all services directly affected by or related to the operation of a trunk corridor.

**The limits of alternative sources of funding**

Planners should realistically assess the ability of the public transportation authority to leverage alternative sources of funding and to estimate potential revenues from these sources. After realizing that most projects are not financially self-sustaining, planners should discuss alternative sources of funding (see table C.3 in appendix C for a list of funding instruments). Experience shows that most of these instruments are technically and politically difficult to implement. Even when they are successfully implemented, the income generated is not as significant as expected.
Other fiscal requirements

In many cases, projects require contingent liabilities from the government to achieve bankability, which has an impact on fiscal capacity. When project structures do not minimize risks, or even when they do but their perceived risk is too high, projects may not be bankable. A project is not bankable when its expected rate of return does not compensate private financiers, given the level of forecasted risk. In these situations, the only way to achieve bankability is through contingent liabilities. Such liabilities may come in an explicit form, such as a partial credit risk guarantee or a public obligation to provide revenue as a last resort. They also can be implicit, as when the concessionaire is entitled to a payment and the fare revenue is the source of payment. Even if this implicit liability is not mentioned in the concession contract, the authority will have the obligation to ensure the provision of services, which may imply a partial or total bailout of the concession if the project fails.

INSTITUTIONAL AND REGULATORY ELEMENTS

A strong legal framework

A PPP contract sets out, in exhaustive detail, the terms of the partnership and the rights and obligations of the private partner and the government entity. If the private partner is not certain of its ability to defend its rights in the event of a dispute, then implementing a PPP will not be possible. A strong legal framework is achieved with the combination of good transportation regulation, a government record of compliance that lowers perceived political risks, and a properly structured contract in the case of a concession.

A transportation authority with adequate capacity

If the government wishes to achieve its goals and ensure that services are delivered at the quality and quantity set out in the contract, it must also have capable staff. Similarly, the transportation authority should have the capacity to fulfill its responsibilities. In a reform involving conventional bus systems, the authority can undertake a wide range of planning levels. From a mere definition of routes to daily programming, planners should find the right balance that ensures an appropriate level of service and a realistic expectation of the role to be played by the authority. Controlling informal competition deserves a special mention. The government must decide whether an existing institution will assume these responsibilities or whether it must create and train an entity to plan and manage the project.

The control and regulation of informal and illegal modes of transportation are also key to the success of proposed reforms. These modes of transportation are becoming more prevalent in many cities around the world, especially in low- and middle-income countries; they are a very important part of the public transportation service provision system, and any reform should take them into consideration.
NOTES

1. In Mexico, León's Optibus represents a rare financially self-sustaining citywide bus system.
2. See appendix C for a more detailed list of questions.
3. Colombia's regulation reflects this shift in thinking. Laws 086/1989 and 310/1996 established the requirement of financial self-sustainability (fares must cover the costs of operations, maintenance, management, and equipment replacement). This requirement changed with Law 1753/2015, which established that fare revenue “combined with other local funding sources should cover costs of operations, maintenance, management, and equipment replacement.”
4. For additional references on institutional and regulatory elements, see Kumar and Agarwal (2013), Munoz and Paget-Seekins (2016), and Rebelo (1999).
5. In Tanzania, the national government developed the Dar es Salaam Bus Rapid Transit DART (described in appendix A).
6. In Ecuador, the national government decentralized urban transportation responsibilities in the Metropolitan District of Quito, which created Metrobús Q to plan and manage the project (described in appendix A).

REFERENCES

The first step in preparing a public-private partnership to finance a public transportation project is to identify and allocate all project risks. This exercise is not straightforward in the case of urban bus systems, which involve multifarious functions and components. It is recommended that project planners take a holistic approach that considers the technical definitions of project components, function allocations, and risk mitigation strategies.

The chapters in this part can guide planners in generating a risk matrix that will help them allocate risks and functions and plan risk mitigation strategies. By the end of this part, planners will have all of the elements needed to structure a project.

Part III provides help in polishing this structure by analyzing common structures and strategies, defining funding and financing mechanisms, and considering essential concession elements.
As outlined in part I, it is recommended that planners of an urban bus reform project carefully review the context and range of possible technical solutions before settling on the use of a public-private partnership (PPP). If, after undergoing this process, they decide that a PPP is indeed the most appropriate delivery model for their project (or an aspect of it), they may move on to the project preparation stage.

OVERVIEW AND GUIDING PRINCIPLES

The first step is to identify and allocate project risks. The analytical framework proposes a two-step process for analyzing risk (chapter 7 provides guidance on its practical application):

- **Identify the risks.** First, planners should identify and analyze all of the project’s risks. To that end, this chapter provides guidance and numerous examples from international experience. Reviewing these risks should strengthen the process of brainstorming potential risks, but the final list will depend heavily on the context.

- **Allocate risks and responsibilities for the various project functions and plan how best to mitigate the risks.** The analytical framework proposes allocating risk at the same time as allocating responsibility for a project’s functions. Deciding who will be responsible for which functions is particularly critical for urban bus systems, which involve a variety of separate functions than can be handled in diverse ways. Planners should also identify strategies to mitigate risks and insurance for those that cannot be fully mitigated.

Risk allocation is a fundamental pillar of the structuring process. It should result from undertaking an analytical context-dependent process rather than from adopting a predefined model. The guiding principle of the risk allocation process, which is at the core of project finance, is to assign each risk to the party best suited to manage it (APMG International 2018j; PPP Knowledge Lab n.d.)—that is, the party who is (Irwin 2007):

- Best able to predict and reduce the likelihood of the risk’s occurrence
• Best able to lower and manage the impact of the risk on project outcomes, by assessing and anticipating it and, if needed, responding to it
• Least vulnerable to the risk’s occurrence.

Planners should be wary of suboptimal risk allocation strategies, such as transferring all risks to the private sector or keeping too many under public sector management. While allocating all risks to the private sector is a simple and clear strategy, it leads to suboptimal project designs; and projects so designed often fail (Metrocali in Colombia and Ecovia in Mexico) or require significant resources for their restructuring (Transantiago in Santiago, Chile). In other instances, planners assume that the private sector cannot manage or mitigate certain risks and allocate to it project components with little to no risk transfer. Structures that leave significant risk with the public sector can reach financial closure, as shown by the case of SYTRAL in Lyon, France, but may also struggle and fail, as illustrated by the Metrobús-Q in Quito, Ecuador.

This framework proposes allocating risk based on a careful consideration of the objectives and restrictions of all stakeholders (previously defined in the process of setting objectives, as outlined in chapter 2). In this sense, the assigning of roles, responsibilities, and functions in the project’s conceptual structure must ensure that the exact services required are consistent with each stakeholder’s objectives and restrictions and can be delivered at (a) a level of quality that meets or exceeds envisaged standards and (b) a cost that is affordable to both users and the government.

Risk management strategies include changing the allocation of project functions. Approaching risk allocation from the point of view of project functions places the focus on delivering services rather than on maximizing risk transfer. In addition, allocating functions to the party best able to deliver them mitigates risk. Some project functions complement one another, creating synergies that support risk management and mitigation. Thus, policy makers may find it beneficial to allocate several project functions to the same party. For example, assigning both operations and maintenance (O&M) components to the same operator encourages it to use assets so as to reduce maintenance costs and, at the same time, to maintain assets so as to increase operational efficiency.

**IDENTIFYING PROJECT RISKS**

The first step toward structuring a PPP is to compile a list of all the risks associated with a proposed project. This analytical framework recommends a risk matrix for this purpose. A PPP is considered bankable if the combination of risks and expected returns attracts investors and lenders.

Risk has several definitions. It can be defined as an uncertain event (an event with a probability of occurrence higher than 0, but lower than 1) whose occurrence would have a negative impact on a key project objective. Risk can also be defined as “the chance of an event occurring which would cause actual project circumstances to differ from those assumed when forecasting project benefits and costs” (Furnell 2000, as cited by Partnerships Victoria 2001). In any case, when assessing bankability, the impact is measured as the effect on future cash flows as well as on a project’s solvency and sustainability.

This framework categorizes project risks based on whether they are direct or indirect. Definitions and examples are presented in the following two subsections.
Direct project risks

Direct project risks originate from project-related activities. In most cases, their connection to project-related activities means that the public or private parties involved in a project can control, manage, and mitigate them.

Table 5.1 shows the elements of direct project risk classified in categories that align with stages of the project development process. Each risk category is identified with a different color, which is consistent throughout the analytical framework.

The risk categories discussed here reflect the project functions that commence after an urban bus project has been selected for development as a PPP. The tables below indicate the related functions by color, consistent with table 5.1. These functions may be defined as follows:

- **Planning.** Identifying a need and identifying, appraising, and structuring a project to meet that need.
- **Design.** Developing the technical solutions and finalizing the technical specifications of the project elements.
- **Financing.** Raising and repaying the project’s debt and equity (reaching financial closure).
- **Construction.** Building infrastructure to specified design standards and providing all the components necessary to begin operations on time; may include the provision of rolling stock and other equipment. Depending on the contract, the construction stage ends with the substantial completion of works or on the commercial operation start date.
- **Operations.** Providing services to users, beginning on the commercial operations start date and ending when the contract reaches term. Operations may include different business units that can, in turn, be provided under different arrangements. Functions include O&M of buses, fare collection, and operation of stations, terminals, workshops, and depots.
- **Maintenance.** Providing preventive service and maintenance of rolling stock, infrastructure, and systems at contractually mandated standards. This stage begins on the commercial operations start date and ends when the contract reaches term.

Table 5.2 defines each direct project risk (again, using the same color format as throughout the analytical framework).

### TABLE 5.1 Categories and types of direct risk, organized by project stage

<table>
<thead>
<tr>
<th>PROJECT STAGE AND CATEGORY</th>
<th>RISK ELEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project stages 1–3: planning, preparation, and structuring</td>
<td>Land availability and acquisition, stakeholder management, permits and licensing</td>
</tr>
<tr>
<td>Planning</td>
<td></td>
</tr>
<tr>
<td>Design</td>
<td>Changes in scope of work, environmental and social factors</td>
</tr>
<tr>
<td>Finance</td>
<td>Financial risk, financial closure, evasion and cash management, affordability, financial coordination, changes in ownership</td>
</tr>
<tr>
<td>Project stage 4: implementation</td>
<td></td>
</tr>
<tr>
<td>Construction</td>
<td>Construction delays, interface, geotechnical details, completion and commissioning</td>
</tr>
<tr>
<td>Operations</td>
<td>Quality and level of service, demand, congestion, transportation fares, technology obsolescence, fuel, incumbent operators, other infrastructure, default</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Fleet, repair parts, infrastructure</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Land availability and acquisition</td>
<td>Land is not available at the time of commercial closure (APMG International 2018g) or delays the delivery of publicly provided infrastructure.</td>
</tr>
<tr>
<td>Permits and licensing</td>
<td>The public authority has difficulty obtaining permits and licenses for the project.</td>
</tr>
<tr>
<td>Stakeholder management</td>
<td>Incumbent service providers undermine, disrupt, or challenge the project during implementation, or delays in implementing the structure of their participation delay their start of operations.</td>
</tr>
<tr>
<td>Change in scope of work</td>
<td>An unforeseen change in project design or service requirements delays implementation (APMG International 2018c).</td>
</tr>
<tr>
<td>Environmental and social</td>
<td>Any unforeseen change in the project scope may exacerbate a negative environmental (APMG International 2018e) or social outcome. The design or intervention needs to be modified (or stopped) because the design does not include appropriate consideration of stakeholders’ social or environmental concerns.</td>
</tr>
<tr>
<td>Financing</td>
<td>Project costs and risks are miscalculated, the private party assumes an unintended risk, or the government assumes a risk it is not well suited to assume absent a guarantee, which increases financing costs.</td>
</tr>
<tr>
<td>Financial closure</td>
<td>A failure to raise the finance required, to satisfy conditions precedent, or to complete negotiations with lenders delays or prevents financial closure.</td>
</tr>
<tr>
<td>Collection, fraud</td>
<td>Users willingly avoid payment, or drivers or other employees divert cash revenues from the project.</td>
</tr>
<tr>
<td>Collection, affordability</td>
<td>Payment becomes unaffordable for users (APMG International 2018f).</td>
</tr>
<tr>
<td>Financial coordination</td>
<td>Project revenues are not distributed correctly due to errors in the revenue system, a complicated payment mechanism, or fraud.</td>
</tr>
<tr>
<td>Changes in ownership</td>
<td>A new controlling shareholder is not as capable as, and does not have the capacity of, the original partner (APMG International 2018I).</td>
</tr>
<tr>
<td>Construction delays</td>
<td>Construction does not get completed on time for operations to commence.</td>
</tr>
<tr>
<td>Geotechnical</td>
<td>Unexpected geological or geotechnical conditions affect designs (APMG International 2018h).</td>
</tr>
<tr>
<td>Completion and commissioning</td>
<td>There is a failure to meet an outcome as prescribed (in relation to infrastructure, rolling stock, systems, technology) or a component as commissioned in order to meet the completion acceptance criteria, thereby causing a delay in earning revenues (APMG International 2018d).</td>
</tr>
<tr>
<td>Interface risk</td>
<td>Operations begin without all project components (infrastructure, rolling stock, systems, technology) ready to operate together.</td>
</tr>
<tr>
<td>Quality and level of service</td>
<td>Services are not available for use or do not meet the quality or expected performance levels, which includes providing enough buses to satisfy demand and meeting schedules for the private partner (APMG International 2018a).</td>
</tr>
<tr>
<td>Demand</td>
<td>Demand forecasts are inaccurate, or the project does not comply with assumptions used to estimate demand.</td>
</tr>
<tr>
<td>Congestion</td>
<td>Government fails to secure infrastructure or technology, such as exclusive lanes for bus rapid transit (BRT) systems, or to provide priority signaling for buses in free-flow or BRT systems, which results in congestion.</td>
</tr>
<tr>
<td>Transportation fares</td>
<td>The project fails to generate enough revenue to cover the cost of operations and debt service because fares are lower than anticipated or are not being updated.</td>
</tr>
<tr>
<td>Technology obsolescence</td>
<td>Certain equipment becomes inadequate for the service, or the service becomes outdated (APMG International 2018k).</td>
</tr>
<tr>
<td>Fuel</td>
<td>Fuels (or electricity) required are not consistently available in required quantities at reasonable prices.</td>
</tr>
<tr>
<td>Competition from incumbent</td>
<td>There is unplanned competition from informal transportation services or incumbent operators whose services should have been restructured.</td>
</tr>
</tbody>
</table>

*continued*
Indirect project risks

Indirect project risks originate from sources that are outside the project and not under the direct control of the counterparties in a PPP. This situation does not necessarily mean that the project parties cannot mitigate or manage these risks. (Strategies for mitigating both direct and indirect risks are explored in chapter 7.) Table 5.3 categorizes and enumerates the key types of indirect risk (as color coded consistently throughout the analytical framework). Table 5.4 defines each indirect project risk.

### MAPPING BUS PROJECT RISKS TO PROJECT FUNCTIONS

Risks may be mapped to project functions based on the concept of comparative advantage (that is, one party in a PPP is best placed to deliver a specific function). As noted earlier, each risk should be allocated based on an assessment of each party’s ability to manage that particular risk (Iossa, Spagnolo, and Vellez 2007). This assessment aims to increase efficiency and incentivize proactive risk management to reduce the possibility that an unmitigated or unavoidable risk will materialize and trigger others at later stages of a project, creating a cascade of negative impacts. Figure 5.1 maps a project’s various risks to project functions where the risks are likely to materialize.

The mapping exercise shown in figure 5.1 illustrates how taking over a given function requires managing risks that arise from development of that function as well as handling the impact of risks that originate elsewhere. The closer a project gets to the O&M phase, the greater the number of risks that can materialize and the greater the need for risk mitigation and allocation mechanisms to be in place.
TABLE 5.4 Definition of indirect risks

<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>RISK</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macroeconomic</td>
<td>Unexpected fluctuations in the exchange rate, inflation rate, interest rate, or cost of raw materials affect the costs of financing and inputs required for operations and maintenance.</td>
</tr>
<tr>
<td>Political</td>
<td>Actions from government or affected stakeholders (but not project counterparties), political decisions, events, or changes in political conditions affect the project.</td>
</tr>
<tr>
<td>Expropriation</td>
<td>The government seizes the asset(s) owned by the private partner without compensation.</td>
</tr>
<tr>
<td>Social unrest</td>
<td>Civil disturbances—such as vandalism, protests, and riots—disrupt system operations.</td>
</tr>
<tr>
<td>Regulation, environmental</td>
<td>The government changes or imposes environmental regulations that introduce new costs or affect project costs.</td>
</tr>
<tr>
<td>Regulation, competition</td>
<td>A lack of regulation, institutional capacity, or political will to control unregulated transportation methods creates unnecessary or unregulated competition for an operator in its concession area. Often, many concessionaires will be working simultaneously on different aspects of the deal, which generates its own set of risks that must be dealt with by the government and stakeholders. Addressing this risk is one of the main roles of a transportation authority.</td>
</tr>
<tr>
<td>Regulation, indirect</td>
<td>Changes in regulations indirectly related to the project (such as labor or tax regulations) increase costs.</td>
</tr>
<tr>
<td>Government obligations</td>
<td>At times, government is unwilling to act on its obligations for political or social reasons, such as increasing tariffs or resettling people located in the project area.</td>
</tr>
<tr>
<td>Early termination</td>
<td>The government terminates a contract for reasons apart from nonperformance on the part of the private partner (APMG International 2018i).</td>
</tr>
<tr>
<td>Changes in law</td>
<td>A legislative change introduces new costs to the project or increases existing costs, or the change affects the government’s or operator’s ability to uphold its contractual responsibilities because of new legal circumstances (APMG International 2018b).</td>
</tr>
<tr>
<td>Natural disasters</td>
<td>Natural disasters (earthquakes, floods, hurricanes, fires, droughts, among others) affect project operations by causing substantial damages, both temporary and permanent.</td>
</tr>
<tr>
<td>Climate risks</td>
<td>Unexpected changes in climate conditions affect project operations, including increased extreme precipitation events, heatwaves, or freeze events.</td>
</tr>
</tbody>
</table>


FIGURE 5.1
Risk categories and project functions

NOTE

1. The examples given in this paragraph and throughout the chapter are described in more detail in appendix A.

REFERENCES


DEALING WITH INCUMBENT OPERATORS

A proper assessment of incumbent operators is a critical part of the planning process, necessary to define a conceptual project structure properly and also to allocate functions and risk properly. For instance, planners should assess incumbent operators’ assets and consider whether they might be incorporated in the project. Similarly, incumbent operators’ access to finance or any existing deals they might have with bus manufacturers are important factors to understand when considering whether to assign the functions of fleet renovation or provision to them. Their ability to plan, operate, and organize internally as well as their internal organizational structure are also critical to assess before assigning them responsibility for planning or organizing a joint operation.

Planners should balance (a) efforts to foster competition by removing barriers to entry and (b) efforts to maximize value for money by taking advantage of incumbent operators’ assets. Incumbent operators themselves are the main barriers to competitors’ entry. For example, consider a bus project that brings in new operators. Their financial viability could be threatened by the ongoing activities of incumbent operators if, for example, planners fail to finalize a restructuring of the incumbents’ routes. Even if planners are careful to separate out the routes, incumbent operators could still continue operating on informal terms. In addition, incumbent operators hold critical assets that may be valuable to the project. These assets may be tangible (buses, depots, sometimes even fuel stations) or intangible (knowledge about demand, operational conditions, costs, political relations). Depending on the context, it might make most sense for incumbent operators to continue operating with key assets or to compensate them so that these assets can be put at the disposal of various bidders. Competition is a tool to a goal, not the goal itself, and efficiency should not be sacrificed in the name of fostering competition. In the case of Medellín, Colombia, for example, continuing to work with incumbent operators was found to be the most efficient solution. Even if new competitors are not introduced at the outset of a project, there is always an opportunity to improve the market’s efficiency (which will always involve increased competition) gradually over the long term.
Irrespective of incumbent operators’ planned role in the project structure, experience from around the world shows how their early engagement and involvement in the reform process are critical elements of success (box 6.1). Incumbent operators should be involved in the project from the beginning and continue to be engaged throughout the project cycle. Many incumbent operators have valuable operational knowledge that can help to design a bus reform project efficiently. And as important stakeholders directly affected by the project, they deserve to be informed and their expectations should be properly managed irrespective of their position or ability to influence the process. Involving them early in the process is a critical risk mitigation measure.

There is a trade-off when it comes to the degree of protections afforded to incumbent operators. On the downside, a lack of competition keeps costs high. This situation is aggravated by the fact that the public transportation authority

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**BOX 6.1 Interacting with incumbent operators: Lessons from around the world**

There are many ways to interact with incumbent operators. As shown in table B6.1.1, options range from the public takeover of transportation operations (as in Quito, Ecuador, alongside threats of military intervention to end protests) to the grandfathering of operators, to the inclusion of incumbent operators in collective plans to improve service (as with business agreements in Medellín, Colombia).

In most Metrobús bus rapid transit (BRT) lines in Mexico City, Mexico, a group of operator companies became the concessionaire of the operations, exchanging their individual concessions for shares in the concessionaire, with a typical contract of 10–15 years. A similar setup was undertaken in Bogotá, Colombia: 96 percent of the operators that provided services before TransMilenio acquired shares in the four companies awarded the operating concessions, which included external capital.

In the BRT system of Rio de Janeiro, Brazil, as in Transantiago in Santiago, Chile, the existing bus operators grouped into companies, but competed with foreign bidders in an open tender. In the Metropolitano of Lima, Peru, however, foreign firms won the operation.

There are also examples of (a) public sector participation in the operating company together with private companies (Zaragoza, Spain) or (b) a mixed model of public and private operation depending on the corridor (Quito, Ecuador, and some Brazilian systems). In China, Europe, and the United States, the operation is usually public.

**TABLE B6.1.1 Examples of engagement with incumbent operators**

<table>
<thead>
<tr>
<th>TYPE OF ENGAGEMENT</th>
<th>EXAMPLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public authority takes over operation</td>
<td>Quito, Trolebus</td>
</tr>
<tr>
<td>Noncompetitive concession to third party</td>
<td>Mexico City, Metrobus L4</td>
</tr>
<tr>
<td>International competitive bidding</td>
<td>Santiago, Transantiago</td>
</tr>
<tr>
<td>Competitive bidding with preference for existing operators</td>
<td>Bogotá, TransMilenio</td>
</tr>
<tr>
<td>Bidding if existing operators decline to participate</td>
<td>Medellín business agreements, Guayaquil, Metrovía</td>
</tr>
<tr>
<td>Formalization of existing operators</td>
<td>Mexico City, Metrobús L1, L2; León, Optibús; Johannesburg, Rea Vaya; Monterrey, Ecovía</td>
</tr>
</tbody>
</table>

*Source: Compilation based on Flores-Dewey and Zegras 2012.*
Risks That Merit Special Attention

usually lacks information on a system’s costs. Therefore, the design of a good incentive system becomes critical. Another drawback is the nature of traditional operators, which in some systems suffer from a lack of experience in corporate culture and inadequate access to financing. Meanwhile, the benefits of taking incumbent operators’ interests into account is that doing so is socially inclusive, fosters local corporate culture, and encourages entrepreneurship. The design of the system is also likely to benefit from the operational knowledge that incumbent operators have gained from years of operating in the city. Communicating appropriately with operators and including them in the design process help to minimize opposition during the preparation phase (and thus the risk of delays or the project not being finalized) and the risk of informal competition during operations.

Planners must carefully consider the best use and placement of incumbent operators’ strategic assets. In many cases, such assets (fleets, workshops, depots) would put incumbent operators at an advantage—for example, during a bidding process. The project’s structure can use mechanisms to integrate these assets into the project—without limiting competition and while safeguarding the rights of incumbent operators. For instance, the authority may consider incorporating incumbent operators’ workshops and depots into the system or may compel operators to lease them at a fair price to any potential bidder. Other strategies may involve granting incumbent operators a role in the new system as, for example, the providers of particular assets. Box 6.2 presents lessons learned for dealing with incumbent operators. For more guidance, see AMPG (2018); Flores-Dewey and Zegras (2012); Lopez et al. (2018); and PPP Knowledge Lab (n.d.).

In any case, once the project is in its operations phase, controlling competition from incumbent operators or illegal transportation service providers is a must. In some cases, incumbent operators may not participate in the public-private partnership (PPP) deal, but may come back to attack profit margins by formal and informal means. The project might fall apart if investments do not pay off and buses fall into disrepair and out of schedule. Operators without updated licenses might take advantage of the situation by serving informal routes at lower costs. This situation can easily have a tremendous impact on the revenues of a project. Even when incumbent operators are part of the system, they must be well rewarded for their role; otherwise, they might have an incentive to neglect their responsibilities and leverage informal ways to capture profits.

When it comes to risk allocation, the public sector often is in the best position to assume incumbents’ risk. Meanwhile, the private sector is often the most exposed to this risk. The public sector can play the role of intermediary between incumbent operators and new investors. It may also plan a project structure that minimizes this risk without greatly affecting competition. Governments are responsible for granting exclusive rights and licenses to operators and for managing project stakeholders. In markets where informal operators provide the bulk of transportation services, incumbents’ risk is likely to be quite high. If incumbent operators take issue with a project, they can disrupt the system and reduce demand; if the private operator assumes the demand risk, it can introduce repayment risks. The Metrocali project in Colombia illustrates the impact of incumbent risk.

**BOX 6.2**

**International lesson for dealing with incumbent operators**

- The government should incorporate incumbent operators in the planning and operations of new systems and may benefit from including them as partners in the project through a special-purpose vehicle (Acabús, Ecovía, Metrobús, Metrocali, Metropolitano, Transantiago, TransMilenio).
MANAGING DEMAND RISK AT THE DESIGN STAGE

As mentioned, any urban bus reform should reduce or at least maintain the generalized travel costs of users to achieve sustainability and other key project objectives. In most cases, fare revenue is one of the most important sources of funding for transportation projects. Therefore, lower-than-expected revenues have a severe impact on project sustainability. The elasticity of demand to the generalized cost of travel (GCT) is greater the more alternatives that users have. Hence, increasing generalized travel costs may cause or exacerbate a problem of informal transportation in those cities where informal transportation is widespread or increase the growth of motorization in others. This situation, in turn, leads to lower operating revenues than expected. In some cases, to compensate for this revenue shortfall (or due to a lack of maintenance triggered by low revenues), operators or the transportation authority may decide to lower the level of service, which only aggravates the problem.

The value of time—the most important element of the GCT—is subjective and depends on users’ preferences. Demand estimations made at the project design stage must take into account users’ preferences regarding transfers, waiting times, and special or specific routes (box 6.3). These preferences depend on the context. For example, transportation users in one city might consider transfer times differently than transportation users in another city. In general, transfer

BOX 6.3

Improving demand modeling using survey results

Demand models assume that users are rational and seek to minimize the generalized cost of transportation. This generalized cost includes the value of transit fares and also, more importantly, the value of time. When people decide which transportation option to take, they tend to weigh time more heavily than money.

The value of time can be defined as the amount a user is willing to pay to avoid one minute of travel. Different types and phases of travel are weighed differently, depending on the degree of their perceived comfort. For this reason, it is important to differentiate modes as well as time spent in a vehicle or waiting, walking, or transferring. The need to transfer may imply an additional perceived cost for the user. Similarly, the value of time spent waiting may be two or three times higher than that of time spent in a vehicle.

The gold standard method of estimating the value of time is through revealed and stated preference surveys. Demand models estimate the maximum utility perceived by people. These demand models use econometric regressions whose parameters are estimated from revealed (observed) and stated preference survey data. Stated preference surveys ask respondents to choose between different hypothetical scenarios. Revealed preferences ask respondents what mode of transportation they actually chose. The main objective of these surveys is to understand how each type of user values each transportation mode. In addition, they provide information about in-vehicle travel time, transfers, changes in time value depending on trip duration, elasticity to price, and value of other transportation features (air conditioning, availability of seats).

In the classic four-step transportation demand model (trip generation, distribution, mode choice, and route assignment), the definition of the value of time and the use of stated or revealed preference surveys is key for the third step: choosing the transportation mode. In the third step (mode choice), the model estimates what transportation mode the user would take to go from the origin to the destination. When estimating demand for a given mode, understanding the value of time is critical. Underestimating the value of waiting or transfer time, for example, would lead to an overestimation of demand.
time is weighed three times greater than travel time. Hence, if a person travels for 20 minutes, waits for 15 minutes, and then travels an additional 20 minutes to get to work, the resulting 55-minute commute will be equivalent to $85 = 20 + 15 \times 3 + 20$ minutes in a vehicle. An unbroken bus ride of 80 minutes, without transfers, is more likely to be preferred than an indirect commute that takes 25 fewer minutes in all.

Increased access to other modes of transportation makes it critical to guarantee a good level of service that decreases the GCT. In many cities in Colombia, for instance, users were paying higher fares to informal motorcycle drivers than the fares charged by the public transportation system. Many such drivers provide services that are not within the legal framework and may be against the law. But users flock in large numbers to them due to their door-to-door service, high speed, high frequency or convenience, and reliability.

Even with the best level of service envisioned at the design stage, the actual implementation of a project will affect travel demand. Demand is also affected by the restructuring of existing routes and their integration into the system. If a trunk-fed BRT system is not integrated into the existing network of public, formal, and informal buses, then the estimated demand might not materialize. Often, to make users change to a new route might require the provision of additional advantages—beyond better travel times and costs. Cheaper fares are not enough to woo new riders. Users value speed and efficiency. For example, in some cases where the fare for BRT is nominally cheaper than the fare for conventional buses, a lack of systemwide integration makes it cumbersome to use the BRT and integrate it with other tickets and vouchers in an economic manner.

External factors can also affect demand. External factors such as economic growth, increased access to other modes of travel, and level of economic activity have an impact on transportation demand. The main issue is whether the economy will continue to grow at the forecast rates. If it does, the probability that demand will keep up with initial forecasts is high, assuming all else is equal. If it does not, then planners will likely need to modify project variables to make the original demand forecast come true. For example, if economic growth is expected to reach 5 percent per year but reaches only 3 percent, then the probability that demand will continue to grow will decline, as will the probability that tariff increases will be respected and enforced in the market. Revenues will also shrink due to the poor enforcement of fare collection.

Mitigating risk requires both pull and push strategies. The following are pull strategies to incentivize the use of public transportation:

- **Improve demand estimates and modeling.** Demand modeling should properly reflect the higher value of time during waiting periods and transfers. Similarly, if the financial modeler asks for a reduction in the level of service, transportation models should incorporate this feedback after the operational plan is drafted. Models should also include a good understanding of cross-elasticities and users’ choices among modes.

- **Design better systems.** The design of citywide, integrated transportation systems should be adapted to the context. Key goals are to increase speed, avoid excessive transfers, and keep ride frequency high (by increasing fleet size and considering a lower-capacity fleet). To this end, it is best to design according to levels of service rather than levels of demand, since there are no captive riders in a citywide system with many available options. Also, and importantly, technical solutions should match the context. Very-high-density demand can in some cases require a rail solution.
• Improve service quality. Examples of improved service quality include air conditioning the entire fleet of public buses in cities with hot climates, implementing low-cost technology systems for providing information to users, and improving the overall quality of service (by evaluating drivers, companies, and so forth), including fare collection. Private initiatives and the use of technology to implement these systems should be encouraged.

Similarly, the following push strategies mitigate demand risk:

• Improve the regulation and enforcement of transportation service provision. Improved regulation and enforcement encompass (a) providing an appropriate legal framework for the sector, (b) increasing authorities’ capacity and resources, and (c) aligning local authorities’ incentives with efforts to stop informal services (by guaranteeing a level of demand to the private operator or by including requirements for the use of funding from the national government).

• Discourage the use of private modes of transportation. Private transportation can be discouraged by generating requirements and barriers to entry for private vehicles (by increasing insurance requirements and enforcing use limitations), especially in city centers where traffic congestion is high.

• Discourage the provision of informal transportation. Informal transportation can be discouraged by designing social programs to give operators of informal transportation services an alternative set of livelihood options.

There is no universal answer to the question of which party should assume the demand risk. Optimal arrangements depend on the specific project and its context. At the same time, getting demand forecasts right is one of the most important drivers of project success. Demand that significantly exceeds or falls below expectations can greatly reduce the benefits that a project generates or, in the worst cases, kill the project altogether. When thinking about demand, it is common to focus on the effects that low ridership can have on a project’s financial viability. However, demand that is far above expectations can have an equally detrimental effect on a project, as it increases operational and maintenance expenditures while reducing user satisfaction. Considering these competing effects, it is important to weigh several factors when determining how to allocate demand risk. First, planners should develop a conservative demand forecast to limit optimism bias and test assumptions through sensitivity analysis. Next, they should consider the market context. In advanced markets where governments have experience with PPPs and demand is well understood, the private party can, and often does, assume most of the demand risk.

Even when a private party does not directly bear the demand risk, demand levels matter when it bears the risk of fare revenues. In fiscally constrained contexts, even when the government guarantees a minimum level of demand or agrees on a payment per kilometer, it is common to use fares as a source of funding for paying operators. When this revenue is lower than expected, the exposure to risks linked to the government’s financial position rises.

In developing PPP markets, the private sector may expect the government to assume all demand risks. This expectation is not unreasonable when other risks—or historical experience in transferring these risks in other parts of the country—are not well understood. This analytical framework suggests that the government should assume the demand risk in developing PPP markets, at least at first, to attract more firms and encourage competition to reduce total costs.
Finally, lessons from the TransMilenio Phase I in Bogotá, Colombia, or Metropolitano in Lima, Peru, suggest a need for mechanisms to increase system capacity if demand turns out to be higher than expected. A project will be better able to adapt to higher-than-expected demand if the structure allows it to increase services without requiring new infrastructure or reformulating contractual arrangements. Box 6.4 presents lessons learned for managing demand risk at the design stage. For more guidance, see Choudhary, Parth, and Ahmed (n.d.); and Chow (2017).

**DEFINING TECHNOLOGY COMPONENTS**

A proper definition of a project’s technology components is the first step in limiting exposure to technological risk. Technology applies to various aspects of a project and may also serve a variety of purposes and objectives. The benefits and viability of a particular technology, as it relates to a particular function, depend on the context of the operation. Excessive technology requirements may lead to overspending and become a risk themselves. Traditional systems reach their potential with scale. The implementation of complex fare collection systems, user information systems, or powerful fleet management systems is usually beneficial once a project reaches a minimum scale in terms of demand and the number of vehicles justifies the technology’s implementation, given the high associated fixed costs. Alternatively, systems can rely on new low-cost technologies or traditional methods.

The following are the most common technological components of an urban bus project:

- **Electronic fare collection.** Electronic fare collection is at the core of many transportation reforms. It allows for transparency in terms of operating revenue and demand levels. It also provides valuable information for planning. Finally, it is a key instrument to mitigate the risks associated with
cash management. The main challenge with electronic fare collection is fast-changing technological development. Contactless cards in closed systems have been the standard for the past 10 years. However, new technological developments call for the incorporation of open systems. Allowing for the updating of technologies during the life of a concession is key. Understanding users’ needs (allowing the use of bank accounts) is also important. Finally, using hybrid systems (allowing payment with cash, together with prepaid cards) has proven useful in contexts where low-density demand is combined with low incomes (and more frequent recharges of cards) and where ensuring access to ticket machines is challenging or expensive.

- **Fleet management and control.** Fleet management and control requirements will depend on the complexity of the operation and the needs of both the operator and the authority (and the fleet provider, if it is a separate entity). Expensive fleet management systems that optimize operations only pay off at a certain scale. Similarly, the authority’s need to access information depends on its oversight responsibilities. If these responsibilities consist of monitoring schedules, routes, frequencies, speeds, and stops, then access to global positioning system data for automatic vehicle location and fleet control would suffice. There is an opportunity to leverage private investments by having the operators or providers of technological services for fleet management and control offer the requisite information to the authority, in lieu of developing new redundant systems.

- **User information systems.** User information systems are a good tool for increasing users’ comfort and mitigating demand risks. Increasing the ease of using such systems may reduce transaction costs and attract new users. Similarly, increasing reliability reduces expensive waiting times. A route with a frequency of 20 minutes may have an average waiting time of 10 minutes. If users have real-time information and services are reliable, this average waiting time can be cut by more than half. GTFS (General Transit Feed Specification) and other standards allow the use of open data to enable the private development of tools to access system data (through an application programming interface, API) and provide information to users.

- **Vehicle propulsion technologies.** The implementation of vehicle technologies may serve various objectives, and it is important to take into account stakeholders’ incentives when defining these technologies and assigning risks. Compared with diesel buses, electric and hybrid buses reduce greenhouse gas emissions and local pollutants. Therefore, both national and local governments are interested in investing in these kinds of vehicles. Compressed natural gas buses reduce local emissions and lower operational costs. Thus, both local governments and operators have an incentive to cover the additional costs and assume the associated technology risks. In some countries, the national or subnational government may want to develop a local bus manufacturing industry and thus be willing to assume some of the risk of production. The contributions of stakeholders interested in introducing a new technology should compensate for the additional acquisition costs as well as for the risk related to uncertainties linked to the operation of the technology (long-term maintenance costs, life spans of batteries).

In addition to defining technology components properly, allocating responsibility for them appropriately across parties is critical to managing technological risk. The definition of the technology provider must be technical, based on a
market assessment and on the provider’s experience. It is common practice to use the same technology provider to provide fare collection systems as well as fleet management and control systems. However, many projects are facing challenges stemming from a provider’s lack of capacity, especially when it comes to fleet management and control systems.

Risk management strategies include the definition of mechanisms that allow for the updating of technology (instead of making it compulsory) in case of obsolescence. Such mechanisms include defining both the technologies and delivery methods that can be updated as well as the mechanisms that permit changing the definition of certain components. Finally, the length of a concession affects how easily a technology can change. It is recommended that planners try to use the following elements:

- **Technologies that can be updated.** In general, the higher fixed cost of implementing a technology, the costlier it is to update. Similarly, fostering open-source, scalable solutions increases the ease of updating technology.
- **Flexible delivery methods and short-term obligations.** Certain delivery methods provide more room for updating technologies. For instance, when a leasing company provides the fleet, the flexibility to introduce a new technology in the fleet is greater than when an operator acquires the fleet as part of the project under a 10–15-year contract for operation. Similarly, all else remaining equal, shorter concessions allow for easier technological upgrades.

In general, the risk of technological obsolescence should be borne by the party that has an incentive to implement changes in technology. This risk depends on the final structure of the project. Rather than forcing a party to update a technology after a certain period of time, which generates costly uncertainties, the project should be structured so that the party that is responsible for a component has incentives to update the technology in an efficient manner and the parties that would benefit from this update have mechanisms to compensate partially for it. Especially significant is the remuneration mechanism. If a concessionaire benefits from lowering operational costs (while maintaining predefined levels of operational performance), the concessionaire will have an incentive to incorporate technology to lower operational costs. If the incorporation of technology includes external benefits, those benefiting from it may want to include compensation mechanisms to incentivize their adoption. Box 6.5 presents lessons learned for defining technology components. For more guidance, see GIZ (2004); and World Bank, PPIAF (2016).

In many cases, technology generates data, whose ownership and access must be clearly defined in the project structure and clarified properly in subsequent contracts. Fare collection systems generate data on levels of demand. Data from fleet control systems are useful for operations and planning, while data from fleet management systems allow for a better estimation of maintenance costs. All parties should have access to information that helps them carry out their functions and manage their risks efficiently. In this sense, project structures should not only regulate the ownership of data but also ensure that data are available and usable by all interested parties. For example, an operation concession may recognize that data on demand and vehicle

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**Box 6.5: International lessons for defining technology components**

- The government should use payment mechanisms to incentivize operators to use better and cleaner technologies (SYTRAL, Transantiago).
- Performance-based payments can incentivize good performance (Acabús, Metrobús, Metropolitano, Transantiago, TransMilenio).
- Fuel provision should be addressed in the contract, including penalties for failing to supply fuel (Ecovía).
location are the property of the authority. However, the concession should also establish that the concessionaire generating these data has an obligation to implement mechanisms so that the authority can effectively access the data. Similarly, the authority must have enough capacity to manage the data.

Open data standards and an enabling environment will allow the project to benefit from private sector–driven solutions to improve both services and the capacity of operators and authorities. For example, data generated by the project are made available in broadly used standards such as GTFS, and implementing APIs and other mechanisms allows third-party developers to access these data and develop solutions that benefit the project. Cell phone apps are used to review the quality of bus services, pay fares in advance, and ensure that routes are regular and bus drivers are safe and courteous to users.

NOTES

1. The cases mentioned in this chapter are described in appendix A.
2. Metrobús in Mexico has experienced lower service quality and higher customer dissatisfaction because of higher-than-expected demand. See appendix A.

REFERENCES


Once risks have been mapped to the functions they can affect, planners may generate strategies for the efficient allocation of functions and risks. This chapter explains how the risks inherent in an urban bus public-private partnership (PPP) project should be allocated based on stakeholders’ competencies and abilities to manage a given set of risks. In some cases, actors in the private and public sectors may have equal ability to manage risks or may face the same limitations, which suggests that the risks are best shared. This chapter also discusses mitigation strategies.

Each section describes a function and an ideal allocation for that function as well as the risks that originate within it. For each risk, the analytical framework includes the following:

- A brief description
- Mitigation measures and strategies
- Lessons learned and best practices, with reference to selected case studies (presented in appendix A)
- Further references for additional information and assessments of the risk.

**PLANNING**

Risks that originate at the planning stage can materialize at a later phase of the project, with severe impacts. The wide reach of these impacts and the general role of the government (Amos 2005) means that, in principle, governments are best placed to assume (a) the planning function and (b) responsibility for managing the risks inherent in this function—for two reasons:

- The public sector controls the risk factors (such as licensing and permits), mechanisms to obtain the land, and the resettlement plan
- The public sector is best suited to engage with all stakeholders.

**Land availability and acquisition**

If the project includes infrastructure, the site for building the infrastructure must be ready and available, ideally before commercial closure. Many times,
when an urban transportation project includes infrastructure for an exclusive corridor, this infrastructure will be located in a densely populated area, which makes the risks of land acquisition more difficult to manage and amplifies their potential impact. Many projects have suffered or required changes in their scope because of difficulties with land acquisition. When land is not ready, it can trigger construction delay, interface, and completion and commissioning risks.

Box 7.1 presents lessons learned for land acquisition. For more guidance, see AMPG International (2018e); Mills Lindsay (2012); and Rajeswari (2014). The public sector is usually in a better position than the private sector to bear this risk. Mitigating it requires careful upstream preparation and stakeholder engagement strategies. Also, the rights of way and at least part of the land needed for the corridor are usually already public. Longer-term delays can be mitigated by acquiring land before calling for tenders (APMG International 2018e). Yet in many emerging markets, governments may find it difficult to allocate funds to acquire the right of way before the project is ready, especially given competing demands for those funds. Strategic thinking will benefit governments and mitigate some land acquisition risks at the planning stage (and inform the design stage). Although the route design will strive to consider maximum potential benefits, planners might also want to consider how to place stations and lanes so that they have the least possible impact on surrounding residences and businesses. After planners identify a suitable site or route, it is recommended that they engage stakeholders, listen and respond to concerns, prepare resettlement action plans, and set up a clear and fair compensation plan. All this activity will inform the design process. Governments might also strategically consider the timing of their announcement of the exact route to prevent opportunistic land acquisition and settlement.

**Stakeholder management**

If key stakeholders such as incumbent operators, potential users, or populations affected by construction work become dissatisfied early on and choose to express their displeasure, this dissatisfaction can generate significant delays and disruptions during the construction and operations stages. Poor management of stakeholders can result in social unrest, incumbents’ lack of cooperation, and early termination of contracts.

The government is best suited to engage with all project stakeholders and would do well to assume this risk. The government can begin to mitigate this risk by building support for the project early and then working to maintain that support throughout the process. For urban bus projects, stakeholders include bus users, incumbent service providers, businesses along the routes, businesses excluded from new routes, households along the new routes, and households that may not benefit from the new service.

Mitigating this risk requires a good understanding of stakeholders’ individual objectives and restrictions. It is recommended that planners clarify what services people really need, ensure that they feel heard, and then deliver services at an affordable rate and improved quality level. Potential damages should be

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**BOX 7.1**

**International lessons for acquiring land**

- Land acquisition should begin before executing the construction contract (TransMilenio).
- It is important to secure the right of way before construction begins (Dar es Salaam Bus Rapid Transit [DART]).
Allocating Functions and Assigning Risks

mitigated and compensated for as appropriate. All these steps reduce the likelihood of this risk materializing. Box 7.2 presents lessons learned for stakeholder management. For more guidance, see APMG International (2018i); IFC (2007); Lopez et al. (2018); and PPP Knowledge Lab (n.d.-f).

Permits and licensing

If the private sector cannot obtain all the permits and licenses required for construction and operations, the project will face delays, which may trigger interface, completion, and commissioning risks. The government controls the permitting and licensing process and, for this reason, is best positioned to manage and mitigate this risk. The government can mitigate it by beginning the permitting and licensing process early and supporting private partner(s) throughout the project to expedite the permitting process. For more guidance, see APMG (2018h).

DESIGN

Project designs seek to deliver an asset or service that meets a designated need at the lowest cost. In PPPs, project designs grow in importance because an inadequately or overscoped project can lead to project failures. Design challenges in Cali, Colombia, led to a three-year delay and caused more than US$200 million in cost overruns; similar problems occurred in Dar es Salaam, Tanzania, and Monterrey, Mexico. Competition can foster private sector incentives to provide efficient solutions.

Changes in the scope of work

When governments develop and control the scope of work, it is recommended that they also manage the risk and the impact of any changes to that scope. Unexpected changes in the scope might trigger other risks beyond the design function, such as construction delays, interface risks, financing risks, and financial closure risks.
Firms do not (and should not) control the scope of work. Planners must conduct a thorough needs assessment during the planning process to minimize the possibility that they will need to alter the scope during procurement or operations. Box 7.3 presents lessons learned for changing the scope of work. For more guidance, see Çigdem et al. (2007) and PPP Knowledge Lab (n.d.-a).

**Environmental and social risks**

Managing environmental and social risks across all project stages mitigates the potential negative impacts on third parties and helps to protect the project. Environmental and social risks can have a serious effect on projects and may lead to significant construction delays, environmental damage, adverse health effects, and early termination of projects. Box 7.4 presents lessons learned for managing environmental and social risks. For more guidance, see ADB (2012); EBRD (n.d.); PPP Knowledge Lab (n.d.-c); and World Bank (2016).

The private party usually bears the risk of a negative environmental and social impact assessment that forces changes in the project design. Furthermore, as the private party is best placed to manage environmental impacts during operations, it is also best placed to manage this risk (APMG International 2018e). The public sector is best placed to resettle households and businesses once a route and an action plan have been developed. If not managed properly, resettlement can trigger social unrest, construction delays, interface risks, completion and commissioning risks, or early termination risks. To mitigate these risks, the public sector can develop and fully fund a clear and executable resettlement plan. The government can also learn from experience in other sectors, since this risk is not isolated to bus projects alone.

Mitigating environmental and social impact risks requires action from both the private party and government. First, the government must establish clear environmental guidelines and compliance criteria; then it must monitor and verify compliance at all stages of the project. The private party must design a project that meets all environmental standards and complies with local regulations.

**FINANCING**

Managing financing risks is essential to reach financial closure, maintain financial viability, and reduce the fiscal burden of the project. Financing risks ideally are shared between the private and public parties. The perceived political risk and the financing position of each party will determine who is in the best position to bear this risk. On the one hand, firms may have the ability to raise capital
even when governments are constrained, and they usually have the ability to negotiate, structure, and coordinate with market agents. On the other hand, the public entity, which may be responsible for raising debt and equity for the project, can provide guarantees and other credit enhancement mechanisms and is responsible for revenue distribution and other structural mechanisms that will determine access to finance from other parties.

Financial

For projects delivered with private finance, the private sector always assumes and manages at least part of the financial risk. Although this analytical framework focuses on projects to be developed with private finance, the consequences of financial risk materializing are the same for publicly financed projects. If either party fails to raise the capital required, the project will not be completed. Box 7.5 presents lessons learned for managing financial risk. For more guidance, see Dodero et al. (2016); Farquharson et al. (2011); and Irwin (2007).

In developed markets, solvent firms can raise debt and equity at market rates without credit enhancements or guarantees. In developing PPP markets and emerging economies, projects may need government or development finance institutions to share financing risks to make bankable projects affordable.

The government can work to mitigate financial risk in several areas:

• Focus resources on upstream project preparation activities to reduce the likelihood of risks that can put financing at greater risk.
• Provide guarantees or seek credit enhancement mechanisms to lower the project’s financing costs. In emerging markets, the public sector can seek help from multilateral development banks (MDBs) to mitigate these risks.
• Include sound financial requirements in the selection of private concessionaires.

Financial closure

Financial closure risk consists of the possibility of failure to raise the finance required, to satisfy conditions, or to complete negotiations with lenders. The private sector should assume this risk in most cases; it does so, in part, by putting a bid bond forward in the context of a bidding process (PPP Knowledge Lab n.d.-b). Furthermore, having spent a lot of money to respond to tenders, prepare bids, and compete for the project, the private sector has an incentive to see a project reach financial closure. Thus, it is in the interests of the bidding firm to reach financial closure. Box 7.6 presents lessons learned for managing financial closure risk. For more guidance, see European PPP Expertise Center (n.d.) and PPP Knowledge Lab (n.d.-d).

BOX 7.5

International lessons for managing financial risk

• Putting up the concession as collateral to banks is an effective measure for derisking operators’ debt and reducing the cost of capital (Acabús, Ecovía, Metropolitano).
• The government can consider partially funding the public transportation system through tax revenues, which has worked in several cases (SYTRAL, TransMilenio).

BOX 7.6

International lessons for managing financial closure risk

• Partially funding the public transportation system through tax revenues has worked in several cases (SYTRAL, TransMilenio).
• Putting up the concession as collateral to banks is an effective measure for derisking the operators’ debt and reducing the cost of capital (Acabús, Ecovía, Metropolitano).
Even where the private sector bears this risk, the public sector can work to mitigate it throughout the planning stage. The impact of the risk, should it materialize, will be substantial. The government can mitigate this risk during the project preparation stage by making good-faith efforts to deliver a project that is well structured and financeable. Additionally, governments can evaluate whether the project will require credit enhancement in the form of guarantees to mitigate this risk and whether such instruments are appropriate. In many cases, guarantees may not be appropriate or may become too costly for the public sector to bear.

If the private partner is unable to reach financial closure, then the government has lost several months, if not years—plus precious financial resources—preparing and completing the project with little to show. If a preferred bidder cannot reach financial closure, the government is forced to make a choice among retendering, restructuring, or canceling the project.

**Affordability**

In principle, either the private sector or the government can assume affordability risk; however, careful consideration must be given to who should bear it and the impact on the project should the risk materialize. The government is best placed to assume this risk when the price elasticity of demand is high. When customers are less price sensitive, the private sector can bear the risk.

Box 7.7 presents a lesson learned for managing affordability. For more guidance, see ITDP (n.d.) and World Bank (2002).

Whoever bears the risk must, early on, assess the willingness of users to pay for the new service and verify that the willingness and ability to pay align with expected costs and revenue requirements. Furthermore, while conducting its own financial analysis, the government would do well to test a project’s financial viability, given changes that could require a tariff increase. In markets where governments choose to subsidize services as a matter of policy, the government must also evaluate its ability to sustain subsidy payments to the operators and test the sensitivity of the subsidy requirements to changes in costs and demand.

The conditions required for the private sector to bear the risk completely, which may be a viable model in mature markets, include (a) a contract that has clear tariff adjustment mechanisms and formulas or (b) an independent and effective regulator that can approve tariff adjustments quickly to respond to shocks.

A third option exists in which the parties share the risk using a minimum revenue guarantee mechanism (APMG International 2018g). Under such an arrangement, the government guarantees the private party a minimum amount of revenue—usually enough to cover capital costs, operations, and debt service—in exchange for the private sector accepting more revenue risk. As a tool to maintain affordability, a minimum revenue guarantee can enable the private party to absorb temporary reductions in farebox revenues. If the government is considering providing such a guarantee, it might also consider sharing the upside of the project in case the project achieves returns above expectations.

**BOX 7.7**

**International lesson for managing affordability risk**

- A mechanism to modify payments to operators and tariffs if revenues fall short of or exceed expectations is a good way of sharing upside and downside revenue risks (Metropolitano).
Evasion and cash management

Both the private and public sectors can assume this risk. In advanced markets where governments have experience charging users and collecting fares, the government can assume this responsibility and risk. If the government is to collect the fares in addition to assuming the risk, then the private partner must view the public party as credible. Rampant nonpayment by bus users can make repayment difficult. The Transantiago project faced a fare evasion rate of 34 percent, which resulted in increased costs for the government due to higher-than-expected subsidy contributions.

In new or developing markets, it might be best to have the private sector procure and operate fare collection systems, provided the legal framework allows for a private party to collect fares from users and grants them the rights to enforce payment. An added benefit of transferring this risk to the private party is that it provides an opportunity to reduce government capture.

To mitigate this risk, the party responsible for fare collection systems must make payment points accessible to users and install systems at stations, at stops, and inside buses to reduce fare evasion. Furthermore, the government must put a legal framework in place that allows the bus operators (either public or private) to penalize riders who do not pay.

Shifting or retaining the risk of collection fraud is related to how mature the market is. If the market is mature, fraud is low, demand is stable and foreseeable, and macro conditions are not volatile, the private sector will likely be willing to take on this risk. But when the opposite is true in some or all of these situations, then the public sector will likely end up guaranteeing this risk as part of demand risk. Where markets are immature and fraud is rampant, private investors will likely not accept this risk; and if they do, their acceptance will be largely nominal. Private investors will require a minimum revenue guarantee that will be triggered often, turning risk transfer into a futile exercise. It is important to understand what is driving the retention and shifting of risks in cases like this. Transportation demand can be shifted from one party to another, but it might also end up being reflected in higher internal rates of return. Box 7.8 presents lessons learned for managing fare evasion. For more guidance, see GTZ (2005); Verougstraete and MacDonagh (2016); and World Bank (2011).

Financial coordination

The government is in the best position to coordinate revenue distribution among various private parties and thus to assume the project’s financial coordination risk. Since projects often involve several private partners, the government should manage the distribution of payment across all firms rather than having one firm manage payment distribution for all other firms.

Nevertheless, in a consortium, the lead firm might decide how to provide payments to its subcontractors, delivering the work according to different private agreements and subagreements. But if there are many different PPP contracts for each of the tasks, the role of government is to control payments and performance. This control is the essence of a government’s role in a concession.
If not managed adequately, poor financial coordination can trigger several other risks downstream. It can make repayment difficult and may lead to defaults from one or more private parties. It can force operators to withdraw and can lead operators to challenge decisions based on the fairness and equity of distributed proceeds. To mitigate this risk, the government may create escrow accounts to manage the distribution of funds to various parties. Box 7.9 presents lessons learned for managing financial coordination risk.

**Changes in ownership**

The private sector or project lenders are best placed to assume the risk involved in changes to the ownership of a concession (APMG International 2018j). Since changes in ownership may alter how well the project partner performs (and payments in PPPs are linked to performance), the private partner should bear this risk.

The contract should require the private partner to notify the government prior to a change in ownership. It should include guidelines, such as the following:

- Changes in ownership will only be allowed after operations have begun in order to maintain incentives during construction.
- The government may retain voting rights, allowing it eventually to reject new shareholders.
- The government may restrict who potential majority shareholders may be.
- Lenders will have step-in rights if a change in ownership leads to the private party failing to perform at required levels.

For further guidance, see AMPG International (2018b) and Global Infrastructure Hub (n.d.).

**CONSTRUCTION**

Managing construction risk properly helps to ensure that projects are completed on time and on budget, with operations beginning on schedule. Governments generally transfer some of this function to the private sector but do not always transfer construction risk at the same time. In general, the private sector can assume this function and can do so using various types of contracts, including:

- Public works contracts
- Design-bid-build contracts
- Engineering, procurement, and construction contracts
- PPPs to design and build infrastructure
- PPPs to provide rolling stock.
Construction delays

The private sector is best placed to bear this risk because the government can align private sector incentives with performance to improve construction outcomes, especially when design and construction functions are bundled together. Delays in construction can trigger risks in other stages, including risks related to availability and quality, collections, and repayment. Box 7.10 presents a lesson learned for managing construction delay risk. For more guidance, see ITDP (n.d.).

Under the DART, Metrocali, and TransMilenio projects, the government constructed the assets and assumed construction delay risk—and all three projects experienced delays. The lessons learned in these cases illustrate how the public sector can manage construction delay risk in the future to avoid similar outcomes.

The first step to mitigating the risk of construction delays is to transfer the risk to the private sector. To reduce the likelihood of further material impact, the government might establish clear milestones linked to contract payments and mechanisms to penalize delays. To ensure that deadlines are met, the government would do well to monitor construction progress closely and enforce penalties, should the private partner fail to deliver at contracted standards or timelines—if these delays are not caused by a lapse in public sector responsibilities, such as those related to eminent domain (as occurred in Metropolitano in Lima, Peru).

Interface

The public sector, which is in charge of planning, should bear interface risk for those elements that do not fall under the same private entity. Given the complexity of urban transportation projects, sharing the risk is often the best strategy. In general, the private sector should bear the impact of the risk when firms fail to deliver the project on time. For example, both the Metropolitano and Transantiago projects experienced impacts from interface risks that arose because each began operations before the entire fleet was ready to begin. As in every exercise of risk distribution, the optimum choice also depends on the market. Less mature markets, which are often seen as riskier, might prefer to retain a small part of this risk (20–40 percent) as a way to reduce internal rates of return. If the private sector still retains a majority of the risk, the interface risk is still aligned with benefits. Box 7.11 presents lessons learned for managing component interfaces. For more guidance, see ITDP (n.d.).

The government should bear the risk when it fails to deliver assets on time. For example, in the Acabús

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**BOX 7.10**

**International lesson for managing construction delay risk**

- To avoid delays, the government should establish deadlines to start operations and conduct technical supervision of construction contractors (Ecovía, Metropolitano, TransMilenio).

**BOX 7.11**

**International lessons for managing component interface risk**

- Operations should only begin when all components of the project (the entire fleet, stations, fare and collection systems, and monitoring systems) are ready for operation (Acabús, Ecovía, Metrobús, Metrobús-Q, Metrocali, Metropolitano, Transantiago).
- The government should establish deadlines to start operations and conduct technical supervision of construction contractors to avoid delays (Metropolitano).
project in Acapulco, Mexico, the public sector assumed the risk and had to bear the impact of the risk materializing. Acabús began operations without the government having the necessary systems to monitor its performance. Therefore, the government was not able to enforce service standards from the beginning of the project.

To allocate interface risk adequately, it is also important to consider the maturity of local markets and government institutions. In advanced markets, the government can retain a larger share of the interface risk because it is more likely to be able to deliver assets on time. In developing PPP markets where governments lack experience and underperform in the delivery of infrastructure, it is best for the private sector to take on a larger share of the interface risk. In either allocation, mitigating this risk requires that all parties in the project have clear incentives and face credible penalties to complete all components on time and to specifications.

**Geotechnical**

The private sector should assume this risk in projects where geotechnical conditions (the engineering behavior of earth materials) do not represent a significant challenge and information on ground conditions can be tested effectively. In projects where the geotechnical risks are significant, the government and the private sector should share this risk (APMG International 2018c). In preparing bus projects that require large capital works, the authority must assess and collect detailed information on the geotechnical conditions and share it with bidders.

To mitigate this risk, governments should select sites known to have few geotechnical challenges, which can be confirmed through detailed studies during the project preparation phase. While the likelihood of this risk materializing may be relatively low given that most bus projects will operate on existing routes or expand paved brownfield roads, it should nonetheless be explored. The private party, in executing its responsibilities, will want to verify that the government’s appraisal of the geotechnical conditions is accurate. For more guidance, see APMG International (2018a, 2018f).

**Completion and commissioning**

The private sector should assume this risk, given the package of incentives it receives to complete the works on time and on budget (APMG International 2018c). Like other construction risks, the government should incentivize the private party to complete construction ahead of schedule, when interface risks are minimal, and penalize it when it delivers late. Box 7.12 presents a lesson learned for handling completion and commissioning risk. For more guidance, see ITDP (n.d.).

**BOX 7.12**

International lesson for handling completion and commissioning risk

- The government should establish deadlines to start operations and conduct technical supervision of construction contractors to avoid delays (Metropolitano).

**OPERATIONS**

Including private operations in a PPP is essential for realizing efficiency goals and value for money and for maintaining the financial viability of operators.
Across the range of project functions, both the private sector and the government have roles and responsibilities to assume, including the operation of buses,\textsuperscript{12} collection of fares,\textsuperscript{13} and distribution of revenues.

**Quality and level of service**

The structures of private bus operators may allow for the provision of higher-quality services at lower cost than the structures of the public sector. Through well-structured contracts, the government can hold the private party accountable for making services available at agreed-on quantities and quality, which can improve the welfare of transportation users. In an alternative scenario, the government retains this risk, which limits its ability to compel an operator to improve performance. Mitigating this risk requires linking the operator’s remuneration to its performance, providing an incentive for operators to improve service quality. Box 7.13 presents lessons learned for achieving quality and level of service. For more guidance, see Gómez-Lobo and Briones (2014) and Tiznado et al. (2014).

**Congestion**

The government is best positioned to assume this risk since it is responsible for planning transportation systems, which includes securing exclusive lanes and rights of way, establishing efficient priority signaling, and enforcing exclusivity and access.

Various options exist for reducing congestion risk that affects operations, and there is no single mitigation strategy. Planners might ask the following questions when developing a mitigation strategy:

- Can exclusive lanes be developed and credibly enforced?
- Can the government and society afford the charges required to cover the capital and operating expenditures for developing new, exclusive lanes?
- Can incumbent operators be integrated into the new system, or can they be forced out of the new system to reduce bus traffic and stakeholder opposition?
- Can priority signaling enable buses to move freely ahead of traffic to reduce congestion?

Box 7.14 presents lessons learned for reducing congestion. For more guidance, see APTA (2010).

After evaluating these options, planners select the best option and include it as an objective of the project when tendering. If the selected option will require enforcement and penalties for violations, the government will want to ensure that credible enforcement mechanisms are in place. Once the mechanisms are in place, the private operator can manage congestion, provided the government continues to enforce exclusivity rights.
Repayment

Whoever finances the project is best positioned to assume the repayment risk, although it can be shared between the government and the private partner. Privately financed projects that cannot make debt service payments will fail, so it is in the government’s interest, as well as that of the private partner, to see that repayment does not become an issue. Since a principal objective of this analytical framework is to help governments to develop bus project structures that can be privately financed, it is assumed that the private sector will take on this risk.

Even where the private sector assumes this risk, the government can help to mitigate its impact during the planning stage by producing reliable and robust demand studies. If subsidies are to be required, the government can pass legislation that places a legal obligation on itself to budget for these payments, ring-fence the funds, and make the payments on a timely basis. Furthermore, when appropriate, the government can guarantee the payment obligations of any public sector agency. MDBs can also provide guarantees that reduce the risk perception of international investors.

Box 7.15 presents lessons learned for handling repayment. For more guidance, see Irwin (2007).

Fuel

The government has good reason to transfer fuel risk to the private sector. One way to do this is through long-term fuel supply contracts (that can be supported by government action). This model worked for the Ecovía project in Monterrey, Mexico. Box 7.16 presents a lesson learned for ensuring adequate fuel supply. For more guidance, see World Bank (2009) and World Bank and IAPT (2018).

In cases where fuel imports are constrained or where customs systems are difficult, it might be appropriate for the government to manage this risk to ensure that fuel is available for the project and that the private operator does not need to wade through several layers of bureaucracy to obtain fuel.

Other infrastructure

The allocation of other infrastructure risk depends on the final project structure. In most cases, it makes sense for the government to assume it, as other infrastructure is likely to fall outside the project’s scope. However, the government should be mindful that assuming this risk might increase its direct costs, create interface risks, and
affect the value for money achieved by the project. Box 7.17 presents a lesson learned for using other infrastructure. For more guidance, see ITDP (n.d.).

To mitigate this risk, project planners need to consider which infrastructure belonging to other components of the transportation system will be used by the project and identify the optimal way to finance and deliver that infrastructure. As shown in the case of Transantiago in Chile, approaching projects without a complete understanding of how various components will interact can have serious consequences.

Allocating the risk to the private sector may be possible and should be explored in environments where the government has limited experience in delivering complex interconnected infrastructure projects. The added costs of private finance may be outweighed by the benefits of having a fully integrated system with the supporting infrastructure required to operate efficiently. However, this balance can be determined only through a detailed analysis of value for money and options that will be specific to each project.

**Default**

The government, as the guarantor of payments to a private operator, assumes the default risk in projects where a transportation authority or any other government department must make payments to the private sector. The private sector must assume the risk of defaulting on its obligations to lenders. In projects where MDBs operate, governments and private partners can seek guarantees to mitigate this risk, as various credit enhancement instruments exist. For more guidance, see Pereira and Kearney (2018) and World Bank (2018a).

**MAINTENANCE**

Whoever is responsible for operations is best placed to maintain the system. However, depending on the component, the responsible party can rely on the fleet manufacturer to support this process.

**Fleet**

The operators of the fleet may, in most cases, retain responsibility for conducting routine maintenance of the fleet. If operators are not required to manage this risk, the incentives to treat buses well does not exist. Bundling maintenance with operations reduces the chances that operators will defer maintenance to save costs, as maintenance is key to achieving service standards. Such is the case in Transantiago, where operators need to follow a maintenance plan and satisfy strict maintenance and quality standards.

This risk is greater in projects where O&M responsibilities are not aligned, which can affect the availability and quality of service, demand, and repayment. If bundling maintenance and operations responsibilities together is not an
option—which may be the case where the government forms a special-purpose vehicle to incorporate existing informal providers to operate buses and another firm to provide the fleet—then clear and enforceable standards must be put in place. The private company that incorporates the operators must put up collateral, preferably cash, that the fleet provider can draw on should bus drivers operate the buses in ways that cause excess wear or damage to the fleet. Each operator must also be insured under a policy that the fleet provider approves. Further, the contract between the fleet provider and the operators should include clear enforcement and monitoring mechanisms that would allow the provider to remove or bar any operator that repeatedly violates performance terms. In this case, the fleet provider can retain responsibility for performing preventive and overhauling maintenance as well as for certifying routine maintenance by an independent third party.

In projects involving new vehicle technologies such as electric buses, the fleet provider may offer knowledge transfer plus a short- to medium-term arrangement for preventive maintenance for new buses. In any case, minor maintenance would be the operator’s responsibility. The operators may choose to seek a third party to provide certain maintenance services in cases where they are not familiar with the vehicles or the technology.

In less complicated arrangements where there is a single owner and operator of buses, establishing clear performance and quality metrics and then monitoring and enforcing them should be enough to incentivize ongoing maintenance of the fleet. Box 7.18 presents lessons learned for fleet maintenance. For more guidance, see PPP Knowledge Lab (n.d.-e).

**BOX 7.18**

**International lessons for maintaining a fleet**

- The government should require operators to develop and follow a fleet maintenance plan and their workshops to be ISO9000 certified (Transantiago).
- The government should require operators to keep an inventory of replacement parts or face penalties for maintenance delays (Ecovía).

**BOX 7.19**

**International lesson for maintaining infrastructure**

- Infrastructure must be maintained to prevent a decline in service quality (Ecovía, TransOeste).

**Repair parts**

The party responsible for operating and maintaining the fleet is best placed to assume the repair risk. This risk may affect the availability and quality of service and disrupt the system’s capacity, as occurred in the Ecovía project, where operators failed to supply enough buses, which led to excess demand. The government can mitigate this risk by requiring operators to maintain inventories of buses or spare parts, but it should be careful not to overspecify requirements and introduce excessive costs for the operators. For more guidance, see PPP Knowledge Lab (n.d.-e).

**Infrastructure**

Generally, the operator will have the greatest incentives to maintain the infrastructure, but the government may be in a better position to do it, depending on the component.

This risk may affect the availability and quality of the demand for service. In the Ecovía and TransOeste projects, the government did not maintain infrastructure at bus stations, which exacerbated failures in the air conditioning, roofs, and ventilation
systems that greatly affected demand during the summer months. Box 7.19 presents a lesson learned for maintaining infrastructure. For more guidance, see PPP Knowledge Lab (n.d.-e).

**NOTES**

1. TransMilenio in Colombia experienced delays due to difficulties in obtaining land for the project.
2. Interface risks originate from a failed interaction between different project components, usually delivered by different project stakeholders.
3. In the Transantiago project, the government failed to communicate with citizens early on, which resulted in high levels of opposition to the project.
4. TransMilenio in Bogotá, Colombia, experienced delays due to difficulties obtaining permits for the project.
5. In some cases, firms attempt to control the scope of work through unsolicited proposals. Several very good resources discuss the challenges and risks associated with unsolicited proposals, which are beyond the scope of this analytical framework. For information on unsolicited proposals, see World Bank (2018b).
6. For further details on environmental guidelines for infrastructure projects, see World Bank Group (n.d.).
7. For more information on resettlement planning, see ADB (2012).
8. For guidance on how MDBs can help governments and what products are available to them, see World Bank (2018a).
9. For an illustration of how financial coordination can affect a project, see a case study of the Melbourne transportation franchises in World Bank (2018a).
10. In Mexico’s Ecovía project, a private partner successfully managed financial coordination and revenue distribution using an escrow account.
11. Most of the projects described in appendix A failed to complete construction work or commissioning on time. See Ecovía, Metropolitano, and Transantiago for examples.
12. The case of SYTRAL in Lyon, France, involves the private operation of buses. Alternatively, the case of Metrobús-Q in Quito, Ecuador, illustrates how the public sector operation of buses can develop, although this is not the only model of publicly operated public transportation.
13. For an illustration of the private operations of fare collection systems, see the case of Avanza Zaragoza in Zaragoza, Spain. For the public collection of fares, see the case of Metrobús-Q in Quito, Ecuador.
14. See World Bank (2018a) for a discussion of the various instruments offered by MDBs and how they may be employed to reduce default risks in public transportation projects.
15. In the Ecovía project, operators could not acquire parts to repair and maintain buses.

**REFERENCES**


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#### Land availability and acquisition


#### Stakeholder management


#### Permits and licensing

Scope of design


Environmental and social risks


Financial risks


Financial closure


Affordability


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Changes in ownership


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Geotechnical risks


Completion and commissioning risk


Quality and level of service


Congestion


Repayment


Adequate fuel supply


Other infrastructure


Default


Fleet maintenance


Repair costs


Infrastructure maintenance

Managing Indirect Risks

Managing indirect risks helps to protect projects from external events that affect foreign exchange rates, inflation, costs of finance, and other market factors. In most cases, the private sector is best placed to assume these risks, but it will do so only if the government provides certain provisions within a contract.¹

MACROECONOMIC RISKS

Macroeconomic risks are common to many sectors, and their impact on an urban bus project will depend on the project’s components and stakeholders’ objectives and restrictions. Whether or not the project has international components, the profiles of stakeholders will make certain risks more relevant than others. Similarly, the project’s exposure to the cost of inputs over time will depend mostly on bus technology. The following are examples of key macroeconomic risks:

- **Inflation.** If the private sector assumes the demand risk, then the government can help the private partner to mitigate it by allowing for inflation-related adjustments to tariffs (APMG International 2018g). The government can also reduce this risk by making payments to the private partner in the currency of the loans.
- **Interest rates.** Apart from the impacts of inflation, the private sector can manage the risk of rising interest rates, especially if the operator took debts involving variable interest rate payments.
- **Foreign exchange.** The project structure should take into account the private sector’s ability to mitigate currency risk (and the market’s ability to provide for its mitigation). An urban bus public-private partnership (PPP) can integrate a foreign exchange reserve in the project structure. The government can provide a foreign exchange guarantee and may be expected to do so when the local currency is more volatile than commonly used international currencies. Maintaining reserves in the currency of the debt and securing central bank support can help to mitigate this risk. Finally, this risk can be partially mitigated by encouraging local currency financing when it is possible and affordable.
• Cost of inputs. Changes in markets can lead to an increase in the costs of operations and maintenance (O&M) stemming from the higher costs of critical inputs.

Most countries with significant currency variability are unlikely to have an established PPP market. For this reason, governments may naturally assume the bulk of the macroeconomic risk where they assume demand risk. Doing so removes the private partner’s risk stemming from a currency mismatch (that is, when services are paid for in local currency and debt service is made in international currency).

In addition to these risk management strategies, several mechanisms exist for mitigating indirect macroeconomic risks. For example, the private sector can purchase interest rate swaps (APMG International 2018c), cross-currency swaps, and currency forwards. For more guidance, see APMG International (2018g); Monaco (2017); and Verdouw, Uzsoki, and Dominguez Ordonez (2015).

POLITICAL RISKS

The government is obviously best placed to mitigate political risks, since a majority of these risks stem from conditions under the control of government authorities (European PPP Expertise Center n.d.). Political risks can set off many other risks across project functions, including financial closure, repayment, collection, and availability and service quality risks.

The government can mitigate these risks by including language in the PPP contract that prevents or encourages it to act in a certain way, such as establishing tariff revision mechanisms, periodic tariff increases, and independent conflict resolution mechanisms. As an additional step, private operators can secure political risk guarantees from multilateral development banks (MDBs) such as the Multilateral Investment Guarantee Agency. Box 8.1 presents lessons learned for minimizing political risks. For more guidance, see Smith and Gannon (2008).

SOCIAL UNREST

While the private sector can purchase insurance products that reduce the impact that social unrest can have on a project’s financial viability (should this risk materialize), the government is best placed to assume, mitigate, and manage this risk. If not managed properly, social unrest can have profound and lasting impacts on a PPP project, triggering demand and repayment risks, infrastructure delays, and other political risks. For example, despite the initial success of the TransMilenio project, protests over service quality led to injuries, arrests, and damage to more than five bus stations (Centre for Public Impact 2016).
Even in the best of circumstances, governments cannot fully mitigate the risk of the public being displeased with a project's services. It must hold operators accountable for providing services at the contracted standard. The public will rightly view a failure to manage private operators as a failure on the part of government, so the best strategy is to design good contracts and enforce them.

While governments would do well to develop a strategy to manage the risk of social unrest, preparing an effective management strategy is understandably difficult. Preparing a strategy should begin during the planning stage and actively engage stakeholders throughout the process. Public engagement and promotion from a political champion can support the mitigation plan. Providing a formal process for people to voice their complaints can also be effective, and governments might explore the benefits of establishing a customer council within the public transportation authority or transportation regulator. Box 8.2 presents lessons learned for managing the risk of social unrest. For more guidance, see APMG International (2018f); IFC (2007); and PPP Knowledge Lab (n.d.-a).

**REGULATORY RISKS**

The government, as the party responsible for regulation, is best placed to assume regulatory risks. Mitigation strategies would do well to address the following risks:

- **Environmental and social.** The government can include compensation mechanisms in the contract for any material impact that a change in environmental or social regulations has on a project.
- **Competition.** The recommendations outlined in this analytical framework for the management of incumbent operators constitute an important first step. It is also important to change regulations to allow for competition in a system where exclusive rights were guaranteed under the contract. In addition, the contract with the private operator should include mechanisms for appeal.
and a compensation formula for any material impacts that the change in regulation causes.

- **Indirect.** The government can maintain a contingency fund to cover unexpected costs caused by changes in regulation, and the contract should include compensation mechanisms for determining how to calculate materiality and compensation for indirect regulation-related effects.

Box 8.3 presents a lesson learned for managing regulatory risks.

Political risk insurance is also available to private operators, which may mitigate the impact that the materialization of these risks can have on a project. The government can require that the operator secure this insurance to cover any events beyond those specified.

**GOVERNMENT OBLIGATIONS**

The public sector naturally assumes this risk because it involves actions that the government controls. In urban bus projects, government obligations to the private operator may include the following:

- Fixed payments to the party hired to design, build, finance, operate, and maintain infrastructure
- A fixed portion of a payment to operators of buses when the government assumes the demand risk, usually to cover debt service and fixed operating costs
- Total payment, including fixed and variable components, when the government collects all revenue and distributes it to the private operator(s).

When a public transportation authority or other government body is to make these payments, the government might consider mitigating this risk in several ways:

- Establishing an escrow account to deposit all farebox revenues for distribution to the private sector
- Including budgetary allocations for fixed payments from the government, whether subsidy or direct project payments, in the annual budget; in some cases, it may be necessary to pass legislation that establishes a legal requirement to make these payments (and can be litigated in courts)
- Guaranteeing any payments made by a state, regional, local, or municipal transportation authority from national budgets, provided that the legal framework exists to support these arrangements.

For more guidance, see Irwin (2007).

**EARLY TERMINATION**

Given that a contract could be terminated by either party and for various reasons, it is suggested that the private sector and government share this risk (APMG International 2018e). If the contract is terminated unilaterally by the public
authority, then the government should bear the risk and compensate the private party. If the contract is terminated because the private partner defaults, then the lenders should bear the risk, which they can establish by including step-in rights in the PPP contract and in the financing agreements (PPP Knowledge Lab n.d.-b). The obligation to secure an operator and maintain service standards then falls on the parties that provided the capital to the original operator.

A key way to manage the risk of early termination is to have very clear mechanisms for asset transfer. This is especially true for bus fleets (in traditional project structures, it is expected that a fleet’s life span will be finalized with the concession). For more guidance, see APMG International (2018e) and PPP Knowledge Lab (n.d.-b).

**CHANGES IN LAW**

While the government is obviously best placed to assume the risk of changes in law (APMG International 2018a), and the contract should include language that provides the private sector with avenues for compensation, these measures will not completely mitigate the impact of the risk, should it materialize. Therefore, in countries where MDBs operate, the private operator should secure political risk insurance as part of its mitigation strategy. For more guidance, see APMG International (2018a).

**NATURAL DISASTERS**

The speed of human-made climate change is accelerating. As the changing climate leads to more extreme weather events and contributes to dramatic changes in local weather patterns, the need to mitigate the risk of natural disasters in urban transportation projects grows (SUTP 2009).

Natural disaster risks are best shared by the private and public parties (World Bank 2017). The options for mitigating the impact of natural disasters vary across jurisdictions. The government would do well to require designs to be technically competent to bear the impact of natural disasters that occur regularly in the region. For example, the following phenomena may be considered:

- Hurricanes in the Caribbean and typhoons in Southeast Asia
- Earthquakes along the “Pacific Ring of Fire,” which stretches from New Zealand northward along the eastern edge of Asia and along the Pacific coasts of North and South America
- Floods and droughts in Asia and Sub-Saharan Africa (ADB 2010; Serdeczny et al. 2016).

Further, to the best of their abilities, the government and the private operator should secure insurance to mitigate the impact of natural disasters as appropriate. For more guidance, see SUTP (2009) and World Bank (2017).

**CLIMATE**

Climate risks are to be shared by the government and the private sector and are best approached with a focus on both resilience and sustainability. Projects should be designed and constructed to adapt to the effects of climate
change—and, importantly, to reduce them. Like other environmental risks, both parties will want to purchase insurance, as appropriate. Box 8.4 presents lessons learned for managing climate risks. For more guidance, see SUTP (2009).

FORCE MAJEURE

The allocation of force majeure risk is determined by agreement between the parties about how to treat unforeseen events that cannot be mitigated within the contract. Often, risks related to force majeure and “acts of God” end up being partially or totally retained by the government (especially when commercial insurance is not easily obtained in the local market).

Generally, a force majeure risk is shared between the government and the private sector. However, the government usually assumes more of the risk because it relates to some extent to the country’s activities, context, and population. The objective of the mitigation strategy should be to avoid early termination by the private partner and to obtain support from the lenders to defer payments until the project is once again stable. For more guidance, see APMG International (2018b, 2018d); European PPP Expertise Center (2013); World Bank (n.d.-a, n.d.-b); and World Bank, PPIAF (n.d.).

WORKING THROUGH THE RISK MATRIX

It is suggested that planners start with the preliminary project structure defined at the planning and identification stage and review the map of stakeholders’ objectives and restrictions throughout this process. Appendix C provides tools and references specific to the allocation of indirect risks.

NOTE

1. For further information, see World Bank Group (2017). The cases mentioned in this chapter are described in appendix A.

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This part aims to help planners to polish the project structure, in preparation for the structuring phase. A finalized risk matrix corresponds to a well-defined project structure. Chapter 9 provides examples of common and new risk mitigation and allocation strategies and considers adjustments in the proposed structure. Chapter 10 reviews definitions of funding sources and financing mechanisms. These definitions directly affect how risks are allocated and mitigated. Finally, chapter 11 guides planners through an exercise of translating the proposed structure into essential elements of the concession. The purpose of this chapter is not to draft a concession contract (which pertains to the structuring phase and is thus beyond the scope of this analytical framework) but to identify inconsistencies or imbalances as well as new risk management strategies through a careful conceptual consideration of the essential elements of a concession contract.
Examples of Urban Bus Project Structures

This chapter presents and discusses examples of private sector participation in urban bus systems. Each model is structured differently with regard to the allocation of responsibility for each function and component, the allocation of direct and indirect risks, and how it may be adapted to the local context and specific project objectives.

Planners may use these models as a starting point when considering how best to structure their particular project. It is recommended that every element of any model be adapted to the local context, using the guidance set out in this analytical framework. This chapter outlines four models:

- Bundled private finance and operation of buses
- Unbundled private finance and operation of buses
- Private finance of infrastructure and buses (bundled or unbundled)
- Private finance and operation of electric buses.

This chapter also shows how multilateral development banks (MDBs) may participate in a transaction, noting avenues for technical assistance, investment financing, and credit enhancement mechanisms. Not all the MDB instruments outlined here will be available in every market. However, the principles and justification for including these instruments in a project remain unchanged: responsibilities and risks must be allocated to the party best suited to manage and mitigate them. In many markets that would benefit from this guidance, MDBs are the parties best placed to take on the roles described below.1

**MODEL 1: BUNDLED PRIVATE FINANCE AND OPERATION OF BUSES**

This is the model typically used for bus rapid transit (BRT) projects. In this model, if infrastructure is included, the public transportation authority (PTA) plans the system and finances and builds the roads, stations, and maintenance and parking depots. The PTA also procures the contracts and monitors system operations. One private operator (or several) is responsible for financing,
operating, and maintaining the trunk and feeder buses. Another private operator provides and operates the fare collection and ticketing services for the integrated bus system. Figure 9.1 illustrates the project structure.

Under this model, responsibilities for various project functions are typically assigned as follows.

Model 1: Planning

The PTA plans the project, including the routes; obtains licenses and permits for the project; and acquires and ensures access to land. Whenever possible, the PTA should integrate the planned bus reform with a larger urban development plan (which may or may not be specific to public transportation). The government assumes all the planning risks.

Planners would do well to engage incumbent service providers as early as possible and to encourage them to participate in planning the project. This one step will go far toward mitigating a host of risks, including incumbent management, stakeholder management, demand, repayment, and social unrest.

This project structure works well in contexts where incumbent service providers are willing and able to come together to raise the financing needed to assume responsibility for some or all of the project’s financing, operations, and maintenance.

FIGURE 9.1
Model 1: The private financing and operation of buses

Note: MDB = multilateral development bank. SPV = special-purpose vehicle. VGF = viability gap funding. The figure shows commercial bank lending to one operator only for purposes of clarity. Commercial banks may lend to all private companies in this arrangement and may benefit from the International Finance Corporation’s risk-sharing facilities for each arrangement.
**Model 1: Design**

In this model, the government procures a private partner to finance, operate, and maintain the rolling stock. While infrastructure is not included in the transaction, a project may feature infrastructure, such as dedicated lanes, that will be publicly financed. Variations include the private financing, building, and operation of stations.

The private sector’s role at the design stage relates to selecting the types of buses and ticketing systems that it will provide for the project. The public sector may retain some design functions, especially if infrastructure for a BRT system or dedicated stations for a bus system with mixed-flow lanes are required. This particular project structure seeks to mitigate the following risks: inadequate service design, availability and service quality, financing and financial closure, repayment, and collections and fraud, among others.

However, the structure introduces the following risks if the public sector retains responsibility for the design and delivery of critical infrastructure: inadequate asset design, inadequate service design, construction delays, and interface risk.

**Model 1: Financing**

One or several bus operators finance the bus fleet. The operators can raise commercial debt (which may be supported by public or MDB guarantees), access various types of support offered by export credit agencies (buyer’s credits, credit insurance, guarantees), get loans from bus suppliers, and provide equity. Bus manufacturers are a potential provider of equity. Operators may finance and maintain parking and maintenance depots and information-sharing mechanisms, such as apps, schedule tickers, and other tools. The private sector assumes all financing risks associated with the provision of buses.

A different private partner finances and operates the project’s fare collection and ticketing systems. The PTA pays the ticketing operator a fee to cover the financing, procurement, and operations of the fare collection and ticketing systems. In low- and middle-income countries, commercial banks or financial institutions often consider bundling fare collection with bus operations to be very risky. Given many bus operators’ poor practices in managing revenue collection, these financial institutions prefer to unbundle these contracts to minimize cash management and evasion-related risks.

If infrastructure is to be included on a public finance basis, the PTA will finance the costs of various components, including roads, stations, stops, and parking and maintenance depots. In a mature market with a creditworthy PTA, the PTA can finance capital expenditures commercially or by issuing bonds. In a less developed market where the PTA is unable to access commercial debt, it must seek funding from the government through a consolidated fund, or borrow from MDBs.

The project’s bankability would improve with a creditworthy PTA, especially in markets where the public sector is best placed to take the demand risk. Bankability can be achieved by setting user fares as close to full cost recovery as possible and allowing them to adjust automatically in small but frequent increments in response to inflation. In most jurisdictions where these cautions apply, making the PTA creditworthy will be a monumental task. However, other options exist to improve bankability, outlined as follows.
First, the government may assume a legal obligation to make subsidy contributions on behalf of the PTA to close the gap between farebox revenues and cost-recovery levels (technical fare). Second, the government may establish an operator payment reserve fund with several months of payments in it to ensure that, in the event of a funding shortfall, operators can still be paid while the problem is being fixed.

Scraping programs provide incumbent operators an opportunity to increase their access to finance and also serve to minimize competition and congestion risks. Incumbents willing to participate can use the cash received for old buses to cover the down payment for the new fleet. The incumbents can then provide the concession as collateral to the lenders to reduce the costs of financing. Doing so increases the possibility that incumbent service providers can continue to operate, as they did in Monterrey and Acapulco, Mexico.

**Model 1: Construction**

If infrastructure is required for the project, either the government or the private sector can build it, or they can work together to do so. Ideally, the government bundles design and construction together to mitigate design and construction risks and reduce whole-of-life costs. The firm building the infrastructure assumes construction risk. Construction can be handled in a separate contract.

A common risk that materializes in this arrangement is interface risk, which may arise when the construction is completed, but the operation arrangements are not defined. Interface risk can be mitigated by starting to plan operations early, involving the incumbent operators in the planning stage, and starting any bidding processes as soon as possible.

**Model 1: Operations and maintenance**

In a bundled structure, the same partner that finances the buses also operates and maintains the bus fleet. Bundling the three functions under the same operator minimizes whole-of-life costing by encouraging the operator to (a) purchase high-quality buses, (b) operate buses efficiently, and (c) maintain buses adequately and regularly (directly or through an agreement with the bus manufacturer).

The private partner may also operate information-sharing mechanisms, apps, schedule tickers, and other tools.

As noted throughout this analytical framework, it is strongly recommended that planners include incumbent operators’ tangible and intangible assets in the project. This inclusion can be done by articulating mechanisms to include their knowledge in the planning and design stages and also to make their assets available to any potential bidder, so they do not have an unfair advantage. These mechanisms should properly compensate the affected operators. Involving incumbent operators in operations (chapter 6) is one way to mitigate the risks that they will resist and delay the project or that their valuable assets will not be leveraged toward project objectives. Moreover, including them in the project mitigates stakeholder management and social unrest risks.

Bus operators may be paid a fixed fee, variable payments, or a combination of both. A competitive award of the contract should, through increased competition, minimize its total costs—and also reduce the sum of payments to operators. Remuneration should be set in accordance with the context, and is an
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Moreover, the payment mechanism should include performance-based incentives to reduce operational risks. Responsibility for maintaining infrastructure, including the corridor, must be clearly defined. Even if the infrastructure is publicly financed and built, the government can achieve greater value for money by contracting a firm to operate and maintain the infrastructure. The government could pay the firm a fee based on availability of the infrastructure and service standards established in the contract. In any case, if a public agency different from the grantor is responsible for maintaining the corridor, effective maintenance should be ensured, as lack of maintenance may negatively affect the operational costs of the operation (for example, particularly dusty corridors reduce the life span of air filters).

Either the government or the private sector can operate the ticketing and fare collection systems, depending on the level of maturity of markets and the public sector’s capacity to operate fare collection systems and monitor operations. If the bus operator operates the fare collection system, the PTA needs to have effective control of demand and income data. Figure 9.2 illustrates the arrangements for financing an individual private bus operator.

**MODEL 2: UNBUNDLING FLEET PROVISION AND OPERATION**

This structure presents a variation of the typical BRT public-private partnership (PPP) structure by unbundling the provision and operation of rolling stock. In an unbundled structure, the PTA plans the system and finances and builds the roads, stations, and maintenance and parking depots. It also procures contracts and monitors system operations. One private entity (or several) finances and procures the buses. The key difference is that the fleet owner is not the fleet operator(s). Operations may be procured as in the other three models outlined in this chapter. Another private entity provides the fare collection and ticketing.

**FIGURE 9.2**

Example of arrangements for financing a private bus operator


Note: MDB = multilateral development bank, SPV = special-purpose vehicle.
services in the integrated bus system (which can be included in the operation). Figure 9.3 illustrates this variation on model 1.

**Model 2: Planning**

As in the typical BRT PPP structure, the PTA (a) plans the routes, obtains licenses and permits, and secures land for the project; (b) ensures that the bus system is part of a larger urban or transit-oriented development plan; and (c) assumes planning risks.

In this structure as well, it is wise for planners to engage incumbent service providers and encourage them to participate in the project. This project structure provides a solution for cases where incumbent service providers are willing and able to participate but lack the financing to acquire the bus fleet themselves. This structure introduces a new stakeholder that has access to finance and is assigned responsibility for providing the fleet; operators are no longer required to acquire the fleet, only to operate it. During the planning process, it is recommended that planners inform incumbent service providers of the PTA’s intentions—likely over several engagements and workshops—and assess their willingness to participate and their capacity to finance a new fleet.

**FIGURE 9.3**

Model 2: Private financing and operation of buses with separate contracts for fleet provision and bus operations


Note: Government may engage more than one fleet provider in this structure in addition to procuring multiple bus operators. MDB = multilateral development bank. SPV = special-purpose vehicle. VGF = viability gap funding.
**Model 2: Design**

The design functions are the same as those for bundled model 1. The government plans the route and the system, while the private partner designs, builds, finances, operates, and maintains the various components of the project.

**Model 2: Financing**

One or several private concessionaires finance and own the bus fleet (and possibly other assets, such as depots and workshops). They can raise commercial debt, debt from MDBs, or shareholder equity. This structure can include structuring cash flow from fare collection to repay the loans to buy the rolling stock. Government and MDB guarantees can help to achieve bankability or improve financing conditions (Pulido 2019). A different private partner finances the fare and collection systems. The system’s fixed infrastructure (stations, terminals, dedicated lanes) is still financed publicly.

**Model 2: Operations and maintenance**

One or more private concessionaires operate and maintain the bus fleet, which is owned by the fleet provider’s concessionaires. Unlike model 1, the financing and O&M functions are unbundled. This variation may be beneficial because it does not require the operators to raise finance and still allows them to provide their experience and knowledge to the project. The operators must hire staff and operate and maintain buses on the routes determined by the government. In this structure, the fleet operator has fewer incentives to operate and maintain the bus fleet adequately, given that it does not own it. To overcome this challenge, the contract must include performance-based incentives that determine the payments to the operator.

Responsibility for fare collection and ticketing systems is structured in the same way as in model 1 and can be public or private. A private partner may also operate information-sharing mechanisms, apps, schedule tickers, and other tools.

In this structure, the PTA remunerates the fleet provider based on the availability and quality of buses, which incentivizes operators to operate and maintain buses adequately and to track data on kilometers traveled and number of passengers carried.

**Model 2: Advantages**

Model 2 offers some advantages over the typical model 1 structure:

- **Increased competition with shorter concessions.** Concessions for operating the buses—which can be structured for shorter terms—are separated from the useful life of the bus fleet.
- **Flexibility in fleet allocation.** The size of the fleets administered by each operator is not fixed during the life of the contract, and the PTA may have flexibility to reallocate buses between routes to adapt to changes in demand.
- **Increased access to finance.** The project’s risk profile is improved by spreading credit risk across the system (the system would remunerate the fleet provider or providers), rather than assigning it to each operator, regardless of the operator’s ability to manage it. Governments can eliminate systemic liquidity constraints by increasing the number of fleet providers.
**Model 2: Disadvantages**

This structure also has some disadvantages compared with a typical model 1:

- **Complexity.** The project structure becomes more complex, requiring more than one contract. The project requires better coordination across its various components.
- **Worse incentive structure.** The bus operator does not have a natural incentive to operate and maintain buses adequately, which implies that the PTA must do more to monitor their maintenance (either directly or by delegating it to a third party).
- **Stakeholder risk.** Removing bus ownership from incumbent operators may create opposition to the project.

**MODEL 3: PRIVATE PROVISION OF BUS RAPID TRANSIT INFRASTRUCTURE, BUNDLED OR UNBUNDLED**

In this structure, a private company finances, builds, and may (or may not) maintain the project’s fixed infrastructure. In cases where PTAs have experience in delivering and maintaining roads and can leverage economies of scale, a private operator may deliver other components of infrastructure, such as bus stops and stations.

The PTA is responsible for planning the system. Responsibility for bus provision and operations is the same as in bundled model 1. A separate private partner finances, operates, and maintains fare collection and ticketing systems. Figure 9.4 illustrates this project structure.

This structure can be bundled or unbundled. Bundling all BRT components into a single contract would entail bundling the bus (both operations and fleet) and the technology components with the provision of infrastructure, using a joint venture consisting of operators, technology suppliers, and construction firms. Bundling all these components into a single contract may be very beneficial, as it could help to mitigate possible interface risk. Moreover, given that infrastructure construction is usually paid for by public funds and represents the bulk of project costs, a single contract can make the project more attractive to the private sector. Private sector involvement would, in turn, make the project more bankable overall and reduce costs for the public sector.

However, while bundling BRT components into a single contract can help make the project more bankable, other contextual elements should be considered. For example, where there is an expectation from the government’s side that informal operators should be included in the bus component of a potential BRT intervention, this expectation would complicate the implementation of a single contract. First, informal operators might not be willing to support an approach of this kind, as their influence in the joint venture would be minimal (as the bus component represents a much smaller portion of the contract than does infrastructure). Second, infrastructure providers might struggle to estimate the payment required to offset the risks posed by the involvement of a previously informal firm. This difficulty could, in turn, increase costs for the public sector. Finally, there is a risk that the influence of the infrastructure component will dominate other project components.
Examples of Urban Bus Project Structures

Model 3: Planning

As with model 1, in this model, the PTA plans the routes, obtains licenses and permits, secures land for the project, and engages incumbent operators early in the planning process. It also ensures that the bus system is consistent with city-wide mobility and land use plans. The PTA assumes the planning risks.

Model 3: Design

In this structure, the government may provide detailed final designs or provide the private party with basic designs consistent with operational needs. If the private partner is responsible for finalizing designs, it will assume all associated risks. Proper planning on the public side and capacity on the private side together optimize operational efficiency and reduce the whole-of-life costs of the infrastructure involved. If a private partner assumes the design risk, this increases the likelihood that it will bring innovation to the design, build within the budget and timeline, and operate and maintain the project adequately. The design of bus infrastructure is closely related to the operating efficiency of the system. For example, the height and length of stations must be properly integrated with operational needs and vehicle technology.

FIGURE 9.4
Model 3: Private finance of both infrastructure and buses using unbundled contracts

Note: MDB = multilateral development bank. SPV = special-purpose vehicle. VGF = viability gap funding. For purposes of clarity, the figure shows commercial banks lending to only one operator. Commercial banks may lend to all private companies in this arrangement and benefit from the International Finance Corporation’s risk-sharing facilities for each arrangement.
Model 3: Financing and construction

In this project structure, a private partner finances, builds, and maintains the fixed infrastructure. The contract with the infrastructure provider will specify the conditions the asset must meet for the private partner to receive availability payments. Private finance for the infrastructure can only be mobilized if there is a clear source of funding to cover such payments. There will be no private sector interest if the government is unable to show at the outset that the infrastructure can be fully funded throughout the contract period.

The funding for infrastructure should not rely on user fares. User fares rarely cover the operational costs of transportation projects. Using operating revenues to fund infrastructure may lead to affordability problems due to high fares (which, in turn, lead to demand problems) or defunct operations if payments for infrastructure are prioritized.

Model 3: Operations and maintenance

Private firms finance, operate, and maintain the bus fleet as they would in model 1. Bus operators can be structured in the bundled model—which means that the same operator finances, operates, and maintains the buses—or in the unbundled model—which means that some firms finance the fleet and other firms operate and maintain it. Under the bundled model—as well as the unbundled model—the duration of the bus operations contracts should generally be the expected life of the buses.

Model 3: Advantages

The private provision model has many advantages over the typical model 1 structure:

- **Maximized transfer of costs.** PTAs might need less up-front public finance if a private partner can finance the infrastructure, which is useful where there are short-term liquidity problems and where a public sector entity’s lack of access to finance is not related to financial capacity. Planners can consider the private provision of infrastructure as a financing mechanism that may be leveraged to overcome fiscal capacity problems.

- **Better operating incentives.** Specifically, in structures that bundle infrastructure provision and system operation, the operator will have an incentive to design and maintain the infrastructure properly, leading to greater efficiency.

- **Easier to avoid corruption in the awarding of construction contracts.** Corruption may be less likely if construction is managed by a private firm with a profit motive to minimize costs.

- **Easier to enforce standards for assets’ conditions.** It may be easier for the PTA to impose standards for the condition of assets on a private entity than on another public entity. Governments face trade-offs when making expenditure decisions, and maintenance is often not prioritized. By contracting infrastructure to a private party, the government is encouraged to enforce the contract, given its commitment to pay the investor in exchange for a level of service quality.
Model 3: Disadvantages

Model 3 also has some disadvantages when compared with the typical model 1 structure:

- **Higher financial costs.** A private concessionaire subject to repayment risk from the PTA will have a higher financial cost than will public financing for public works.
- **Greater risks if payments are charged to the project.** Planners may be tempted to charge payments to the project fares. Doing so would put affordability at risk, which would affect demand negatively and could create the need to defund the operation or increase public subsidies.
- **Risk of cost overruns if costs are charged to user fares.** Tariffs seldom cover operational costs. Thus, a private provider of infrastructure will perceive repayment risk as high if its remuneration for capital costs is associated with tariffs as the only source of revenue. If a private entity agrees to enter into such an agreement, it will charge a higher risk premium or require guarantees from the PTA.
- **Loss of flexibility in the alignment of routes.** As street layouts and routes need to change from time to time, some flexibility in the alignment of infrastructure is desired. However, this realignment is difficult or impossible to achieve if the project is locked into a long-term contract, and changes will most likely require paying additional remuneration to the contracted firms (which may perceive higher risks in the new alignment).

Model 4: Private Finance and Operation of Electric Buses

Technological advances and rapidly declining battery costs have created an opportunity for electric buses to penetrate markets at an increasing rate. As the cost of electricity—especially from renewable energy sources—continues to fall, cities can take steps to deliver carbon-neutral public transportation. One important point is that technology risks should be allocated to the party with an incentive to foster the technological updates. In the case of electric buses, positive externalities can justify the additional investment required.

The introduction of electric buses brings with it both opportunities and challenges for planning, operating, and financing a project. Electric buses require additional elements at the planning stage linked to battery-charging plans, selection of the right technology (fast vs. slow charging), and analysis of operational plans that will affect vehicle ranges. Electric buses also require different financing plans due to their higher fleet costs, the need for charging infrastructure, and the possible need for an increase in the capacity of the local electricity grid. Finally, their introduction involves a new set of stakeholders, such as electric utilities and battery manufacturing companies. Utilities are particularly interested in creating a new electricity market segment and can be included in the project structure by undertaking the following:

- Providing charging infrastructure and equipment
- Retaining batteries’ obsolescence risk by providing the batteries, offering guarantees, or committing to buy batteries after their life span in bus operations is complete (as they retain value for energy storage)
• Participating in the project as capital contributors, for instance, by buying an electric fleet
• Retaining the risk of rising or fluctuating electricity costs through long-term power purchase agreements.

Project planners can include these elements in any of the structures outlined in this chapter. For example, electric buses can be introduced under either the bundled or the unbundled variant of the structure. In the bundled variant, the same contractor would finance and operate the electric bus fleet. Figure 9.5 illustrates a single, bundled operation.

Model 4: Planning

As with the previous structures, the PTA plans the routes, obtains licenses and permits for the project, and secures the land for the project. It also ensures that the bus system is part of a larger urban mobility and land use plan. The PTA assumes planning risks.

Electric buses involve several specific technical challenges that must be addressed at the planning stage:

• Technology selection and assessment of operational conditions. When planning the project, the PTA must assess the operational conditions of the corridor and select the most appropriate fleet composition (not all fleets need to be or can be electric) for these conditions. The functioning of electric buses varies widely, depending on operating conditions (slopes, speeds, required acceleration rates, air conditioning, and level of demand, among others). Similarly, charging times depend on the architecture and type of batteries used (fast vs. slow charging) and on the initial level of battery charge. Also, the speed of charging depends on the power (the higher the power, the shorter the life span of the battery). Different technologies will offer very different outcomes, depending on the corridor.

[Diagram of Model 4: Arrangements for financing a private bus operator with electric buses]

Note: MDB = multilateral development bank. SPV = special-purpose vehicle.
• **Identification of infrastructure needs and charging solutions.** In addition to the usual need for depots, depending on the charging technologies and the operational strategy, electric buses may need more space than normal to allow for charging. In addition, the need to build and install charging equipment calls for coordinating closely with the party providing the infrastructure and for managing interface risk and any disruption that it may cause to the existing system. Engaging with local utilities is crucial.

• **A need for gradual implementation.** Even where detailed planning has been conducted, the learning curve involved in operating electric vehicles suggests that implementation should be gradual, with redundancies built in and a cushion to ensure compliance with the level of required service (World Bank and UITP 2018). For example, allowing a battery’s charge to reach under 20 percent has a severe impact on its life span. Experts recommend planning for a 30 percent battery reserve. A good practice is to plan for 40 percent at the beginning of operations and adjust to a lower battery reserve as experience accumulates. Similarly, planning a larger-than-usual fleet reserve may mitigate the risk of unexpected failures.

• **Identification of other electricity distribution needs.** In case of large electric fleets, the effects on the grid may be substantial and require an adjustment from the electricity sector. The PTA, together with the electricity utility, needs to study whether the electricity system can bear the effects of the increase in demand. This study should assess the load profile, stability of the grid, and generation capacity, among other factors.

In general, planners should try to maintain technological neutrality and create incentives for the private sector to adopt electric vehicles (World Bank and UITP 2018). At this stage, policymakers need to create mechanisms to incentivize the use of electric vehicles. In the meantime, most electric buses are implemented in publicly operated systems, which can also benefit from some of the lessons reflected in this analytical framework.

**Model 4: Design**

All relevant variables defined at the planning stage should be refined and reflected at the design stage. The infrastructure related to electric buses—such as depots, charging stations, and other bus stations—should be consistent with the charging strategy and operational plan. Similarly, the specificity of vehicles’ operations and local conditions should be considered when designing a detailed operational plan. An iterative process may end up in an adjustment of the original strategy. The PTA may be best positioned to specify the locations for charging stations and clearly set out the interconnection agreements. An electricity utility should design the infrastructure required to supply power to charging stations, such as transmission lines and distribution substations.

**Model 4: Financing**

Private investors, bus manufacturers, or the electricity utility can finance the buses, not just the government. If an electricity utility finances the operator, it can, for example, invest cash in the company and sell its energy to the company, or it can provide the energy free of charge in exchange for some specified level of equity in the company.
The electricity utility may also cover the cost of the power infrastructure necessary to supply electricity to the charging stations, such as transmission lines, substations, and distribution infrastructure. Or the operator may finance the charging stations for the buses and parking and maintenance depots.

Both vehicles and batteries can be provided (together or separately) by a separate entity, different from the operator. Many different stakeholders can participate in such agreements. These stakeholders may include bus manufacturers, utilities, or multiple-stakeholder leasing entities or equity funds and may include public entities wanting to foster fleet acquisition, utilities, or private investors.

Model 4: Construction

As with financing, the electricity utility is best placed to build the power infrastructure that the project requires by building the depots and charging stations for the buses.

Model 4: Operations and maintenance

Although most electric buses are publicly operated, this analytical framework is intended to support the structuring of projects that involve private participation. Therefore, the proposed structure involves private O&M. The bus manufacturer might, for example, maintain the buses or provide ample assistance and knowledge transfer to the operator, given its experience and qualifications in handling electric buses. In an unbundled variant of the structure, a private investor or bus manufacturer might finance and deliver the electric buses, while another private partner operates them.

Model 4: Advantages

Electric buses have many advantages over conventional buses:

- **Emissions reduction potential.** Electric buses can achieve greater emissions reductions than standard fuel buses.
- **Mitigating input fuel costs.** Electricity supply contracts and equity from electricity utilities reduce the fuel and electricity supply risk.
- **New options for transferring risks.** The involvement of new players such as utilities and carbon funds allows for innovation in project structures to incorporate more financing instruments, funding sources, and stakeholders.
- **Potential demand risk mitigation.** Electric buses are less noisy and more comfortable, so they tend to attract more users.
- **Potential stakeholder risk mitigation.** Electric bus projects can achieve greater support from key stakeholders due to their environmental benefits.

Model 4: Disadvantages

Electric buses also have some disadvantages compared with conventional buses:

- **Increased capital costs and technology risks.** Electric buses can cost two or three times the equivalent of diesel buses. The main element that increases the price is the battery, and the life span of the battery is uncertain and depends heavily on its operation.
• **New planning requirements.** Implementing electric buses involves planning for new elements and challenges such as a strategy for where to locate charging stations in relation to routes.

• **Emissions reductions depend on an energy generation matrix.** Emissions reductions can be offset depending on the source of the electricity used to charge the buses (World Bank and UITP 2018).

• **Electric infrastructure requirements.** An electric bus project needs to finance and deliver more infrastructure than a project with standard-fuel buses.

**NOTES**

1. For further guidance on the role of MDBs in urban transportation, see World Bank (2018).

2. To incentivize fleet renovation and actual decommissioning of vehicles past their life span, it is common for authorities to subsidize the scrapping of old buses. In some projects, funding this work is a responsibility of the awarded operator.

3. The case studies cited in this chapter are detailed in appendix A.

4. For further guidance regarding the remuneration of private operators, see chapter II. See also Gómez-Lobo and Briones (2013, 2014).

5. As in the cases of Medellín and Transantiago.

6. World Bank (2019) identifies five groups of factors needed to implement electric buses in public transportation systems: (a) adequate public transportation systems, (b) environmental policies, (c) funding and financing, (d) regulation and governance, and (e) energy and infrastructure.

7. Even if externalities at the current level do not justify the investment, national industrial policies and advancing the learning curve may justify full or pilot projects that include electric buses.

8. An emerging best practice is for projects to remain “technology neutral” so they can support the development of electric mobility without prescribing it as the only solution.

**REFERENCES**


This chapter provides an overview of various ways to structure the financial elements of an urban bus public-private partnership (PPP). It explains how external financing instruments come together with revenue sources to achieve project bankability (given the appropriate technical and legal elements). In the process, the chapter outlines key financing and funding instruments that have been used in urban bus systems around the world and discusses their application to urban bus PPP structures.

Funding sources and financing instruments are key to the viability of a project’s structure. How they are defined for each function or component of a project may either generate or mitigate a risk. Funding sources are revenues that will be used to pay for project functions and components during the life span of a project. They will be used to cover, for example, up-front costs, investment needs over the project’s life cycle, and expenses associated with operations and maintenance (O&M). Financing instruments allow project planners to bring funding sources’ future cash flows into the present in exchange for remuneration (interest). In this sense, funding sources should be sufficient to repay financial instruments with interest. Financing instruments differ in their conditions (cost, tenure) and the level of risk assumed by the financier (depending on the particular rights and obligations associated with the instrument).

Given the importance of public subsidies for maintaining most urban bus projects, this chapter ends with a brief discussion of subsidies.

**STRUCTURING A PROJECT’S CAPITAL**

**Corporate finance vs. project finance**

Project finance differs from corporate finance in that it allows planners to isolate a project’s financing risks into a special-purpose vehicle (SPV) that ring-fences both these risks and cash flows. Project finance is commonly used in large infrastructure projects. In some cases, the capital required for infrastructure exceeds the borrowing capacity of sponsors or project finance is more sustainable for the sponsors’ financial structure than a loan on the books (from an accounting perspective, participation in an SPV looks like an asset, instead of an obligation, and
the SPV is the borrower, leveraging debt over the equity provided by investors). Pure project finance separates the sponsors’ risk profile from that of the project. However, most bus projects do not have pure project finance.

In practice, the financial profile of an SPV’s shareholders—particularly when they are not competitively selected—influences the financing mechanisms’ terms and conditions and the overall bankability of the project. Pure project finance is nonrecourse, meaning that it does not create any contingent obligation for the public sector. The main advantages of pure project finance are that it (a) allows for off-the-book financing, (b) eases the implementation of risk allocation and mitigation mechanisms, (c) makes it easier to achieve higher debt-to-equity ratios, and (d) involves additional due diligence on the part of investors, which look not only at the financial condition of the borrower but also at other technical and legal considerations. Among the main disadvantages are (a) higher transaction costs for structuring and due diligence; (b) the need for greater capacity and experience in the sector on the lender’s side; and (c) the need for capacity among the SPV’s shareholders to understand project finance plans and a capital stack that differ from those seen in traditional bus operations (in which the operators are the borrowers and the owners of buses and bear operations permits or rights derived from an operation concession).

Unlike other infrastructure projects, urban bus PPPs are rarely financed with pure or nonrecourse project finance plans. Because of urban bus projects’ relatively small size, complexity, and variety of stakeholders, many lenders in low- and middle-income countries have not developed the capacity to assess their eligibility for project finance. Even so, many urban transportation projects are structured as if they were targeting project finance. In practice, most of these projects involve credit enhancement instruments (for example, partial credit risks in most bus projects supported by the central government in Mexico), by which the public sector assumes contingent responsibility to remunerate the operator if the agreed-on revenue does not cover the fares (Bogotá, Colombia). In other cases, the SPV transfers the debt to the sponsors’ companies (Tijuana, Mexico), or the debt is generated on the books of the sponsors (León, Mexico; Dar es Salaam, Tanzania). These loans are backed by the balance sheet of the borrowing company instead of future cash flows arising from the project.

**The capital stack**

Regardless of the nature of the borrower, the composition of all external sources of financing is known as the capital stack. Figure 10.1 is a simplified representation of a project’s capital stack. (A real-world project might feature a variety of structures for its transactions and a variety of instruments for external financing.) In the figure, the bottom of the green section of the pyramid represents the most senior level of debt, while the top represents sponsor equity (the least senior instrument). The gray bottom section represents obligations, which delayed payment would make into financing. Degrees of seniority have various associated features:

- **Risk level.** The higher the seniority, the lower the associated risk. Senior debt is at the base of the pyramid.
- **Priority of payment.** One of the factors that determine the level of risk is the priority of payments. More senior debt is afforded greater priority.
• **Remuneration.** Remuneration is directly related to risk level. Investors assume that a higher level of risk requires more remuneration.

• **Control.** The level of control over project decisions is in general inversely proportional to the seniority of the instrument. The more risk is assumed, the stronger the mechanisms to control that risk. Certain instruments, such as step-in rights, allow users to gain greater control in decision-making processes in case an event could jeopardize the project’s viability (insolvency of the borrower, a breach of contract).

### Achieving bankability

The main objective of the capital structure is to help a project achieve bankability. Thus, planners try to minimize project risks and the cost of capital. Bankability is traditionally defined as a combination of risk and remuneration that makes a transaction attractive to a bank or a financier. For instance, the *PPP Certification Program Guide* defines bankability as “the ability of a project to be accepted by lenders as an investment under a project finance scheme [i.e., plan], or the ability of the project to raise a significant amount of funding by means of long-term loans under project finance, due to the creditworthiness of the project in terms of sufficiency and reliability of future cash-flows” (APMG International 2018).

To achieve financial viability, all funding sources (revenue sources) must be sufficient to cover up-front costs and investment needs and also to repay capital and debt contribution instruments (financing instruments), with interest. The following sections introduce the various financing instruments and funding sources that are available for urban bus PPPs.

### PUBLIC FINANCING INSTRUMENTS

Financing instruments may be either private or public, depending on the nature of the borrower. This section focuses on public instruments.

**FIGURE 10.1**

Simplified representation of a capital stack

National vs. subnational finance

Public entities can access debt by applying for a loan or by issuing bonds. Depending on local regulations, subnational entities may have the ability to borrow from national or international financiers to fund project-related infrastructure or equipment. In the case of public commercial debt, loan conditions will depend on the creditworthiness of the public entity.

Urban bus projects are usually subnational projects (with exceptions—such as Chile, Costa Rica, Honduras, and Panama—where national entities are responsible for providing public transportation), and subnational entities may access debt using budgetary resources (local revenues or federal transfers) to provide public-financed components of the project. Alternatively, local governments can raise extrabudgetary resources by leveraging ring-fenced assets and the revenues generated from them, which might require a guarantee from budgetary resources. In general, public entities will access finance at better terms than private entities.

National governments are, in general, better placed than subnational governments to access debt. They will most often do so in contexts where urban transportation is the responsibility of the nation, in the framework of national urban transportation programs, or for an ad hoc project. In countries such as Mexico, resources can be leveraged from the revenue generated by certain assets (toll roads). The extrabudgetary nature of these revenues may allow the national government to reduce its debt exposure once enough trust has been established in the management of these revenue sources.

Although urban transportation is usually the responsibility of subnational governments, several factors favor contributions from the national government. First, in most countries, fiscal systems are structured such that local governments lack the tax instruments required to shoulder massive outlays for transit projects. Second, transit projects may have a redistributive objective that, in principle, falls under the purview of national responsibility. Third, as cities are commonly the key place of national economic activity, national governments have an interest in ensuring that they function efficiently. Fourth, a national presence in local transit can minimize the influence of local interest groups, support good planning, and strengthen the institutional memory of lessons learned. Fifth, since urban transit projects may span several municipal jurisdictions, national governments can play a key role in facilitating metropolitan solutions. Sixth, given the growth of cities, urban problems such as pollution, road congestion, and safety, which often disproportionately affect the poor, take on national dimensions.

In addition, requirements linked to the use of national urban transportation programs can encourage good planning and monitoring. National governments can use funding to incentivize their agendas or reforms in a top-down manner. For example, over the years 2005–14, the Jawaharlal Nehru National Urban Renewal Mission program in India urged the repeal of urban land ceilings, thereby promoting efficient real estate development. Many national urban transportation programs, such as the Public Transportation Federal Support Program (PROTRAM) in Mexico, require the existence of a transportation planning authority, the integration of projects into a metropolitan-level land use and mobility plan, and the reporting of key indicators.
Securitization of public project assets

Securitization of public assets often happens when state-owned enterprises (SOEs) and the government are unable or unwilling to issue more debt (because they have a high ratio of debt to GDP). If the SOEs and government are heavily in debt, they may securitize future cash flows arising from user fees (or even their own availability payment) to float bonds and then refinance the whole project.²

Development finance

Urban bus projects have a high social rate of return. Therefore, bilateral and multilateral development banks can provide public entities with loans and credit enhancement instruments to finance urban bus projects. Maximizing finance for development principles calls for a subsidiary use of development finance. In this sense, development banks should focus on ensuring viability and need to be careful that they are not crowding out local commercial banks.

PRIVATE FINANCING INSTRUMENTS

This section considers several private sector financing instruments.

Senior debt

Banks’ commercial loans are the most common senior debt instrument. Such loans can include various financial terms, grace periods, interest rates, and tenures depending on the market and the borrower's financial status. In Colombia or Mexico, most banks feel more comfortable financing traditional operators than SPVs, because of the bad reputation of the sector. The conditions of the loans vary significantly, depending on the financial status of the borrower. In Mexico, the most common conditions include rates that range from 10 to 15 percent (although some operators could access cheaper rates) with tenures of around six years, equity requirements of 10 to 20 percent, and a six-month grace period.³ Banks usually require a partial-risk public guarantee to consider the project bankable. Other instruments are also available for raising senior debt.

Bond issuance

A bond issued by a concessionaire accrues interest for its entirety from day one of placing it with bondholders. This is different from bank borrowing, in which case only funds needed to invest in the project accrue full interest, whereas the unused balance involves only a small commitment fee. To offset the problem of interest accrual, bonds can be issued and placed in tranches. But this process of matching tranches can pose its own problems, especially given the expensive issuing fees charged by bankers and lawyers. Another problem can arise when projects have a long period of capital expenditures (CAPEX) (say, five years), with the largest disbursements in the final years. The concessionaire issuing the bond often pays interest over time, whereas the full principal amount is due at
the end of the period. In PPPs, the principal and interest on bond issuances are paid only after the project is complete.

**Asset securitization**

Asset securitization usually involves bond issuance. The securitization of cash flows arising from an asset’s use and sale are directed to pay interest on the bond issued from that securitization. In the case of a bus project, all cash flows arising from user tariffs can be securitized and directed to service a loan that funded the buses, and a firm can use the availability payments to pay its expenses and its expected return (profit) on the project. In this case, the securitized asset is the PPP contract itself that provided the rights for the concessionaire to capture these cash flows. These rights are transferred via the securitization operation to the bondholder, which agreed to hold that bond at a given credit rating against the right to capture cash flows. The bondholder is not expecting the bus company to turn a profit. Rather, it only cares about the cash flows to which it has rights (such as user tariffs). It is clear, though, that investors care about other accounting ratios and indicators, such as the debt service coverage ratio and other covenants that can make the bond callable (or due at the time the covenant is broken). But, overall, the bondholder only cares about its cash flows.

**Bus manufacturers’ loans**

The bus manufacturer lends money for a bus operator to acquire buses, using the vehicles as collateral. In markets where most operators do not have access to finance, bus manufacturers need to fill this gap in the market to keep their business. There are three main advantages to this structure. First, the bus manufacturer understands the borrowers’ business better than most banks. Second, it may be a more flexible player than other financiers, which often have more rigid requirements in terms of down payment amount or tenure. Bus manufacturers understand the conditions in the market and the volatility of the business cycles of the bus industry. Third, if all else fails, it can recollect assets and resell them more effectively than other players. Thus, it might be able to charge lower rates than other lenders. However, bus manufacturers can manipulate the price of a bus to compensate for better financial terms or an operator’s inability to provide a down payment.

**Export credits**

Export credit agencies (ECAs) may be publicly operated, private, or some combination of the two. ECAs offer various instruments to help domestic producers finance international export operations. While most of these instruments are directed toward manufacturers, they indirectly help bus rapid transit (BRT) interventions to procure supply from foreign companies by eliminating the risks that bus manufacturers take when exporting their products. These instruments include financial support, interest rate equalization, credit insurance, and guarantees, depending on the specific ECA and country of BRT operations. Furthermore, ECAs can support imports directly by offering a buyer’s credit. Doing so helps to eliminate transaction costs by paying exporters up front and having importers pay over a period of time. A buyer’s credit was used to acquire 90 low-emission, double-decker buses from a British firm for the BRT system in Mexico City. This credit required the participation of a domestic financing institution. While many ECAs operate in high-income countries, many south-south
exchanges facilitated by ECAs have been operating out of low- and middle-income countries as well.

**Leasing**

Leasing is a sector-specific instrument usually related to fleet provision. Instead of assets being purchased, the project structure might include leasing them and expending their entire value instead of depreciating it over time. In theory, depreciation should function like lease payments, but the interest involved means that lease payments are usually bigger. The risk allocation involved in financial leasing differs from that involved in operational leasing. Financial leasing transfers to the lessee risks related to the operation of an asset. Usually, financial leasing also allows for an option to purchase the asset when the leasing period ends. Also, each type of leasing may be categorized differently for accounting purposes, with operating leasing most often considered an operating expenditure and financial leasing considered a financial expenditure. Advantages of leasing include the possibility of having shorter concessions, more flexibility for fleet allocation, and easier implementation of technology upgrades.

**Subordinated debt**

Subordinated debt consists of financial obligations with less seniority than senior debt. Subordinated debt gets more remuneration due to higher risk exposure but gets paid after senior obligations are satisfied. Subordinated debt can be used to extend the length of the period needed to pay back the bus acquisition capital. Therefore, combining subordinated debt with senior debt (which usually has a shorter payback period) helps to relieve some stress from the financial model for the initial years of operations. Subordinated debt is usually available for infrastructure CAPEX. As for bus acquisitions, subordinated debt is only available for those operators that have gained a reputation for reliability in the market. National development banks are the most likely institutions to offer this type of debt for bus acquisitions.

**Mezzanine debt**

Hybrid in nature, mezzanine debt usually involves a very junior debt bond that may be converted into equity in the case of default, generally after venture capital companies and other senior lenders are paid. This happens because of its junior position. In bus contracts, mezzanine instruments are often featured in larger deals, where multiple layers of debt are required to finance large infrastructure CAPEX and sizable bus fleets need to be upgraded or purchased at the same time. In these cases, lenders often will acquiesce to being put in relatively less secure positions, but they may also request the right to convert the loan into equity during insolvency procedures. In low- and middle-income countries, mezzanine instruments are rarely suitable for the acquisition of new buses in BRT projects.

**Equity**

Pure equity is an investment that does not grant a fixed remunerated coupon (as debt instruments do, for instance). Since equity requires a more variable source of revenue (if there are no profits, there are no dividends and thus no payout to
investors), its expected return is usually far higher than that of debt instruments. Thus, equity investment becomes very expensive in PPP deals. Sponsors of the project are usually expected to provide equity. They can have an interest in the project’s construction or operation (as with construction, operation, or specialized funds), or they can be institutional investors (as with pension funds).

**Preferred equity**
In contrast to pure equity, preferred equity is an option given to some institutional investors or development banks willing to provide equity to help the project achieve bankability. Usually, preferred equity investors will have less control than sponsors of pure equity, but they also will enjoy a lower risk exposure by, for instance, having priority for remuneration or having the right to sell their participation at a given time.

**Letter of credit**
When investors provide some equity capital, they may also give some small bridge lending or a “letter of credit” to support initial working capital or small investments. After the bridge loan is conceded, the concessionaire should find a more permanent loan. As soon as the permanent loan is contracted, the first task of the concessionaire is to repay the bridge loan right away. The debt cost is lower, as debt interest is paid first from the concessionaire’s cash flows. Debt can be even cheaper with government guarantees. Thus, the expected return on equity, or the equity internal rate of return (IRR), can weigh a lot on the overall project IRR, which is brought down by the debt’s lower IRR.

**Rate of return**
Pure equity investments require an expected rate of return. Equity returns are uncertain by nature. While fixed-income payments have higher seniority, equity payouts to investors in the form of dividends are uncertain. The required expected return on equity is the cost of equity in the project, which together with the cost of debt will lead to the weighted average cost of capital. This rate should be the discount rate for the project, according to many financial analysts. After all, this is the rate that the market has charged to concessionaires looking for equity and debt to fund the project. Even if a government is not structuring a PPP, it should price concessionaires’ discount rate according to the weighted average cost of capital in a transparent bidding competition.

**Level of equity risk and pricing**
Equity investment in bus projects involving the private sector is often related to the component(s) financed by the private sector. Two very different types of risk are involved. The first is the infrastructure investment in CAPEX. This type of risk is related to building bus stations, exclusive lanes and corridors, bridges, and overpasses for the bus system. This is traditional construction risk, which is well understood and priced by engineering, procurement, and construction (EPC) companies worldwide. Since EPC activity is generally understood, it becomes a known risk, to which is added the premium charged to the municipality in a given country, according to the risk listed in JPMorgan’s Emerging Market Bond Index. The second type of risk is for bus operations. Operators in the local market know this business very well. Incumbent operators are often well integrated into the political economy landscape, especially at the municipal level. It is of critical importance to engage these operators...
early in the process when working on bus system reform. The risk of incumbent operators delaying or opposing the project is far less clear to investors than is the EPC risk—especially if the incumbent operators are somehow involved in the construction phase. As a result, international financiers would charge a much higher risk premium (if they consider the project to be bankable at all) when dealing with incumbent operators.

As for bus acquisition, other than equity injected into the SPV by informal operators, equity is rarely available in low- and middle-income countries, particularly in brand-new transportation interventions. Potential investors might perceive bus acquisition as high risk given its low bankability. Furthermore, informal operators themselves might oppose the participation of a third party in the SPV, fearing it will threaten their long-term participation in bus provision.

**Credit enhancement mechanisms**

Credit enhancement mechanisms are financial instruments that allow transactions to have access to financial conditions or even achieve bankability. These mechanisms can be internal (contingency funds, overcollateralization of assets) or external (insurance, guarantees). Guarantees are the most common instrument in urban bus PPPs and are essential for them to achieve bankability in some emerging markets. Credit guarantees help to improve the bankability of BRT projects by eliminating all (full guarantee) or some (partial guarantee) of the risk to lenders. They are useful in securing relatively favorable loan conditions and are particularly helpful for new BRT interventions where the public transportation authority or local operators do not have a track record of reliability, particularly in the acquisition of buses. New BRT operations can establish a successful record of compliance with repayment under the favorable terms of an external loan guarantee. These guarantees are particularly important where tariffs are controlled for political and social reasons, increasing the risk associated with defaults by commercial banks. Partial guarantees can be provided by the government or by multilateral development banks. Depending on the nature of the project, the cost of these guarantees either is covered by the public sector or, most often, is attached to the terms and conditions of the loan to the private sector (premiums).

**Multilateral development bank instruments**

A variety of instruments offered by the World Bank Group can help countries structure bus projects. These instruments can both attract private investors, by boosting investor confidence and helping private firms to secure better terms and conditions, and improve overall project structures, by, for example, introducing best practices in project management and design.

World Bank Group instruments are both nonfinancial and financial (table 10.1). Nonfinancial instruments can improve the overall performance of the project and are suitable for the following:

- Preparation of overarching and sector-specific policies, laws, and regulations
- Additional governance work, including institutional design
- Sectorwide planning and master planning
- Project preparation, including compliance with environmental and social safeguards
- Fiscal risk management processes and reporting, including processes for the provision of fiscal support and assessment of fiscal commitments and contingent liabilities
- Capital market development and support
- Transaction structuring, including procurement
- Maximization of sector funding mechanisms
- Capacity building.

### TABLE 10.1 Summary of the World Bank Group's instruments

<table>
<thead>
<tr>
<th>ADVISORY INSTRUMENTS (NONFINANCIAL)</th>
<th>INSTRUMENTS TO MOBILIZE CAPITAL (FINANCIAL)</th>
<th>INSTRUMENTS TO CLOSE THE VIABILITY GAP (FINANCIAL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IBRD, IDA, and IFC technical assistance and reimbursable advisory service: a help to structure the project to optimize risk allocation, ensure bankability, prepare draft contracts, and plan and manage the competitive procurement process</td>
<td>IFC partial credit guarantee: cover lenders on debt instruments issued by the project’s organization, such that the IFC will pay shortfalls of principal or interest payments up to a predetermined amount</td>
<td>IDA grant: where grants are possible, offset some of the up-front public funding required, such as for the construction of fixed infrastructure, viability gap funding, or studies to advance projects</td>
</tr>
<tr>
<td>IBRD and IDA guarantee: cover project lenders against project company debt service defaults due to adverse government action or inaction; also includes guarantees for (a) scaling up existing infrastructure asset recycling programs and similar plans that will allow the governments to invest in new infrastructure without significantly adding to the fiscal burden and (b) leveraging resources from the cash flow generated by existing public assets in order to access a broader set of international financiers through newly created financial platforms</td>
<td>IFC loan: help to address currency risk that arises due to the mismatch between farebox revenues and financing and repayment in another currency</td>
<td>IBRD and IDA loan: finance fixed infrastructure, provide fare subsidies, or pay the ticket and fare operator; can also be used to make availability payments to the infrastructure contractor</td>
</tr>
<tr>
<td>MIGA’s political risk insurance and credit enhancement: mitigate the risks of cross-border investors and lenders by providing cover for both equity and debt instruments against four specific political risks</td>
<td>IFC equity: lend credibility to the project and induce a “crowding-in” effect with other investors becoming more comfortable to participating</td>
<td>IFC risk-sharing facility: extended to local commercial banks providing loans to bus companies; has the potential to crowd in additional financing</td>
</tr>
</tbody>
</table>

Source: Pulido 2019.


a. Technical assistance and reimbursable advisory service are similar in essence. Technical assistance is nonrefundable and focuses on advice that supports legal, policy, management, governance, and other country reforms. Reimbursable advisory service is a customized form of technical assistance that either is a stand-alone program or complements an existing program and is conducted on a reimbursable basis if the World Bank Group cannot fund the entire cost within the existing budget envelope.
The World Bank Group’s financial instruments can be used to improve the financial structure of a project and attract private investment. These instruments can support the following project activities:

- Derisking projects
- Enhancing projects’ bankability
- Lowering the cost of capital
- Providing equity to projects.

Depending on a country’s regulations, financial instruments can also be used for the activities listed under nonfinancial instruments. The purposes of the two types of instruments are not necessarily mutually exclusive.

Multiple instruments from different branches of the World Bank Group can, and often should, be used in conjunction with instruments from other branches. However, certain instruments can be used only in countries whose designated status qualifies them. The focus of each branch is as follows:

- **International Bank for Reconstruction and Development (IBRD).** Middle-income and creditworthy low-income countries (with the exception of “enclave projects” in countries otherwise covered by only the International Development Association)
- **International Development Association (IDA).** Poorest countries (noncreditworthy), “blend countries” (creditworthy countries, as determined by the IBRD), and countries with a population of less than 1.5 million
- **Multilateral Investment Guarantee Agency (MIGA).** Investors and lenders to facilitate foreign direct investment in emerging economies (cross-border investments in low- and middle-income countries)
- **International Finance Corporation (IFC).** Private ventures located in low- and middle-income countries.

### FUNDING SOURCES

The identification of revenue sources has become even more critical for urban bus projects than it is for many other public services involving other sectors. Bus projects are, at a city level, seldom self-sustaining (even when costs associated with O&M are expected to be recovered by user fares), and project planners are usually tasked with finding other revenue sources to fill in the gap. Given the importance of public transportation services, the associated transaction costs, and the uncertainty of alternative revenue sources, the analytical framework considers the public budget to be the main source of revenue, after user fares, that is needed to ensure a project’s long-term financial sustainability.

This section outlines the most common revenue sources that planners can include in the structure of urban bus projects.

**Tariff revenue**

If the fares paid by users are considered a source of funding for the project, they should be linked to the costs of the system to some degree. In most cases, the income generated by the fares paid by users are directed to the system—irrespective of the risk allocation or the remuneration mechanisms involved. The costs of public transportation systems are linked to the variation of prices
for the main inputs and factors used in this industry. Among the most common factors are fuel prices, labor costs, exchange rates (dollar or euro), consumer price index, and price of parts and lubricants. To ensure the system’s financial equilibrium and compensate for cost increases, this analytical framework advises that the income be readjusted based on these factors. Several systems in Latin America have established transparent and predictable public tariff indexing mechanisms, in which an analysis is made based on objective parameters. An example is the independent Panel of Experts created in Santiago, Chile, whose tariff decisions are binding on the PTA. Another example is the Tripartite Panel (with representatives of the PTA, users, and operators) in León, Mexico, which determines the rate for the next period. In both cities, a public tariff indexing polynomial has been defined that includes the variations in the main inputs of public transportation. Lacking this mechanism, the PTA should design a method of remuneration that minimizes the impact of political risk associated with changes in fares.

In addition to being done through predictable mechanisms, fare setting should avoid having a negative impact on demand or affordability. As seen in part II of this analytical framework, predictable fare-setting mechanisms are an important mitigation measure. For example, if fare levels are uncertain and fares are included in a remuneration mechanism for the operator, the revenue level of the concessionaire is uncertain. However, fare setting should consider demand elasticities, so as not to diminish demand to undesirable levels, as well as affordability, especially for the most vulnerable. One way to increase tariffs without compromising affordability for the most vulnerable is by setting up demand-side subsidies. The political authority, if concerned with affordability, can target subsidies to particular groups of (vulnerable) users by (a) indexing the operators’ remuneration, but defining users’ tariffs independently; or by (b) indexing users’ tariffs while providing subsidies to those who need them.

Finally, the way in which fares are collected affects the associated risks. When fares are a source of funding for a project, investors and financiers penalize the use of cash due to the associated risks. Cash management is associated with the risk of fraud, higher rates of fare evasion, and susceptibility to robbery.

**Nonoperating revenues**

Nonoperating revenues are all revenues generated by the system that do not correspond to tariffs:

- **Use of commercial space.** Urban transportation projects may include terminals or stations with a high volume of passengers, which provide the opportunity to generate revenue by exploiting these spaces commercially. Revenue can be generated by leasing space or by incorporating the right to exploit it as part of a concession.
- **Advertising.** Advertising contributes to diversifying revenues, increasing the chances that the concessionaire will eventually collect the earnings forecast. Advertising is a very stable source of revenue and can provide direct funds for specific aspects of the transportation system. An example is bus shelters in London for which capital and operating expenditures are fully covered by advertising. Similarly, Mexico’s Metrobús BRT system includes advertising rights in concessions for stations.
• **Additional uses of infrastructure.** The strategic location of urban transportation project assets creates opportunities to monetize this infrastructure in different ways. For instance, the project can lease space in stations for installing cell phone antennas. Similarly, as many projects incorporate telecommunication infrastructure, the project may lease the use of this infrastructure to third parties, whether public or private.

**Land value capture mechanisms**

Governments may monetize part of the land appreciation related to a bus project’s development. Higher productivity generated by urban transportation projects is partially transferred from the user to other agents and is ultimately captured by landowners. Land value capture mechanisms allow the public sector to generate funding by monetizing some of the benefits reflected in the increased price of land. The following are stylized modalities for land value capture:

- **Land sale.** The private sector pays a lump sum for government-owned land near areas where the infrastructure investment for the bus corridor will happen. If paid at the beginning of the project, this lump sum provides capital for the infrastructure investment.

- **Land lease.** Leases allow the government to keep control of the land and to upgrade lease values over time. As a result, these lesser, more constant funds can be used to fund operating expenditures, reducing user tariffs or availability payments. Moreover, as the bus project gets under way and the value of the area around it becomes more expensive, higher lease values can be charged. In that sense, a land lease is more flexible than a land sale.

- **Development rights.** When the government does not own the land next to the project, selling development rights can provide additional revenue. Development rights also help to define how the area’s land should be used, which helps to accurately plan the number of buses required, based on the flow of passengers for each destination—for example, the sale of Certificates of Potential Additional Construction in São Paulo, Brazil. In Quito, Ecuador, an “ecoefficiency tool” allowed developers 400 meters away from a mass transit corridor to increase their developments in exchange for implementing certain eco-friendly measures.

- **Development rights awards.** The government asks the private sector to fund initial capital expenditures. In exchange, over time, the private sector gets the right to recover this initial investment (plus an IRR) through real estate development.

- **Land for rights.** If the private sector owns the land, sometimes the public sector can ask the owner to give the public sector some of the land for development rights.

- **Betterment levies.** Betterment levies are taxes excised by the government on property owners that will benefit from the development of a project on their property.

- **Property and asset sales taxes.** Property taxes are expected to increase with time after an improvement in a given area. These gains can be a source of revenue. An example is the use of tax increment financing arrangements in the United States. These arrangements involve structured financing instruments that enable a project to be funded by securitizing the expected cash flow from higher property and other taxes due to the project.
Measures incorporating incentives for public transportation

Several measures are useful for maximizing project benefits and mitigating risks in addition to generating revenue. These measures have the ability to discourage the use of private vehicles by helping to internalize their associated externalities. Although useful, their implementation should consider vulnerable groups that rely on private car use and may be severely affected by a decrease in affordability. These measures include:

- **Parking charges.** Cities experiencing severe transit problems charge hefty parking fees. In San Francisco, street parking fees in some areas are close to US$6 per hour. These charges are controlled by the city authority and represent a third of its revenue. In Dar es Salaam, parking managed by a private firm represents 25 percent of the PTA's budget. In Barcelona, parking charges are used to fund the city's bicycle-sharing program. In London, the city council is authorized to use parking charges as resources for public transportation projects.

- **Road pricing.** Road pricing consists of directly charging road users for the use of public assets. Ideally, it internalizes the externalities of using private cars. Most commonly, road pricing takes the form of tolls, which are often part of a concession linked to the development of the urban road. An economic analysis (rather than a financial model of the concession, which requires a minimum demand level to be financially sustainable) should inform the setting of tolls.

- **Congestion charges.** As with road pricing, congestion charges help to internalize externalities related to the use of private cars by charging users for circulating in a given area. However, in the case of congestion charges, the objective is usually to reduce congestion-related externalities rather than to create a source of funding for infrastructure. In this sense, they are best suited to fighting congestion. London's congestion charges, managed by its local authority, generated US$400 million in 2018 or close to half the system's operating expenditures (OPEX). In Milan, Italy, the value was US$28 million. This revenue was used for the city's bicycle-sharing program and to pay the PTA's OPEX; the rest was invested in the metro and tram. Finally, in Singapore, congestion charges go directly to the central budget.

- **Fuel and vehicle taxes.** Systems that impose fuel surcharges and increase vehicle taxes reduce traffic and capture funds that can be invested in public transportation. However, many countries do not allow taxes to be earmarked, and these funds get diverted. In the US state of California, 70 percent of fuel and vehicle tax revenue is used for transportation, but only 10 percent of it is directed toward mass transportation. In Colombia, the fuel surcharge pays for the BRT CAPEX in many cities. In Germany, these taxes are used for the operating expenses of trains.

Other contributions from public entities

Other contributions include support from the public authority, which generates savings by creating rights, waiving obligations, or providing assets for the project. The following are examples:

- **Tax credits.** The public sector can provide financing to a project by creating tax exemptions that will benefit the SPV or the project sponsors. This way,
the public authority waives some of its future income to ensure project viability.

- **In-kind contributions.** The public authority can provide existing assets that are part of project components.
- **Other national or local assets.** In some cases, countries own assets (toll roads) and manage the revenue generated by these assets. Mexico created the National Infrastructure Fund (FONADIN) to support infrastructure investments across the country with both nonrefundable and refundable financing instruments. Funding from FONADIN comes primarily from the national toll roads that the fund manages. PROTRAM, a program under the umbrella of FONADIN, supports the development of urban mass transit. PROTRAM resources can be used for subordinated debt or guarantees for closing the viability gap.

### Making the most of revenue sources by mobilizing funds for investment

Operating and nonoperating revenues can be managed strategically to mobilize further funds for investments. Sources of operating revenue—or at least a portion of the total revenue generated—can be directed to an independently managed trust fund for their future securitization. The trust fund can invest the securitized resources in strategic capital investments that would help to improve service provision and revenue generation. Given that most mass transit systems in low- and middle-income countries are managed by SOEs, this securitization might be registered as public debt or might require a guarantee to access already tapped or untapped investors.

Regarding sources of nonoperating revenue, the challenge remains of how to earmark these revenue sources for the bus project or leverage them into more resources. Given that the nature of these nonoperating revenue sources is usually budgetary, they can be collected and used for purposes other than public transportation provision. The greater the size of these revenue sources, the more incentives governments have to redirect them toward other public services. This situation is often the case in low- and middle-income countries where the need to support other public services is critical.

As in the case of sources of operating revenue, a trust fund will be needed to manage any additionally generated resources. This fund will provide confidence to investors that the revenues generated by securitization will be invested in projects that will improve the collection of nonoperating revenue. Moreover, investors will require a certain amount of newly generated nonoperating revenues to be set aside to repay their investments.

### SETTING UP SUBSIDIES

Regardless of their source of funding, setting up subsidies properly is a powerful risk mitigation mechanism and helps to ensure efficiency in the use of public resources. As discussed above, given the elusiveness of a project’s financial self-sufficiency, subsidies are often required to ensure the sustainability of urban bus projects. This section briefly discusses the justification for subsidies and describes a few experiences with their application.
Supply-side subsidies

There are three main theoretical justifications for offering subsidies for the supply of public transportation (operational subsidies). It is argued that such subsidies reduce the cost of environmental externalities, exploit economies of scale in users, and increase the cost-efficiency of public transportation systems.

The first argument is based on the idea that subsidies can reduce congestion by encouraging users of private vehicles to use public transportation instead. However, this modal shift depends on the attractiveness of public transportation for car users, and research has found the cross-elasticity of demand to be normally low.

The second argument, based on the so-called Mohring effect (Mohring 1972), points to the increasing returns to scale made possible by subsidized public transportation services. These returns can increase service frequency, which, in turn, reduces the waiting times of passengers and therefore saves users’ valuable time. This premise, however, is based on the presence of excess capacity.

Finally, the cost-efficiency argument in a multimodal system indicates that there could be greater economies of scale in rail-based systems than in land transportation systems. Train (1977) argues that cross-subsidies are needed from the means of transportation that has higher returns to scale and an optimal policy of cross-subsidies. Empirically, under certain conditions, it has been found that supply subsidies may be socially desirable by helping to improve the quality of service and increasing its frequency (Dodgson 1987; Glaister 1987, 2001; Parry and Small 2009; Savage and Schupp 1997). However, the evidence is not conclusive, and some experts do not agree that supply-side subsidies benefit society overall, pointing to the adverse effects that they can have on operational efficiency.

Demand-side subsidies

Fiscal constraints in low- and middle-income countries constitute the main reason to advocate for efficient, targeted, demand-side subsidies. Especially in these countries, arguments against operational subsidies criticize the fiscal burden that they generate and point out that direct subsidies need to benefit those social groups in greatest need of support. Therefore, to balance the needs of economic and social sustainability in public transportation, cities should try to establish rates that come as close as possible to recovering operational costs and should offer subsidies aimed at specific segments of the population.

The experience so far with demand-side subsidies has been limited, and their impact is questionable. These subsidies have not always produced the expected results due to difficulties in precisely identifying—and reaching—the populations to be covered (especially when they fall outside the formal sector), the potential abuse of the subsidy, and large errors of exclusion or inclusion.

Recently, two elements have supported the development of subsidies directed to demand. First is the development of more advanced instruments for identifying particular beneficiaries of social programs (that is, as used for conditional cash transfers); second is the progressive adoption of smart cards and other payment methods that enable the identification of users and the customization and execution of different subsidy structures (fixed subsidy, depending on the time of day or type of route; a certain number of free trips or trips with discounts).

In general, the design of these targeted subsidy plans must take into account the following considerations: efficiency of the system, in terms of targeting the
correct population (considering both inclusion and exclusion errors); effectiveness (percentage of total subsidy obtained by the poor, impact on transportation affordability indexes); financial impact (impact of the subsidy on the total demand of the system, operating costs, total revenues); and consideration of misuses or abuses of the program. Finally, with regard to financial impacts, the way to finance the demand subsidy is a key issue. Ideally, this financing will come from generating cross-subsidies from the users of private vehicles (parking fees, congestion charges, fines) to the users of public transportation. These funds would serve to improve public transportation systems and finance subsidy plans for specific segments of the population. Table C.3 in appendix C provides tools and references specific to this process.

NOTES

1. The cases mentioned in this chapter are described in appendix A.
2. In Uruguay, this approach was applied in 2017 by CVU (a road concessionaire) and UTE (an electricity generator) in an environment where the government had a very high debt-to-GDP ratio (66 percent) relative to its considerable investment rate grade (A by Standard and Poor’s). The securitization issuance done by an SOE with a 98 percent debt-to-equity ratio (virtually no more debt capacity) achieved the same rate as the sovereign and was backed by the future cash flows arising from user tariffs and purchasing power agreements, with no fixed asset as collateral.
3. These figures correspond to the period 2014–16, when the Mexican interbank rates ranged between 300 and 400 basis points.
4. For a comprehensive list of funding sources—including a discussion of their main features, effects, and applicability to public transportation—see Ardila-Gomez and Ortegon-Sanchez (2016).

REFERENCES

Planners are not expected to draft a concessions contract at the preparation stage; however, essential elements should be identified and preliminarily defined by the end of this stage. Drafting concession contracts is part of the structuring stage. This chapter supports the preparation stage by listing and briefly discussing the essential elements of a bus project’s concession contract, which is the most common contract in urban bus public-private partnerships (PPPs).¹

**TECHNICAL ELEMENTS**

**Operators’ remuneration plans**

Remuneration plans are used to pay operators or concessionaires for providing the transportation service as incentives to provide an adequate level of service and to reduce risk to the concessionaire’s income. Despite the diverse range of procurement and payment mechanisms used, there are some core elements (Wallis, Bray, and Webster 2010; Wallis and Hensher 2007). These core elements are characterized by some mixture of demand and supply baseline and incentive-linked contracts:

- **Fixed payments.** This type of payment covers the passenger transportation services provided without considering the kilometers traveled and the demand served. Fixed payments protect operators from fluctuations in demand and thus make the operator’s revenue profile less risky (which is especially important if the operator needs to access finance). They do not necessarily provide an incentive to the operator to maintain the quality of service, but they can serve to increase demand, improve services, and decrease the possibility of default.

- **Payments based on operational variables.** Payments per seat-kilometer or vehicle-kilometer are set at a fixed price for the number of kilometers traveled while providing the service. These payments depend not on demand but on the offer made by the concessionaire for the number of vehicles and seats used to provide the service. Therefore, they assure the operator stable revenue during the project term. This mechanism represents a risk to the quality of
service, since the concessionaire will ensure that buses travel the routes at the decided frequencies and timings without necessarily paying attention to the quality and efficiency of the service, since these elements do not affect the payment expected.

- Payments based on passengers transported. These payments depend on the number of users (demand), which encourages the concessionaire to provide efficient and high-quality service. However, this compensation mechanism is costly, since a risk premium must be paid in the event of insufficient demand to cover operating expenses. The public transportation authority (PTA) must guarantee the accuracy of the forecasted demand resulting from technical studies and also ensure that the return on investment will be within the promised timeline.

Therefore, the design of the payment mechanism is very important in a PPP, as it introduces key indexes or incentives meant to improve operations (Beltrán, Gschwender, and Palma 2012; Hensher, Mulley, and Smith 2013). Some researchers have proposed designing a simplified payment model that can be used to ensure value for the government’s money (for example, Hensher, Mulley, and Smith 2013).

The payment mechanism must be decided when designing the concession, since the incentives to provide an adequate level of service and reduce the risk to the concessionaire’s income will depend on it. However, setting an effective mechanism often requires the PTA to have capacity for the planning, supervision, performance clauses, and high-quality execution of programs as well as the ability to apply the law and the concession. In this sense, as can be seen in table 11.1, depending on the characteristics of the operation, the PTA must use one or more payment mechanisms to allocate the incentives in an appropriate manner.

### Defining the level of service

Defining service is a vital aspect of a concession, since it establishes the parameters that will guide the efficient provision and quality of service. The following are key operational variables:

- **Routes.** Determined routes on which the service operates
- **Frequency.** Number of units that must travel through a specific point of the route during a given time interval
- **Hours.** Start and end of service hours
- **Stops.** Stops required on the given routes

<table>
<thead>
<tr>
<th>TABLE 11.1 Remuneration arrangements and incentives</th>
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<tr>
<td>REMUNERATION ARRANGEMENT</td>
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<td>---------------------------</td>
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<tr>
<td>Catering demand</td>
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<tr>
<td>Frequency</td>
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<td>Risk and access to finance</td>
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<td>Capacity requirements for planning and monitoring</td>
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</table>

Source: Gómez-Lobo and Briones 2013.

Note: − = the incentives generated by the payment mechanism cause a negative result; + = the incentives have a positive result or impact.
• Safety requirements. Speed limits, specific rules, or expected behaviors in specific places or situations
• Operation program. An instrument that defines and regulates the features of the transportation services that concessionaires must provide within the framework of the concession.

Monitoring and supervision

The mechanisms of monitoring and supervision help the authority to ensure that the public transportation service operates in accordance with the provisions of the concession and regulations in an appropriate and efficient manner. Similarly, they can be articulated in a way that helps operators optimize planning and operations.

The following mechanisms are commonly used to carry out supervision and guarantee the efficient operation of the public transportation service:

• Inspection visits by trained and qualified personnel, to places and offices providing the services and to the concessionaire, as well as to other facilities related to the provision of the service
• A fleet management system, including verification and review of the operation and administration of the technical specifications of service provision—such as itineraries, authorized stops, schedules, frequencies, speed, type of units, operation and transporting of units, and other elements of operation
• Periodic reports on technical, administrative, financial, and statistical data related to the operation of the service
• Citizen participation mechanisms, including user surveys and information dissemination systems
• Administrative audits, including reviews of the financial statements of the concessionaire and system operators
• Obligation to provide information, such as global positioning system data from automatic vehicle location systems, to allow the authority to monitor compliance.

These mechanisms of evaluation and supervision are important to project an image of transparency, control, and institutional efficiency since they ensure the continuous provision of high-quality service and thus help mitigate operational risk. When relevant responsibilities are carried out by the authority, they are based on the administrative procedures established in the concession and applicable regulations. When they are carried out by a private firm, they are based on the relevant administrative and operational manuals.

To determine the effectiveness of particular technical and operational elements, the concession must contemplate the design and execution of evaluation instruments, such as quality indexes, performance indicators, and compliance indicators. This information can be used to help monitor the quality of service provision (punctuality, availability, use of appropriate technologies, accident rates, user services, and maintenance, including cleaning, among others) and its compliance with specifications provided in the applicable legislation. The following are several real-world examples:

• Acabús. The quality index is reviewed quarterly and covers the parameters of punctuality (fulfillment of the offer), regularity (compliance with frequency standards), operational elements, accident levels, and the status of buses.
• **Metrobús.** Performance indicators are reviewed every six months to measure the mileage achieved, the incidence of faults, the incidence of accidents, and the impact of drivers on the provision of the service.

• **Transantiago.** Indicators of fulfillment of the offer measure the achievement of frequency levels and customer service as well as the effective availability of transportation for users and transportation capacity (overcrowding in vehicles) according to those planned for each service.

These indicators not only measure the quality of the service but also impose sanctions on operators for noncompliance. The incomes of concessionaires may be discounted by 3–10 percent depending on the level of quality provided. However, it is important that the percentages deducted not to be so high as to consume a substantial part of the operators’ resources. This situation would considerably reduce their capacity to execute the changes necessary to improve the quality of service.

**INSTITUTIONAL AND REGULATORY ELEMENTS**

**Institutional elements**

The government should be in charge of systematizing, controlling, planning, programming, guiding, developing, organizing, approving, and, where appropriate, modifying the presentation and operation of the public transportation service as well as granting the corresponding concession and, if necessary, implementing the procedures for its closure. Having regulatory authorities and specialized support allows for legal certainty that there will be proper decision-making and acts of authority because they guarantee that institutions have not only the power to make decisions but also the technical capacity to promote the efficiency and quality of the transportation system. Key agencies responsible for related actions include the following:

• The national government
• Subnational governments (states or provinces, metropolitan governments, and municipal governments)
• Public transportation authorities.

The World Bank’s “Institutional Labyrinth” (Kumar and Agarwal 2013) provides a good framework for understanding institutional settings for urban transportation projects. The following is a summary of its main messages:

• **No institutional model fits all situations.** The appropriate model depends on the administrative policy of the country and the city.

• **Urban transportation institutions take time to evolve.** The ideal cannot give rise to the moment of creation; patience is needed to align expectations appropriately.

• **New urban transportation institutions need financial resources and, above all, regulatory authority over the financial resources available to be successful.** This fact, more than any other, provides the institutions with power to achieve their plans and carry out their mandate successfully.

• **Any new transportation institution will experience setbacks and opposition from existing agencies.** The success of a lead institution depends primarily on its ability to implement policies in the public interest, develop technical
capacity and a solid financial base for the performance of its tasks, and garner strong support at the political level.

- **Institutional change can be catalyzed by external “trigger events,” such as an election, political movement, public protest, or a change in macroeconomic conditions.** It is of fundamental importance to involve civil society through a communications program.

### Concessionaires’ rights and obligations

The definition of a concessionaire’s rights and obligations must be consistent with the risk-and-function allocation strategy defined in the risk matrix (see the chapters in part II). The obligations and rights derived from the concession are intended, from the administrative perspective, to guarantee the operation, quality, and efficiency of the transportation service. They must be defined clearly and in a way that is consistent with project objectives. On the one hand, the rights granted by the concession must be related to the concessionaire and to the provision of the transportation service (to obtain remuneration). These rights may include the right to use the infrastructure associated with the service and to formalize contracts to attract additional resources. The concession should define whether rights are specific to the individual entity and nontransferable and if the concessionaire must execute them by itself or with a third party (so long as the concessionaire personally supervises their execution in accordance with the provisions of the concession’s characteristics and specifications).

On the other hand, the obligations have to be linked to the provision of the service in compliance with the terms and conditions indicated in the applicable regulations, as well as the technical, operational, material, economic, and financial elements necessary to provide the public service.

### Concession terms

The terms of the concession refer to the validity of the rights of use or exploitation that it will grant to its signature. There is no general rule to determine this duration; the administrative authority establishes its terms, based on the conditions and specific characteristics of the public service concession and the useful life of the investment in capital (since the plan must guarantee the recovery of the concessionaire’s investment).

A typical operation concession in the transportation sector ranges from 3 to 15 years and rarely exceeds 15 years, depending on various criteria. The terms of the concession vary depending on the characteristics of the fleet and its ownership; the concessionaire’s responsibilities for infrastructure provision; and the technical, legal, financial, investment, or recovery criteria used to set the terms. Subject to local laws and regulations, the following criteria, among others, directly affect the terms: (a) type of service; (b) infrastructure required to provide the service; (c) rolling stock (type and characteristics); (d) amount of investment required for operating costs and service of a particular quality; and (e) project structure and obligations of the concessionaire.

The concession may be extended for a period equal to or perhaps less than that originally established, provided that the conditions of the contract have not changed and the concessionaire, for its part, has fully complied with the obligations derived from the concession. Specifically, the terms of the concession may be subject to extension under the following assumptions:
• The concessionaire's compliance with each and every one of the obligations contracted in the concession
• Sufficient need for or general interest in the continuation of service
• The absence of any conflict of personality with the representative of the legal entity or controversy regarding ownership over the concession and its inherent elements.

**Termination: Causes and procedures**

Causes and procedures for termination must be clearly established in the concession (to the extent possible), along with applicable regulations, to ensure legal certainty, transparency, and equality among subjects. For this purpose, there are different ways to terminate the concession, some attributable to the grantor (authority) and others to the concessionaire. Common causes of a concession’s termination are as follows:

- **Compliance with terms.** Once the terms are complied with, the concession ceases unless it is extended. An extension will depend on the discretion of the PTA.
- **Lack of object.** If the object of the concession is extinguished or exhausted or it is unable to subsist, the concession is considered to be terminated.
- **Rescission.** Rescission is the right of any of the parties to rescind the contract without incurring any liability. Rescission occurs when the other party breaches the contract because of default or any other cause beyond the control of the parties. Usually, damaging a third party will be a cause for rescission. Other causes include default by the concessionaire or the public party, the public interest, and force majeure, among others.
- **Revocation.** Revocation is a unilateral act of the authority. It can be a sanction that cancels the rights of the concessionaire. It can also be part of a unilateral termination that would generate rights to the concessionaire.
- **Expiration.** The authority can trigger termination when the concessionaire fails to comply with the starting date for provision of service, suspends the service for reasons attributable to the concessionaire for a period longer than a maximum stipulated time, or does not grant the guarantees in the manner and at the times established.
- **Nullity.** Absolute nullity occurs when the contract does not comply with the law. Relative nullity occurs when the contract's formalization lacks one or more essential elements: consent, object, or cause (which correspond to causes for voiding the contract). This will cause termination de facto but not de jure, as the null contract was never effective.
- **Lack of concessionaire capacity.** The authority can trigger termination when the concessionaire does not have the capacity or aptitude to continue providing the public service. This situation includes the bankruptcy, liquidation, or dissolution of the moral person in charge of the concession, such that it cannot continue to provide the service. It also includes changes in the concessionaire that are not compatible with the requirements of the concession.

The process by which the authority may declare termination should be included in the concession contract and the applicable law, in addition to the process by which the concessionaire may request termination. The key elements may include the following:

- Defined notification procedures for both parties, including deadlines to present evidence, pledges, or allegations within their rights
• The authority’s publication of administrative decisions after the notification and analysis of pledges and information
• Processes, rights, and obligations pertaining to mechanisms to cease activities and transfer assets.

Finally, the concession should carefully plan for transition mechanisms and the transfer of assets, even if the assets are not expected to survive the concession. Otherwise, in case of early termination, their lack of definition can lead to disputes and costs.

Dispute resolution

In order to guarantee continuity in the provision of the service, preserve order, and reduce the possibility of conflicts of interest, the concession must consider procedures that enable the resolution of disputes between the subjects or the parties that constitute it. Dispute resolution has several key mechanisms:

• Friendly agreement among the parties. Conflicts of interest between the parties of the concession may be resolved through the intervention of a third-party friend of both parties without subjecting their procedures to preestablished rules of law.
• Arbitration. A controversy or conflict of interest may be submitted, by agreement of the parties, to an arbitrator or a court, which then issues a decision on the problem that is mandatory for the parties.
• Mediation. A third neutral entity (mediator) may help the parties to communicate and find a way to settle the conflict. The mediator may also recommend a form of conciliation.

The importance of having instruments and mechanisms for resolving disputes is to avoid affecting the general interest and putting at risk the realization of a concession’s public service objectives.

ECONOMIC AND FINANCIAL ELEMENTS

The economic and financial elements of a concession are critical, since the participation of private (and public) investors largely depends on them. Therefore, the concession must support the general interest, the quality of service provided, and the return on participants’ investments. Other than ensuring fairness, economic and financial elements are important, but are less critical if financial risks are mitigated by requirements that help to ensure that any selected concessionaire is in good financial condition.

Financial management

The concession contract should be consistent with the project’s financial management arrangements. Financial management arrangements are also operationalized in financial management instruments. Such instruments concentrate resources received through the collection of public transportation service fares as well as the rights derived from the exploitation and operation of other services or business units’ portion of the concession (related services, advertising). Fare collection trust funds are the most commonly used financial instrument for urban transportation projects. They involve assigning the rights
for the administration of resources to a fiduciary, which then maintains and deposits them into the necessary accounts according to the priority of payment that is determined at signing. The fare collection contract should define the prioritization of payment established—that is, the order of the accounts to which they must be paid once the income is obtained. The payment of operations and maintenance costs to system operators should come first, along with the payment of credit, which depends on the requirements established during the negotiation and signing of the financing.

Financial management arrangements can include additional guarantees. These guarantees may include the creation of a reserve or contingency fund—that is, a mechanism to save resources for expenses that are not foreseen in budget design and operation of the budget service. These funds can be made up mainly of resources coming from the operation of the service during established periods, agents’ remuneration, the project’s financial returns, government contributions, and penalties that may arise from the noncompliance of concessionaires or contractors with their obligations. Likewise, some concessions consider creating funds dedicated to purchasing buses or scrapping obsolete units. Another option is to create reserves to be used in case of default on payment to the financial institution or in case of a need to purchase more units to satisfy an increase in demand.

**Economic equilibrium clauses and financial protection**

Economic equilibrium clauses refer to the joint responsibility of the authority and the concessionaire for granting rights, obligations, and risks derived from the scope and fundamental elements of the administrative act (table 11.2). In case of a decrease in income and a change in the sustainability of the project (derived from established causes that may or may not be attributable to the parties), an adjustment mechanism must be applied that allows for the return of the economic equilibrium of the business model so that the operation of the transportation service is not affected, and thus performance is not put at risk.

The concession must clearly indicate causes that affect the economic equilibrium, applicable support, and guarantee norms. It must indicate the mechanisms and legal and technical instruments applicable to each situation so that the public administration (regulatory authority) may carry out the pertinent actions for the benefit of the affected party. Mechanisms such as the following are commonly used to reestablish the equilibrium of the project’s business model:

- Fare adjustments
- Extensions of terms

**TABLE 11.2 Situations affecting economic equilibrium**

<table>
<thead>
<tr>
<th>AUTHORITY</th>
<th>CONCESSIONAIRE</th>
<th>OTHERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Change in regulations</td>
<td>Deficiencies in the provision of the service (poor quality)</td>
<td>Accidental case</td>
</tr>
<tr>
<td>Uncertainty (lack of transparency, discretion)</td>
<td>Insecurity in the service</td>
<td>Cases of force majeure</td>
</tr>
<tr>
<td>Suspension of the service</td>
<td>Did not start the operation on the established date</td>
<td>Social problems (uprisings, protests, revolts)</td>
</tr>
<tr>
<td>Regulatory authority</td>
<td>Noncompliance with concession obligations; suspension of the service</td>
<td>Macroeconomic aspects (inflation, devaluation, interest rates)</td>
</tr>
</tbody>
</table>

*Source: World Bank.*
• Payment of compensation
• Exercise of subsidies
• Demand guarantees.

The importance of economic and financial equilibrium clauses lies in the fact that they mitigate income, economic, and political risks and thereby help ensure the economic sustainability of the concessionaire and the scope of the project.

Guarantees and compliance mechanisms

The concession must establish very clearly and precisely how to respond to breaches of responsibilities and obligations on the part of its parties. Guarantees to repair damages and fulfill obligations are among the most important elements of a concession. These guarantees establish the mechanisms by which the parties to the project (the authority and concessionaire) will fulfill their obligations with respect to the responsibilities and scope indicated in the administrative act and applicable legal provisions. Common forms of guarantee and compliance mechanisms are conventional penalties or contractual responsibility, surety bonds, and bank securities. Table C.4 in appendix C provides tools related to outlining the essential elements of an operation concession contract.

NOTES

1. For further guidance on related topics not specific to bus projects, see World Bank (2017).
2. The examples in this chapter are described in appendix A.
3. Terms in this section may differ depending on the country. They are intended not to serve as legal terms but to identify the substance of the most common causes for termination.

REFERENCES


METROPOLITANO (LIMA, PERU)

Metropolitano improved Lima’s public transportation system, reducing travel times and the number of buses in the system. This bus rapid transit (BRT) system coordinates 700,000 trips per day. It was developed using the “bundled private finance and operation of buses” public-private partnership (PPP) structure. Its experiences highlight the importance of aligning the development of all project components to mitigate interface risks.

Before Metropolitano, Lima’s public transportation system was characterized by an oversupply of vehicles, congestion, and informality, leading to pollution, overuse of personal vehicles, and a high rate of traffic accidents. Low ridership led to difficulties in earning enough revenue to cover maintenance and modernization costs. Service quality deteriorated, pushing demand ever lower. The economic impacts of congestion in the early 2000s were large. It is estimated that Lima faced US$500 million in annual economic losses because of the poor state of transit in the city.

The Metropolitan Municipality of Lima sought to address the congestion crisis with the Metropolitan Lima Urban Transport Program. The first project in this program, the Metropolitano, led to the development of 28.6 kilometers of bus lanes, 35 bus stations, 2 integrated terminals, 1 central station, and 300 (gradually increased to 600) natural-gas-powered buses. The project aimed to accomplish the following:

• Improve mobility, particularly for low-income citizens
• Increase the efficiency, reliability, cleanliness, and safety of the corridor
• Reduce the costs of public transportation to users
• Reduce travel times, accidents, and pollution
• Carry 600,000 to 650,000 passengers per day.

The municipality financed and constructed the infrastructure for this project, including roads and stations. Initially, it raised US$134.4 million: the Inter-American Development Bank and the World Bank provided US$90 million in loans, and the municipal budget provided the rest. It selected four bundled
operators through a competitive procurement process. The operators financed and provided the rolling stock and operated the buses on 12-year concessions. Bus depots were built with loan funds and counterpart money. Bus operators provided maintenance equipment for the buses and desks for office workers. Another private partner financed, procured, and operated ticketing and fare collection systems. Total private investment in this project was US$90 million, or 34 percent of the total project costs.

By 2014, the project had reduced travel times by 34 percent, while reducing the number of buses operating from 5,000 to 300 (IDB 2015), at least initially. Later on, the number of buses increased slightly as ridership rose. Initial ridership fell well short of expectations, achieving only one-third of the amount forecast for 2010. Currently, ridership has improved to more than 700,000 daily passengers, above the initial target. Despite this success, the project ended up costing the government of Peru 95 percent more than originally estimated, reaching a total of US$261.9 million. One reason for this difference in costs was the rising cost of construction, which was perhaps exacerbated by a weakening of the Peruvian sol after 2013.

Feeder routes operated in parallel with regular buses, also overlapping with the BRT corridor. As a result, fewer trips were justified during regular hours, and waiting times at stops on feeder routes were as long as 40 minutes. Moreover, this disequilibrium led to overcrowded buses during rush hours, affecting, as usual, low-income citizens, who mainly lived outside the metropolitan area. This case shows the importance of enforcing integration and reorganizing the system even after a BRT system is built.

The original concessions defined an extension, still in the planning phase when contracts were awarded, as an essential component of the concession. Concessionaires claimed that, without the extension, the contract had not entered its operational stage. As a result, after eight years of operating, concessionaires claimed that their concession period had not started. Based on the

<table>
<thead>
<tr>
<th>TABLE A.1 Lessons learned from the Metropolitano bus rapid transit project in Lima, Peru</th>
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</thead>
<tbody>
<tr>
<td>BEST PRACTICES</td>
</tr>
<tr>
<td>A mechanism to modify payments to operators and tariffs if revenues fall short of or exceed expectations is a good way of sharing upside and downside revenue risks.</td>
</tr>
<tr>
<td>The government incorporated incumbents in the planning and operation of new systems and benefited from including them as partners in the project in a special-purpose vehicle. [operation risk] [political and social risk]</td>
</tr>
<tr>
<td>Putting up the concession as collateral to banks is an effective measure for derisking the operators’ debt and reducing the cost of capital. [financing risk]</td>
</tr>
<tr>
<td>An incentive fund is given out every six months to the operator with the best service score. The fund is made up of all the penalties charged to the operators. [operation risk]</td>
</tr>
<tr>
<td>Operations must begin with just a small sample of the fleet, in order to allow control centers to scale it up later while learning from its mistakes and correcting small details. [operation risk]</td>
</tr>
</tbody>
</table>

same argument and taking advantage of the essential nature of their service, poorly structured financing, and the presence of a public sector financier, operators did not comply with their debt repayment schedule.

Serving as a lesson to BRTs in Africa, such as those in Dakar and Dar es Salaam, Metropolitano started operations with 9 BRT buses out of a planned total of 300. It was not the first project to start with a fraction of its planned fleet. TransMilenio in Bogotá started operations with 90 of a planned 470 buses. This approach is more realistic, as a small fleet can start operations and generate a pull effect to bring more buses on board. As a positive side effect, the control center can learn by managing a smaller fleet. Table A.1 reflects on other lessons learned from the project.

**TRANSANTIAGO (SANTIAGO, CHILE)**

*Transantiago increased the quality of service and organization of public transportation in Santiago (ECLAC 2017). The Transantiago BRT system was developed using the “private finance of infrastructure” PPP structure. This case demonstrates the importance of conducting exhaustive project planning, creating robust demand estimates, and executing appropriate feasibility studies.*

In 2001 the public transportation system of Santiago was scattered and informal, had low coverage, and competed unfairly for customers. The Ministry of Transport developed the “Gran Santiago’s Urban Transport Plan, 2000 to 2010” to solve the public transportation crisis. Transantiago was the first project developed under the plan. It led to the development of 2,821 kilometers of roads, 378 routes, 11,339 bus stops, 35 bus stations, and 6,646 vehicles. The project had the following goals:

- Develop a modern, safe, efficient, high-quality, and integrated transportation system
- Establish integrated tariffs and an integrated payment system
- Carry more than 513,000 passengers per day.

Up to 2013, the World Bank provided US$2.4 million for the project. By 2017, the total project investment was almost US$5.8 billion. The private sector financed 69 percent of the project’s infrastructure, amounting to almost US$4 billion. Seven bundled operators financed and procured the rolling stock, built depots for bus maintenance and parking, and operated the buses under concessions lasting between one and nine years. Another private partner financed, provided, and operated ticketing and fare collection systems.

Transantiago has achieved positive operational results but has faced financial difficulties. By 2018 Transantiago carried roughly 3 million users daily. From 2007 to 2011, it improved bus speeds, reduced travel times from 59 to 50 minutes, and cut waiting times in half, from 15 minutes to 7 minutes. Issues with project design required the government to pay operators more than US$4 billion in subsidies to cover 40 percent of operating expenditures. Transantiago suffers from a high rate of fare evasion (34 percent) and has had to bear additional costs to pay fees to the metro system to use its intermodal stations. These additional costs were not considered prior to project development. Table A.2 presents the lessons learned from the project.
Lessons learned from the Transantiago bus rapid transit project in Santiago, Chile

<table>
<thead>
<tr>
<th>BEST PRACTICES</th>
<th>AREAS FOR IMPROVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transantiago is part of an integrated transportation system with the metro.</td>
<td>• Operations began before all components of the project and operators were ready (the entire fleet must be ready to operate). [interface risk]</td>
</tr>
<tr>
<td>Transantiago has a qualified team of professionals managing the system.</td>
<td>• The contract did not include effective incentive and penalty mechanisms, which meant that operators were covering the demand without receiving the incentives, affecting their finances. [operation risk]</td>
</tr>
<tr>
<td>Operators and routes are differentiated by bus colors to make it easier for users to identify which bus to take.</td>
<td>• Not all stations and only 20 percent of the buses had fare collection systems, which created risks. [operation risk]</td>
</tr>
<tr>
<td>Each concessionaire developed an operation plan according to the service standards set out in the contract, which was then validated by the public authority.</td>
<td>• The contract did not include methods to renew or revoke concessions. [political and social risk]</td>
</tr>
<tr>
<td>Operators must develop and follow a fleet maintenance plan, and their workshops need to be ISO9000 certified.</td>
<td>• The government did not conduct a feasibility study, and subsequent demand studies were inaccurate. [design risk]</td>
</tr>
<tr>
<td>The government paid operators a fee per kilometer determined by the technology used and the type of bus to incentivize the use of better technologies.</td>
<td>• Communicating effectively with citizens is essential to gather support. The likelihood of success will increase when the government has a clear strategy and conducts a good public campaign, which can be strengthened by establishing an information system to keep people up to date. [political and social risk]</td>
</tr>
<tr>
<td>The government can penalize operators up to 10 percent of the revenue if they do not meet service quality goals.</td>
<td>• The project failed to collect enough revenue to cover the costs of the project, resulting in the government spending more than US$4 billion to close the gap. [operation risk]</td>
</tr>
<tr>
<td>Operators are required to have financial statements independently audited.</td>
<td>• Transantiago had to pay the metro system to use its intermodal stations, at costs that may have been reduced with better planning. [planning risk] [operation risk]</td>
</tr>
<tr>
<td>The government incorporated incumbents in the planning and operation of the new system and created a special-purpose vehicle to bring them in as partners.</td>
<td></td>
</tr>
<tr>
<td>A mechanism to modify payments to operators and tariffs if revenues fall short of or exceed expectations is a good way of sharing upside and downside revenue risks.</td>
<td></td>
</tr>
<tr>
<td>Buses are accessible to disabled people thanks to ramps, wheelchair spaces, and braille and sound signaling.</td>
<td></td>
</tr>
<tr>
<td>In June 2018 the Government of Chile passed a fare evasion law to penalize people who do not pay the public transportation fare. Potential penalties are the suspension of driver’s licenses or other benefit cards and fines (Transantiago 2018).</td>
<td></td>
</tr>
<tr>
<td>Transantiago is beginning to replace buses that are 12 years old or more. The 3,000 new buses will be more energy efficient and have wi-fi, padded seats, and security cameras (Santiago Times 2018).</td>
<td></td>
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</table>


TRANSMILENIO (BOGOTÁ, COLOMBIA)

TransMilenio improved service quality and set a new standard for BRT projects in Bogotá (Rodríguez Hernández n.d.). TransMilenio was developed using the “bundled private finance and operation of buses” PPP structure. This case describes how the government could have benefited further by transferring additional functions and risks to the private sector.

Before the development of TransMilenio, Bogotá faced challenges like other congested cities globally, and planners looked for ways to improve mobility, reduce air pollution, and improve the use of public space. Bogotá’s public transportation system was outdated and inefficient. Its quality of service was poor, road infrastructure was insufficient, operators were not accountable to customers, and labor was not regulated. The Municipality of Bogotá developed TransMilenio, a BRT system, to tackle the city’s public transportation and traffic problems. Phase I of the project led to the development of three routes...
(42 kilometers in total), 1 central station, 4 intermediate stations, 52 regular
stops, and a 420-vehicle fleet. The project had the following goals:

- Reduce costs and travel times for users
- Foster competitiveness, urban entrepreneurship, and productivity in the city
- Encourage technological advancements and savings in fuel
- Improve accessibility to main roads
- Improve safety and reduce pollution
- Carry 400,000 passengers per day.

The government (national and local) funded the infrastructure (roads,
stations, stops, and bus parking and maintenance depots), part of the rolling
stock, and fare collection systems. Total investment in the project was US$320
million. Multilateral development banks provided around 5 percent of the total
public financing. Four bundled operators raised more than US$138 million to
finance and procure the rolling stock. Two other private partners operated
ticketing and fare collection systems. A second phase of the project includes
availability payments to pay for the infrastructure, and a third phase includes the
use of local sources of income to pay for the infrastructure.

Phase I of TransMilenio achieved positive results. More than 1,200 old buses
were decommissioned and replaced by articulated buses on dedicated routes.
Government subsidies were not required to cover operation costs. However, the
government faced construction delays due to difficulties in obtaining

| TABLE A.3 Lessons learned from the TransMilenio bus rapid transit project in Bogotá, Colombia |
|---|---|
| **BEST PRACTICES** | **AREAS FOR IMPROVEMENT** |
| A fuel tax was established to finance the feasibility studies, designs, and construction. This tax paid for most of the infrastructure required for TransMilenio. [financing risk] | A better project structure would have improved outcomes—many of the issues experienced during the operations phase originated on the public side of the partnership. Infrastructure was outpaced by demand or the quality was inadequate. The city would have benefited more by assigning more functions to the private sector. [planning risk] [design risk] |
| The project demonstrated how a national and local government can collaborate to develop impactful projects through clear delegation of responsibilities, setting of deadlines, and provision of resources to the project. [political and social risk] | To avoid construction delays, the planning authority could have obtained permits and acquired land before executing the construction contract. [planning risk] |
| The project has good financial management through the fideicomiso and electronic payment systems. [financing risk] | The government could have established deadlines to start operations and conduct technical supervision of construction contractors, which could have been promoted with penalty-and-reward mechanisms in the contract. [construction risk] |
| The competitive procurement process gave more certainty to the bidders and led to an unbiased choice of operator. [operation risk] | Insufficient planning and integration of phases may overconcentrate demand in some areas and affect the quality of service. [construction risk] |
| Tariffs reflect the costs of operation. [operation risk] [political and social risk] [financing risk] | The government should follow good corporate governance practices to avoid brain drain and learning costs. [operation risk] |
| The payment mechanism includes performance-based incentives. [operation risk] | The public authority should regularly review the operations report and respond as needed to changes in demand and system pressures. [operation risk] [design risk] |
| TransMilenio’s control center monitors service effectively and communicates information to users. This helps to plan, validate, and dispatch system operations. [operation risk] | Demand forecasts must be robust and should be updated periodically. [design risk] [operations risk] |
| Creation of a special-purpose vehicle allowed for the integration of existing operators, preventing social conflicts and maintaining local experience. [operation risk] [political and social risk] | Increasing coverage of payment points and introducing incentives for concessionaires to maintain better control of payment evasion may have improved financial performance. [financing risk] [operation risk] |
| The project included a system to decommission old buses to maintain service quality and reduce congestion. [operation risk] | |
| Continued political support and championing of the project are important ingredients of success. [political and social risk] [planning risk] | |

environmental and city permits; despite the early success of TransMilenio, protests about service quality have led to injuries, arrests, and damage to more than five bus stations (Centre for Public Impact 2016). Table A.3 shows the main lessons learned from the project.

**METROBÚS (AV. LOS INSURGENTES, MEXICO CITY, MEXICO)**

*Metrobús formalized public transportation in Av. Los Insurgentes in Mexico City. This case presents the development of a BRT system with exclusive lanes using the “bundled private finance and operation of buses” PPP structure. Metrobús has achieved positive results, but unforeseen growth in demand has reduced the efficiency of its operations.*

Before Metrobús, Mexico City had a largely nonregulated and inefficient public transportation system. Buses had aged beyond their useful life and had low capacity; the overall system was oversupplied—particularly during nonpeak times—exacerbating congestion. The Mexico City government led the Metrobús project to provide safer and faster service by reorganizing and better regulating existing operators. The project involved broad negotiation, instead of large capital expenditures. The goal was to improve the efficiency of one of the city’s busiest corridors. The project was structured in two phases. This led to the development of 30 kilometers of lanes, 44 intermediate stations, 3 terminals, and an initial bus fleet of 80 vehicles that grew rapidly to satisfy an ever-growing demand. To date, the Metrobús fleet amounts to 225 buses. The Metrobús project had six basic goals:

1. Improve access to fast and safe public transportation
2. Service an increasingly dense corridor
3. Enhance road network efficiency
4. Improve infrastructure to reorganize public transportation
5. Replace obsolete rolling stock
6. Carry 500,000 passengers a day.

The government financed and built US$33.8 million in project infrastructure: roads, stations, terminals, and fare collection systems. It also supported a newly created special-purpose vehicle (SPV) rolling stock purchase with US$9 million, half given through a scrapping program to compensate operators for retiring their obsolete buses (stakeholders’ engagement). Three bundled operators financed and procured the rolling stock—using commercial practices—and operated the buses on a 10-year concession contract. Operators also financed and built maintenance and parking depots on land provided by the government. A fourth private partner operates the ticketing and fare collection systems. The total private finance raised for the project was US$16.5 million, equivalent to 27 percent of the total investment for the project.

Metrobús initially achieved efficient operations. Its early financial sustainability relied largely on government subsidies that were provided either through direct cash transfers to the SPV operators or through the public SPV operators, which were allowed to operate more kilometers not fully paid by the transportation authority. Recently issues have begun to arise because of excess demand. Although the bus fleet increased from 80 vehicles in 2005 to 225 in 2017, overcrowding in stations, low operating speeds, and long waiting times are still common. Furthermore, Metrobús operated without a central control system between
Appendix A

<table>
<thead>
<tr>
<th>Table A.4 Lessons learned from the Metrobús bus rapid transit project in Mexico City, Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BEST PRACTICES</strong></td>
</tr>
<tr>
<td>• Institutional capacity—Metrobús has a specialized agency to manage, coordinate, supervise, and evaluate the system staffed with qualified and professional personnel. [operation risk]</td>
</tr>
<tr>
<td>• The Mexico City government and the World Resources Institute supported the creation of a technical unit outside the government structure, the Sustainable Transport Center (a nongovernmental organization), to design and execute transportation services and promote integrated transportation in Mexico City. [operation risk] [design risk]</td>
</tr>
<tr>
<td>• Proper technical studies were conducted prior to developing the project. [design risk]</td>
</tr>
<tr>
<td>• Planning and demand estimates were realistic and adequate, resulting in on-time construction of infrastructure and commencement of operations. [design risk] [construction risk]</td>
</tr>
<tr>
<td>• Conflicts among existing operators were minimized with the introduction of an engagement strategy that resulted in exhaustive negotiations with existing operators to ensure their participation in the proposed project. [operation risk] [planning risk]</td>
</tr>
<tr>
<td>• The government incorporated incumbents in the planning and operations of new systems and benefited from including them as partners in the project in a special-purpose vehicle. [planning risk] [operation risk]</td>
</tr>
<tr>
<td>• The Mexico City government gave a “scraping bonus” to operators for each bus retired. [operation risk]</td>
</tr>
<tr>
<td>• Metrobús was successfully integrated into the city’s transportation system. [operations risk]</td>
</tr>
<tr>
<td>• The system was planned and structured in such a way that special-purpose vehicle shareholders were supposed to receive returns like those obtained in prior systems. [operations risk]</td>
</tr>
<tr>
<td>• Metrobús included a reserve and contingency fund—after capital and operating expenditures—but in reality, revenue generation has not been sufficient to cover any of the system’s full costs (or operating expenditures, let alone capital). [funding risk]</td>
</tr>
</tbody>
</table>


2005 and 2013, leaving it unable to determine the distance covered by each bus or evaluate bus performance against schedules, preventing the accurate calculation of payments to operators. Table A.4 presents the lessons learned from the project.

**ECOVÍA (MONTERREY, MEXICO)**

The Ecovía case describes the development of a BRT system with exclusive lanes using the “private finance of infrastructure” PPP structure (Mehndiratta 2014). Ecovía did not achieve the expected results and demonstrates the importance of integrating incumbent service providers into new projects and ensuring that new routes cover at least what the previous system covered.

For years, Monterrey has suffered from increasing congestion and transportation costs, with 42 percent of residents traveling by car. The state government of Nuevo León sought to develop a Metropolitan Integrated Transport System (SITME) to reduce costs and reliance on personal vehicles. In 2011 the state government began developing the BRT-Ecovía as part of this SITME, which already
included two metro lines. Ecovia led to the development of a 30-kilometer BRT route, 39 stops, 2 terminals, 2 intermodal stations, and a fleet of 80 vehicles, each with a capacity for 80 passengers. The project had five main aims:

- Modernize the city’s transportation system
- Decrease travel time by 50 percent
- Reduce emissions by 5 percent
- Create a model that can be replicated in other parts of the state
- Carry 160,000 passengers per day.

The federal and state governments financed 68.5 percent of Ecovia’s infrastructure, which included stations, terminals, and roads. A private consortium financed, constructed, and operated the system’s stations. The same consortium financed and procured fare collection systems. One bundled operator financed and operated the rolling stock on a 20-year concession. BANOBRA, Mexico’s national development bank, provided the credit to acquire the rolling stock. A third private partner supplied natural gas for the buses, and a fourth partner commercialized it through service stations. Unlike other bus projects in the region, a private partner was responsible for revenue management through a trust fund (escrow account).

### TABLE A.5 Lessons learned from the Ecovía bus rapid transit project in Monterrey, Mexico

<table>
<thead>
<tr>
<th>BEST PRACTICES</th>
<th>AREAS FOR IMPROVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The competitive procurement of infrastructure gave certainty to bidders and reduced political influence on the choice of partner.</td>
<td>• Sound analysis of the fiscal burden and costs to the government could have prevented cost overruns and the transfer of financing to a private partner midway through construction.</td>
</tr>
<tr>
<td>• Independent companies validated technical studies to confirm demand, route, and size of fleet.</td>
<td>• The demand projections developed by the government were not accurate and could have been improved by the use of qualified and independent parties.</td>
</tr>
<tr>
<td>• The government incorporated incumbents in the planning and operations of new systems and benefited from including them as partners in the project via a special-purpose vehicle.</td>
<td>• The project did not adequately integrate the feeder system, which restricted demand.</td>
</tr>
<tr>
<td>• Putting up the concession as collateral to banks is an effective measure for derisking the operators’ debt and reducing the cost of capital.</td>
<td>• The provision of infrastructure was greatly delayed and could have been improved through better planning, analysis, and contract design.</td>
</tr>
<tr>
<td>• Payment systems were placed in easily accessible sites, including OXXO (the best-known convenience store in the country) as well as all stations and points in the feeder routes.</td>
<td>• Buses operated for a year without monitoring systems, which was a government responsibility, and the lack of monitoring affected private partner revenue collection.</td>
</tr>
<tr>
<td>• An integrated tariff allowed passengers to use the metro, buses, and feeder systems.</td>
<td>• Operators could not acquire parts to repair and maintain buses, which could have been prevented with an improved contract design that would have required the party responsible for maintenance to have an inventory of replacement parts or face penalties for maintenance delays.</td>
</tr>
<tr>
<td>• The government established a fund capitalized by revenues acquired during the grace period for repaying loans for the acquisition of new buses.</td>
<td>• The government did not maintain infrastructure.</td>
</tr>
<tr>
<td>• Financing of the fleet was negotiated using low-demand estimates, diminishing the possibility of a default on the payments.</td>
<td>• The contract did not include changes in legal provisions to allow for adjustments of payment mechanisms following regulatory or legal changes.</td>
</tr>
<tr>
<td>• Smart traffic lights gave priority to buses in exclusive lanes to reduce travel times.</td>
<td>• The system might consider ways to integrate tariffs better between the metro and buses to reduce the number of people who pay for only one service.</td>
</tr>
<tr>
<td>• Tariffs are reviewed monthly.</td>
<td>• The system might consider ways to integrate tariffs better between the metro and buses to reduce the number of people who pay for only one service.</td>
</tr>
<tr>
<td>• Buses use natural gas, and fuel provision was included in the contract.</td>
<td>• The contract did not include changes in legal provisions to allow for adjustments of payment mechanisms following regulatory or legal changes.</td>
</tr>
<tr>
<td>• The project established a contingency fund with Mex$12 million.</td>
<td>• The system might consider ways to integrate tariffs better between the metro and buses to reduce the number of people who pay for only one service.</td>
</tr>
</tbody>
</table>

Ecovía did not perform as planned. It achieved daily ridership of 100,000 passengers per day—only 62.5 percent of what was forecast. Buses had limited capacity on important routes, as planners were not able to secure the feeder services of incumbent service providers into the project design. Further, Ecovía’s revenues fell short by more than US$2.5 million because of a system leakage in one of the Ecovía stations providing connectivity to the metro system. In this station, users transferred from the existing metro system to Ecovía for free. Table A.5 shows the main lessons learned from the project.

**ACABÚS (ACAPULCO, MEXICO)**

*Acabús reduced travel times and costs for users in Acapulco. The Acabús BRT system with exclusive lanes was developed using the “bundled private finance and operation of buses” PPP structure (Transconsult 2011). This project shows the importance of having efficient and easily accessible payment systems for revenue collection to demonstrate how design risks can affect operations.*

The Metropolitan Zone of Acapulco suffered from congestion and low travel speeds (between 18 and 38 kilometers per hour). Public transportation was unregulated, oversupplied, and unplanned. Pollution, accidents, and travel costs for users were very high. The state government of Guerrero developed the BRT-Acabús system to address these problems. Acabús led to the development of a 16-kilometer route with exclusive lanes, 20 kilometers of feeder routes, 18 stations, 3 terminals, and 135 vehicles. The project had the following goals:

- Establish a new, good-quality, comfortable, affordable, safe, and sustainable transportation system
- Develop exclusive lanes
- Reduce congestion by eliminating existing low-capacity fleet and the over-supply of vehicles
- Reduce travel times, accidents, travel costs, and pollution
- Carry 197,000 passengers per day.

The state government finances and maintains the infrastructure—which includes roads, stations, and terminals—amounting to US$6.7 million. A private partner built the infrastructure. The state also financed 10 percent of the rolling stock, amounting to US$2.1 million. An SPV formed by incumbent operators financed the rest of the rolling stock and operated it on a 12-year concession. The fleet operator also financed and built a parking and maintenance depot. Another operator financed, procured, and operated the fare collection systems.

Acabús has had a positive impact on Acapulco. Acabús has reduced transportation costs for users by 40 percent and travel times by 12 percent. Despite the benefits to users, the state government took on additional costs because of design changes that required an additional US$18 million in funding. Moreover, as a result of issues with the fare collection systems, the project failed to collect around US$1.6 million in five months. Table A.6 shows the main lessons learned from the project.
The Metrocali BRT system with exclusive lanes was developed using the “bundled private finance and operation of buses” PPP structure (Guerrero and Scholl 2015). The project sought to upgrade the infrastructure and fleet in Cali’s existing public transportation system. However, it failed to improve public transportation.

Before Metrocali, Cali suffered from congestion, traffic accidents, and pollution. Cali’s public transportation system was unregulated and oversupplied. Its aging fleet of more than 5,000 vehicles transported an average of 1.37 passengers per kilometer. Observing the success of TransMilenio, the national government and the municipal government of Cali sought to develop a BRT system to address the city’s mobility and public transportation issues, dismissing the original plan of developing a light rail system. Metrocali led to the development of 3 primary trunk lines of 49 kilometers, 180 articulated buses, 9 terminals, and 78 stations. The project had four principal aims:

- Improve service frequency and reliability
- Reduce travel times, accidents, and pollution
- Connect the low- and middle-income areas of Cali with the areas that concentrate job-generating and social activities
- Carry 960,000 passengers per day.

The national government and the municipality financed and built Metrocali’s infrastructure—which includes roads, terminals, and stations—initially amounting to US$300 million (in 2005 US dollars). Four bundled operators financed, procured, operated, and maintained the fleet. They also financed and built parking and maintenance depots. Another operator financed, procured, and operated the fare collection systems.

### TABLE A.6 Lessons learned from the Acabús bus rapid transit project in Acapulco, Mexico

<table>
<thead>
<tr>
<th>BEST PRACTICES</th>
<th>AREAS FOR IMPROVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Acabús conducted operational trials months before operations started. These trials allowed Acabús to ensure the adequate functioning of the system.</td>
<td>• The project would have benefited from specialized personnel to manage the system. [operation risk]</td>
</tr>
<tr>
<td>• The competitive procurement gave more certainty to private parties and helped the government to select the most qualified firms to do the work. [political and social risk]</td>
<td>• Fare collection systems failed in several stations, resulting in fare evasion and lost revenues equivalent to US$1.6 million. [operation risk]</td>
</tr>
<tr>
<td>• The government incorporated incumbents in the planning and operations of new systems and benefited from including them as partners in the project in a special-purpose vehicle. [operation risk]</td>
<td>• Fare collection systems were not available in all stations or along all feeder routes. [operation risk]</td>
</tr>
<tr>
<td>• Acabús offers integrated tariffs between feeder routes and trunk routes, which makes the service more accessible. [operation risk] [financing risk]</td>
<td>• The city did not effectively maintain the exclusivity of the bus lanes, which were frequently used by private vehicles or people walking. [operation risk]</td>
</tr>
<tr>
<td>• Acabús’s operational program is designed by the operator and approved by the public authority, which has improved efficiency. [operation risk]</td>
<td>• The government would have benefited from the inclusion of positive performance-based payments in contracts. [construction risk] [operation risk]</td>
</tr>
<tr>
<td>• The contract includes penalties as performance-based incentives if the operator does not meet the contractually mandated service standards. [design risk] [operation risk]</td>
<td>• Incumbent service providers that were not included in the project protested at the beginning of project operations. [planning risk] [political and social risk]</td>
</tr>
<tr>
<td>• Putting up the concession as collateral to banks is an effective measure for derisking the operators’ debt and reducing the cost of capital. [financing risk]</td>
<td>• Only one firm responded to the request for proposals for the fare collection systems. Rather than rescope or retender the project, the government chose the only firm that applied. [operation risk]</td>
</tr>
<tr>
<td></td>
<td>• It is not advisable to start operations without having all components of a project ready to start operating. In this case, station equipment, control systems, and maintenance depots were not ready by the start of operations. [operation risk]</td>
</tr>
</tbody>
</table>

Metrocali has failed to meet its operational targets and objectives. The municipality experienced construction delays of three years and cost overruns for the government and private sector, which amounted to more than US$700 million in extra costs for the government and US$370 million for the private sector. Ridership in 2015 was 525,000 passengers per day, 45 percent below the forecast demand and 30 percent short of the project’s break-even point. Metrocali failed to increase average bus speeds, increase bus service frequencies, or improve reliability in the bus system, resulting in a fall in the modal split for public transportation from 48 percent to 39 percent between 2005 to 2012, compared with personal vehicles and walking. Table A.7 shows the lessons learned from the project.

### SYTRAL (LYON, FRANCE)

SYTRAL, Lyon’s public transportation authority, has provided accessible and reliable transportation to citizens for more than 30 years (MassTransit Magazine 2014; World Bank 2015). This case describes the development of an integrated public transportation system—which includes metro, tram, and bus routes—through a combination of publicly financed infrastructure and rolling stock and management contracts. It demonstrates how a publicly financed transportation system can achieve its objectives and deliver affordable, reliable, efficient services.

Founded in 1985, SYTRAL manages Lyon’s public transportation system—the second-largest in France. It consists of three integrated public transportation networks, including 4 metro lines, 5 tram lines, 2 cable car lines, and more than 180 bus lines. In 2007 a survey of bus system users showed high levels of

### TABLE A.7 Lessons learned from the Metrocali bus rapid transit project in Cali, Colombia

<table>
<thead>
<tr>
<th>BEST PRACTICES</th>
<th>AREAS FOR IMPROVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metrocali modified its operations to mitigate the impact of lower-than-expected demand and to ensure the financial sustainability of operators.</td>
<td>• The project began operating without having finalized all of the infrastructure, which affected ridership and expected revenues. [interface risk]</td>
</tr>
<tr>
<td></td>
<td>• The municipality could have awarded the construction function to a private partner to reduce the risk of delays. [construction risk]</td>
</tr>
<tr>
<td></td>
<td>• Fare collection systems were only available in a limited number of stations. The operator in charge of fare collection systems refused to increase the number of fare collection points and card recharge stations in the system. [operation risk]</td>
</tr>
<tr>
<td></td>
<td>• Incumbent service providers that were not included in the project (40 percent of the total) increasingly protested and disrupted project operations, affecting ridership and financial sustainability. [planning risk] [political and social risk] [operation risk]</td>
</tr>
<tr>
<td></td>
<td>• The project exceeded the city’s local capacity to implement the bus rapid transit system. Multilateral development banks did not provide technical assistance for procurement and management of the contract. The government could have requested further technical assistance from them. [planning risk] [operation risk]</td>
</tr>
<tr>
<td></td>
<td>• The municipal government missed the opportunity to develop this project as part of a greater transportation-oriented development plan. Integrating the project with an urban plan would have increased the system’s sustainability and value. [planning risk]</td>
</tr>
<tr>
<td></td>
<td>• Demand estimates could have been more robust, and the project should have included mechanisms to mitigate demand risk, given that the project was supposed to be fully sustained with fare revenues. [operation risk] [financing risk]</td>
</tr>
<tr>
<td></td>
<td>• The municipal government should have deepened the assessment of low-income people’s mobility needs at the planning and feasibility stages. The project failed to have an impact on this segment of the population. [planning risk]</td>
</tr>
<tr>
<td></td>
<td>• The municipal government could have developed mechanisms to facilitate the transition of low-income users from a cash-based system to electronic payments. The government underestimated the impact of the cultural transition on low-income citizens. [operation risk] [political and social risk]</td>
</tr>
</tbody>
</table>

satisfaction, with a margin for improvement. In 2011 SYTRAL implemented a system improvement plan that led to the development of 230 new stops, more than 90 new buses, and new road infrastructure. SYTRAL’s project aimed to improve service quality and increase access so that all citizens could access reliable and affordable transit.

SYTRAL finances all the infrastructure, rolling stock, and fare collection systems through a transportation tax, the local government budget, and system revenues. Between 2009 and 2011, SYTRAL invested US$46 million in new rolling stock. SYTRAL engaged Keolis Lyon to operate and maintain its US$4.5 billion in assets on a US$2.42 billion contract between 2011 and 2016.

SYTRAL was able to improve service quality and access with a 2011 initiative that has proven popular with its citizens. Congestion in the city fell by 13 percent between 2005 and 2012. Ridership across the system has grown to 1.6 million passengers per day. Integrating tariffs and accessible infrastructure, to a large extent, has helped SYTRAL realize its objectives. Table A.8 shows the main lessons learned from SYTRAL.

**TABLE A.8 Lessons learned from the SYTRAL integrated public transportation system in Lyon, France**

<table>
<thead>
<tr>
<th>BEST PRACTICES</th>
<th>AREAS FOR IMPROVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYTRAL is the only authority responsible for public transportation in the region, which simplifies planning and enforcement.</td>
<td>• Lyon’s transportation system could have a better real-time information service to help users plan trips better and reduce travel times. Currently, real-time information systems cover only certain routes.</td>
</tr>
<tr>
<td>All stations are accessible for the disabled.</td>
<td>• Lyon’s transportation system is not fully integrated with the regional transportation system. Tariffs are not integrated with the regional transportation system.</td>
</tr>
<tr>
<td>Electric vehicles account for 74 percent of the trips in the bus system.</td>
<td></td>
</tr>
<tr>
<td>Lyon’s public transportation system was part of a greater transportation-oriented development and urban plan. The city has an extensive bike-sharing program and parking spaces in stations and terminals.</td>
<td></td>
</tr>
<tr>
<td>SYTRAL makes the system accessible to everyone by providing differentiated tariffs and discounts for the elderly, students, and the disabled.</td>
<td></td>
</tr>
<tr>
<td>The public transportation system is financed in part through a transportation tax paid by companies, organizations, and public authorities with more than nine employees. In 2015 the tax represented 39 percent of annual revenues.</td>
<td></td>
</tr>
<tr>
<td>The public transportation governance framework establishes clear roles and responsibilities, resulting in good planning and monitoring.</td>
<td></td>
</tr>
</tbody>
</table>


**DART PHASE 1 (DAR ES SALAAM, TANZANIA)**

Phase 1 of the Dar es Salaam Bus Rapid Transit (DART) reduced congestion, travel times, and waiting times at stations (World Bank 2017). The DART BRT was developed through a “bundled private finance and operation of buses” structure. This case shows the importance of the planning and procurement stages and the impact that appropriate time spent on these tasks can have on reducing costs and delays.

To alleviate the Dar es Salaam’s congestion issues arising from rapid urbanization and motorization, the government of Tanzania developed the Dar es Salaam Urban Transport Improvement Project (DUTP). As part of the DUTP, the government also planned and implemented a BRT project—the DART—over six phases.

Before developing the DART project, the public transportation system was largely informal and served by too many buses. In 2008 the bus fleet consisted of
7,000 small privately owned buses called *daladala*, which had an aggregate capacity of approximately 273,000 seats. In 2008 the government began Phase 1 of the project to develop 20.9 kilometers of trunk lanes, 57.9 kilometers of feeder routes, 5 terminals, 1 bus depot, 27 stations, and 4 feeder transfer stations. The project had the following main goals:

- Alleviate congestion
- Reduce traffic accidents and pollution
- Reduce travel times for users and improve reliability
- Carry 400,000 passengers per day.

The government of Tanzania financed the US$165 million required for DART’s infrastructure, which included roads, stations, terminals, utility power relocation, and a bus depot. Private contractors constructed the infrastructure. One bundled operator financed, operated, and maintained the trunk buses, feeder buses, and fare collection systems. This operator was not procured competitively and was supposed to be a temporary operator. However, by 2017, the government had not conducted the selection process for a new operator. Another private partner managed the project’s accounts.

Phase 1 of DART faced many challenges during the design and procurement stages. However, it achieved positive results during operations. Phase 1 reduced the number of *daladalas*, travel times, and waiting times at stations, despite construction delays, a noncompetitive procurement process, and cost overruns. Table A.9 shows the main lessons learned from Phase I of the project.

### Table A.9 Lessons learned from the DART Phase I bus rapid transit project in Dar es Salaam, Tanzania

<table>
<thead>
<tr>
<th>BEST PRACTICES</th>
<th>AREAS FOR IMPROVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>- DART is part of a larger urban transportation master plan, which can improve transportation system integration and benefit urban development. [design risk] [planning risk] [operation risk]</td>
<td>- Lack of resources and delays resulted in disputes and termination of contracts, as some sites were not available at the start of construction. The Government of Tanzania could have secured resources in advance to implement the resettlement action plan on time. [political and social risk] [construction risk] [operation risk]</td>
</tr>
<tr>
<td>- Developing the project in phases allows the public authority to reduce the complexity of transactions and allows it to learn from previous phases. [design risk] [planning risk] [operation risk]</td>
<td>- The quality of designs caused considerable delays, which could have been mitigated had the government included an independent review of the technical and engineering aspects. [design risk] [construction risk] [operation risk]</td>
</tr>
<tr>
<td></td>
<td>- The government introduced a public-private partnership law only in 2010, after the project was developed. This resulted in contracts being awarded on a temporary basis without competitive procurement. [planning risk] [operation risk]</td>
</tr>
<tr>
<td></td>
<td>- A public-private partnership contract was not signed prior to developing the infrastructure. Because of this, the government had to engage a temporary operator. The contract should have been signed one year before completion of the infrastructure for operations to coincide with the handover of the completed infrastructure. [planning risk] [design risk] [construction risk] [operation risk]</td>
</tr>
<tr>
<td></td>
<td>- The government did not have transaction advisers to guide it through the procurement process. This support could have encouraged competition and avoided delays in implementation. [operation risk] [planning risk] [design risk]</td>
</tr>
<tr>
<td></td>
<td>- The government would do well to incorporate incumbents in the planning and operations of new systems and may benefit from including them as partners in the project in a special-purpose vehicle. [operation risk] [construction risk] [design risk]</td>
</tr>
<tr>
<td></td>
<td>- The government did not incorporate road safety measures as part of the design, such as training of drivers, communications, awareness campaigns, protection of vulnerable users, and improvement in walkability. [natural and environmental risk] [operation risk]</td>
</tr>
<tr>
<td></td>
<td>- DART and TANROADS lacked the capacity to manage the project, which could have been solved with technical assistance. [operation risk] [design risk]</td>
</tr>
<tr>
<td></td>
<td>- The government did not plan to build the infrastructure during the dry season to avoid losses due to flooding. [natural and environmental risk]</td>
</tr>
</tbody>
</table>


Note: TANROADS is the national roads agency of Tanzania.
METROBÚS-Q (QUITO, ECUADOR)

Metrobús-Q has failed to deliver expected service improvements, despite the local government’s investment of US$172.3 million in Quito’s public transit (Deloitte and Taryet Ingeniería del Transporte 2016; Hidalgo, Custodio, and Graftieaux 2007). This case discusses the challenges that the Metropolitan District of Quito faced in delivering a publicly financed and operated project and explores ways in which the project could have been improved. It demonstrates the importance of having a competitive procurement process and planning an integrated BRT system.

Prior to Metrobús-Q, public transportation in Quito was inefficient and unsafe, and buses were oversupplied. Services were delivered informally and by operators with buses that were well beyond their life span. Public transportation planning and regulation were concentrated at the national government level.

In 1990 the Metropolitan District of Quito assumed responsibility for the provision of and planning for public transportation and suggested an integrated transportation system to solve the city’s public transportation issues. The district planned and developed Metrobús-Q as the integrated solution. Metrobús-Q consists of five corridors with exclusive lanes and feeder routes. Table A.10 shows the main characteristics of the five Metrobús-Q corridors.

The district government financed and procured Metrobús-Q’s infrastructure and fleet through the Metropolitan Public Passenger Transport Company. Total investment for the first three corridors was US$172.3 million. The company also operates four of the five corridors: Ecovía, Trolebús, the southeast corridor, and the southwest corridor. A private partner, made up of incumbent service providers, operates and maintains the northern central corridor.

Metrobús-Q has improved public transportation in Quito but faces many challenges, with the benefits and costs of the system distributed unevenly across the routes. Average travel speeds vary between 16.3 and 20 kilometers per hour. Users have complained of overcrowding of buses during peak hours, poor service by feeder routes, and safety concerns in the buses. Table A.11 shows the main lessons learned from the project.

### TABLE A.10 Main characteristics of Metrobús-Q corridors in Quito, Ecuador

<table>
<thead>
<tr>
<th>CORRIDOR</th>
<th>DISTANCE COVERED (KILOMETERS)</th>
<th>ARTICULATED BUSES</th>
<th>FEEDER BUSES</th>
<th>STOPS</th>
<th>DAILY RIDERSHIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trolebús (central corridor)</td>
<td>22.5</td>
<td>113 electric buses</td>
<td>113</td>
<td>39</td>
<td>281,000</td>
</tr>
<tr>
<td>(1995)</td>
<td></td>
<td>36 gasoline buses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecovía (northeast corridor)</td>
<td>10</td>
<td>66 gasoline buses</td>
<td>77</td>
<td>17</td>
<td>130,000</td>
</tr>
<tr>
<td>(2001)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Central north corridor</td>
<td>15.4</td>
<td>74</td>
<td>139</td>
<td>19</td>
<td>200,000</td>
</tr>
<tr>
<td>(2005)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecovía southeast corridor</td>
<td>15</td>
<td>60</td>
<td>88</td>
<td>22</td>
<td>67,000</td>
</tr>
<tr>
<td>(2010)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Southwest corridor (2012)</td>
<td>28</td>
<td>33</td>
<td>268</td>
<td>21</td>
<td>235,000</td>
</tr>
<tr>
<td>Total</td>
<td>90.9</td>
<td>346</td>
<td>685</td>
<td>118</td>
<td>913,000</td>
</tr>
</tbody>
</table>

Sources: El Comercio 2018; Trolebús 2017.

a. Ecovía corridors operate as a single unit.
TABLE A.1 Lessons learned from the Metrobús-Q System in Quito, Ecuador

<table>
<thead>
<tr>
<th>BEST PRACTICES</th>
<th>AREAS FOR IMPROVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Decentralizing a transportation authority from the national government to the Metropolitan District of Quito was key to developing the project. [political and social risk] [planning risk]</td>
<td>• A different project structure that transfers more risk to the private partners could have benefited the project. Two attempts to negotiate operation contracts failed. However, these two attempts negotiate directly with incumbent operators rather than employing competitive procurement. [operation risk] [planning risk] [design risk]</td>
</tr>
<tr>
<td>• The commitment of the mayors of Quito during planning and project implementation was key to completing the project. [political and social risk]</td>
<td>• The Metropolitan Public Passenger Transport Company could have benefited from competitive procurement to contract operators for the corridors, instead of direct negotiation with incumbent operators. [operation risk] [planning risk] [design risk]</td>
</tr>
<tr>
<td>• The initial success of the Trolebús corridor helped to develop the other corridors. [planning risk] [design risk] [operation risk]</td>
<td>• The implementation team lacked the capacity to structure the project adequately, which could have been solved with technical assistance. [operation risk] [planning risk] [design risk]</td>
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AVANZA ZARAGOZA (ZARAGOZA, SPAIN)

The Municipality of Zaragoza has provided high-quality public transportation services to its citizens since the beginning of the 20th century (Municipality of Zaragoza 2017, 2018). This case describes the operations and upgrade of an existing public transit system through a concession for operations and maintenance (O&M) of the system. It demonstrates the importance of integrating public transportation planning with larger urban development plans.

In 1982 Zaragoza awarded its first bus concession to the firm Zaragoza Urban Transport (TUZSA). TUZSA operated the streetcar system that was in place until 1976. Since 1982, the bus system has reported positive results. In 2006 the municipality developed the Sustainable Mobility Plan for Zaragoza (SMPZ). As part of the new plan, the municipality restructured the public transportation system and awarded the new concession to the same operator, now called Avanza Zaragoza. It renewed the concession in 2013. The bus system now consists of 641 kilometers of routes, 315 buses (85 articulated buses, 205 standard buses, and 10 microbuses), 11 buses for people with limited mobility, and 3 double-decker buses for tourism. The SMPZ had the following aims:

• Offer a high-quality, efficient, and sustainable service
• Improve constantly the supply of public transportation
• Connect citizens with the parts of the city where economic activity is concentrated
• Increase access to information for all public transportation modes
• Ensure that public transportation, pedestrians, and bicycles account for most trips in Zaragoza.
Avanza Zaragoza operates and maintains buses and fare collection systems under a six-year contract.

Zaragoza’s bus system has achieved positive results since its inception. It covers 93 percent of the population. Citizens conduct 22 percent of all trips through the bus system, equivalent to more than 89 million trips in 2017. In 2012 Zaragoza obtained the lowest congestion index among cities in Europe (Tranvía Zaragoza 2013). The bus system has an occupancy rate of 4.8 passengers per kilometer, which is higher than in other large Spanish cities. Further, 57 percent of the bus routes have an average waiting time shorter than five minutes. The buses travel at an average speed of 15 kilometers per hour. Table A.12 presents the lessons learned from the concession.

### URBAN MOBILITY IN PORT-AU-PRINCE (HAITI)

Urban mobility in Port-au-Prince has been constrained by rapid urbanization, low economic growth, and stagnant infrastructure development (Garham and Sethi 2017). Congestion in the city is high—vendors crowd sidewalks and parked vehicles block the street, leaving little space for pedestrians and vehicles to circulate. Public transportation is provided informally by companies that operate inefficiently. This case shows the importance of having clear and effective regulation of public space before developing more complex public transportation systems.

Haiti is both the poorest and the fourth-most-urbanized country in Latin America and the Caribbean. From 2000 to 2015, the urban population in Haiti doubled from 3 million to 6 million. Rapid urbanization and low economic growth have resulted in congestion in Port-au-Prince.

Urban mobility in Port-au-Prince is limited by the quality of infrastructure and overcrowding of public spaces. The road network is poorly maintained;
roads are unpaved and suffer from severe encroachment—cars park in driving lanes, people walk in streets, and sidewalks are filled with street vendors. As a result, on most roads, only half of all lanes are available for driving at any time. Tap taps—private pickup trucks adapted to seat passengers in the back—are the most common mode of motorized transportation. Around 13,000 tap taps are operating, providing 57 percent of all motorized trips in the city. Tap taps travel at an average speed of 10.5 kilometers per hour. Private minibuses provide 25 percent of motorized trips.

Adding to the congestion and disorganization, public transportation services in Haiti are fragmented, informal, and inefficient and in urgent need of improvement. Planning and regulatory responsibilities in the transportation sector are not clearly assigned, and the government currently lacks the resources and ability to restructure the public transportation system. It is unable to invest in infrastructure and engage with incumbent service providers.

To improve urban mobility in Port-au-Prince, the government should undertake both short- and long-term measures. In the short run, the government should implement measures to reduce congestion and optimize public space. These measures would allow operators to increase efficiency and revenues. The government also could improve sidewalks, regulate street vendors, regulate parking, improve intersection signaling, and rehabilitate street and highway pavements. In the long run, the government should focus on restructuring the public transportation system to replace the existing fleet, transition to larger vehicles, and formalize and professionalize bus services. For this, the government must implement mechanisms to pool ownership, credit, and risks among incumbent service providers. Table A.13 presents the lessons learned for urban mobility in Port-au-Prince, Haiti.

**TABLE A.13 Lessons learned for urban mobility in Port-au-Prince, Haiti**

<table>
<thead>
<tr>
<th>BEST PRACTICES</th>
<th>AREAS FOR IMPROVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>• The government needs to regulate the use of public spaces—such as sidewalks, roads, and parking—to improve mobility. [operation risk] [planning risk]</td>
<td></td>
</tr>
<tr>
<td>• The government needs to address waste management to optimize public space. The accumulation of solid waste in the streets and sidewalks of Haiti affects the flow of pedestrians and worsens the conflicting use of space between pedestrians and vehicles. [operation risk] [planning risk]</td>
<td></td>
</tr>
<tr>
<td>• The government could develop terminals and transportation facilities at key points of access to public transport. Doing so would enhance pedestrian safety and optimize public space. [operation risk] [planning risk]</td>
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<tr>
<td>• The government would do well to address drainage and watershed issues to improve mobility. [operation risk] [planning risk] [natural and environmental risk]</td>
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</tr>
<tr>
<td>• Regulation should assign maintenance responsibilities for the pedestrian environment in governance arrangements for urban transportation. [operation risk] [planning risk]</td>
<td></td>
</tr>
<tr>
<td>• The government could address the issue of street vendors on sidewalks to improve walking mobility and safety. [operation risk] [planning risk] [political and social risk]</td>
<td></td>
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</table>


**TRANSOESTE (RIO DE JANEIRO, BRAZIL)**

The TransOeste (Trans-West) BRT line was the first of three corridors implemented in Rio de Janeiro between 2012 and 2016 (Weaver 2019). The BRT was chosen as the best transportation solution to increase mobility and reduce congestion for the 2016 Olympic Games. It is considered one of the games’ most successful legacies.
Rio de Janeiro is the second-largest metropolitan area in Brazil, with roughly 11 million people in more than 30 municipalities. Economic and population growth over the past two decades have resulted in congestion amid an increase in personal vehicles and motorcycles. Until a few years back, Rio had the third-worst congestion among cities worldwide, as residents wasted, on average, 100 hours per year in traffic jams (Ramalho 2015). From 2001 to 2011, personal vehicles increased 62 percent, while the motorcycle fleet tripled (Mobilize n.d.). Together, motorcycles and cars represented more than 88 percent of the total number of vehicles in Rio.

Scheduled to host the 2014 Soccer World Cup and the 2016 Olympic Games, Rio adopted a plan to improve public transportation options in the city, which included expansion of the metro system and implementation of BRT corridors. The local government launched TransOeste in 2012, the first of three BRT corridors to solve the city’s mobility issues and congestion. TransOeste led to the development of 62 stations and 61.5 kilometers of bus routes. The project had four principal aims:

- Alleviate congestion and improve the supply of public transportation
- Reduce travel times and pollution
- Connect the West Zone, which lacked public transportation options, with the rest of the city
- Carry 220,000 passengers per day.

TransOeste, together with the rest of Rio’s integrated transportation system, has improved public transportation in the city despite facing many challenges. TransOeste was inaugurated in 2016 during the Olympic Games for game attendees only. After the games, it became available to the general public. TransOeste reduced travel times by 65 percent, from 120 minutes to 43 minutes, and surpassed its ridership objectives, serving 216,000 passengers each day (BRT Consortium n.d.). The total cost of TransOeste was US$470 million

<table>
<thead>
<tr>
<th>BEST PRACTICES</th>
<th>AREAS FOR IMPROVEMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>TransOeste is part of an integrated transportation system with the metro and train systems.</td>
<td>Technical designs that reduce whole-of-life costing are key to achieve value for money and service quality in the project. Inadequate design led to asphalt being used instead of concrete. Asphalt has not been able to withstand the weight of crowded buses and has caused potholes, broken vehicles, and schedule delays.</td>
</tr>
<tr>
<td>Continued political support and championing of the project were key to the project’s success.</td>
<td>Maintaining the project infrastructure is key to achieving the project’s service quality goals. In this case, the government failed to maintain the infrastructure.</td>
</tr>
<tr>
<td>Attendees at the 2016 Olympic Games followed the authorities’ advice and used the public transportation system—especially bus rapid transit—without restrictions, which alleviated the city’s traffic during the games.</td>
<td>Implementing measures that increase transparency and reduce political influence are key to achieving the project’s results and avoiding corruption. Political risk is often present in low- and middle-income countries, especially in large, sophisticated projects with a lot of visibility. In this case, TransOeste was involved in corruption scandals that affected the government’s credibility.</td>
</tr>
<tr>
<td>All stations are accessible to the disabled.</td>
<td>Changes to the project design and structure can result in higher costs. In this case, the contract got renegotiated, which resulted in higher-than-expected costs.</td>
</tr>
<tr>
<td></td>
<td>Demand has risen and saturated the system.</td>
</tr>
<tr>
<td></td>
<td>A lack of safe crossing points has caused dozens of deaths and hundreds of injuries along the TransOeste routes (Kassens-Noor et al. 2016).</td>
</tr>
</tbody>
</table>

Appendix A

| 159

(Rio Prefeitura 2013). The city government got a loan from the Brazilian Development Bank to cover this project and others before the Olympic Games (BNDES 2014). Table A.14 presents the lessons learned from the project.

**MEDELLÍN (METROPOLITAN AREA OF ABURRA VALLEY, COLOMBIA)**

Medellín’s experience poses a unique opportunity to compare different delivery models in implementing urban bus projects in a conventional bus system. The experience of setting up a special-purpose vehicle for providing bus services in an area of the city proved inferior to an alternative arrangement using business collaboration agreements.

Area Metropolitana del Valle de Aburra (AMVA) is an example of transportation integration in the region. Metro de Medellín SA is a public operator in charge of operating the metro, the BRT system (Metrolúps), the famous cable cars (Metrocable), and the Ayacucho tram. In parallel, conventional buses serve the majority of transportation demand (53 percent) in the area. AMVA is the transportation authority that plans transportation in the metropolitan area, manages permits, and approves routes and levels of service for all modes in the integrated system.

In 2011 AMVA began efforts to integrate the conventional bus system with the publicly operated modes. The efforts started by dividing the city into nine areas—called cuencas—for the purposes of planning and operation. The authorities structured a bidding process for the operation of cuencas 3 and 6, which currently handle 160,000 trips per day. One of the local operators reorganized itself and won the bid for operating one of the cuencas; the other cuenca is operated by a joint venture of a local operator and a national operator. The metro provided fare collection systems in the vehicles, the fleet incorporated the system’s corporate image, and the authorities managed the planning of operations and also took over their control. The operators took out 600 vehicles and bought 377 compressed natural gas buses. Operations had commenced by the end of 2013. Early results were mixed. There were problems in finding depots and workshops and also in distributing fare collection cards in low-demand areas. The buses were not fit for operation in the hilly areas of the city. Despite the high level of rationalization (almost 40 percent) and the higher efficiency of the newer vehicles, the gap between user fares and technical tariffs offered by the awardees resulted in the need for subsidies, which amounted to about US$20 million a year, or about US$0.40 per trip.

After this experience, AMVA devised a new strategy that achieved better results without a bidding process and maintained permits and the current legal framework. Before a bidding process, it offered permit holders in a given cuenca a chance to reorganize themselves to mimic the expected outcomes of a bidding process without the reorganization. They had to present a joint operational plan that included joint fare collection (and also devise the internal remuneration processes for sharing the income), the use of corporate image elements, and the sharing of vehicle location data with AMVA. Their plan had to comply with the levels of service and conditions set by AMVA. In turn, AMVA would spend US$500,000 (plus around US$350,000 in annual operating costs) to develop a specific platform to control the fleet and monitor compliance with requirements.
The results were excellent. Fleet rationalization was lower (17 percent on average in cuencas 1, 2, 4, 5, 7, and 8), fare collection on buses was integrated with the system (through a hybrid operation that allowed for cash payments), assets from existing operators were incorporated into the system, more than 90 percent of buses were clean and included the corporate image, and all vehicle operations were controlled by the authority. The operations were integrated with the rest of the system, and there was no associated subsidy on any of the routes. Table A.15 presents the lessons learned from the business collaboration agreements.

### CITYWIDE UNBUNDLED FLEET PROVISION AND OPERATION IN SINGAPORE

*Singapore is a successful example of an innovative citywide intervention characterized by the unbundling of the fleet and operations.* The incorporation of incumbent assets (especially depots in a context of land constraints) removed barriers to entry and reduced costs. The reform focused on improving the level and coverage of service, which led to successful results.

Singapore initiated reform in 2012 with the creation of the Bus Service Enhancement Programme. The program supported the purchase of 1,000 new buses and the introduction of new services to expand the program. Little by little, the city improved bus services in the existing system. In 2016 the Land Transport Authority (LTA) bid 14 packages with about 300–500 buses each, for a duration of five years with the possibility of a two-year extension. To ensure a gradual transition, an additional 11 packages were extended in periods from 2 to 10 years. In addition, LTA made sure that the affected employees of incumbent operators were offered jobs by the new operators.

In the model implemented in Singapore, operators receive a fixed fee to operate bus services. The fees are automatically adjusted to reflect changes in inflation, wages, and fuel costs. Operational costs are considered separately and paid...
Appendix A

by the government. LTA retains all fare revenue that the operators collect. LTA determines the level of services to operate the routes, and the number of vehicles allocated to a given route. LTA acquires the fleet and owns the buses, leasing them to the operators. Operators are responsible for routine maintenance of the buses and on-board equipment as part of their contracts. They are also responsible for maintaining the bus depots assigned to them. Operators also provide user information as well as customer service (lost and found, grievance redressal). Operating contract terms range from 2 to 10 years.

To provide the right incentives for operators, which are entitled to fixed payments, the remuneration includes performance payments of up to 10 percent. If the operator does not meet standards, up to 10 percent of its fee will be deducted. Performance indicators are linked to reliability and waiting times, the punctuality of first and last dispatches, and the maintenance of buses, depots, and equipment.

The model has led to improved service quality. It has allowed the LTA to adapt the fleet to changes in demand, making urban bus services responsive to changes in ridership and commuter needs. It has increased competition in the industry and raised service levels for commuters. Table A.16 presents the lessons learned from Singapore’s business collaboration agreements.

NOTES

1. This improvement surpassed the municipality’s goal of a 25 percent reduction.
2. For the 10-year exchange rate, see https://www.xe.com/currencycharts/?from=USD&to= PEN&view=10Y.
4. Bono de chatarrización, a grant that allowed operators to cover the down payment for the new fleet.
5. Syndicat Mixte des Transports pour le Rhône et l’Agglomération Lyonnaise.
6. T Sh 364,602,325,731 converted to US dollars (US$1 = T Sh 2,179.98).
7. No measurable results are available from reliable sources. However, sources seem to show a consensus about positive results in terms of increased quality of service and reliability.
8. Compilation of data and information by Leonardo Canon Rubiano (transportation specialist), 2019.

REFERENCES


The standard method for examining the hypothesis of whether to use a public-private partnership (PPP) is to consider the possible value for money (VfM). VfM has various definitions (Flor et al. 2015). According to the United Kingdom’s “VfM Assessment Guidance,” “Value for Money is defined as the optimum combination of whole-of-life cost and quality of the good or service to meet user’s requirement” (Her Majesty’s Treasury 2006). The World Bank’s policy on procurement states, “The principle of value for money means the effective, efficient, and economic use of resources, which requires an evaluation of relevant costs and benefits, along with an assessment of risks, and non-price attributes and/or life cycle costs, as appropriate” (World Bank 2016).

A VfM analysis usually consists of an economic analysis that compares the expected social return from a solution delivered through a PPP with the public sector comparator (PSC). The PSC estimates the hypothetical risk-adjusted cost if a project were to be financed, owned, and implemented by government (Kerali 2012). The analysis assesses whether a private investment proposal offers VfM in comparison with the most efficient form of public procurement. An analysis of VfM proceeds in three main stages:

1. **Risk analysis.** The analytical framework supports this stage. The analysis helps decision-makers evaluate many different aspects of a project, including (a) which party is best suited to hold risks, (b) which risk-sharing structure creates more value for the government and society, and (c) the effective cost and value of each risk.

2. **Quantitative analysis.** For the purposes of analyzing VfM, the planning authority must estimate the total impact of a given risk and the probability that this risk will materialize. Quantitative analysis requires enough good-quality data to conduct a comprehensive analysis of the different components of the PSC and the PPP. In some models, a Monte Carlo simulation exercise is done through Excel’s Cristal Ball add-on. This exercise simulates a vast amount of possible scenarios given the probabilities of occurrence of different risks and their impacts. It helps to estimate the probability that the decision to implement a PPP will generate VfM. Not only does a VfM analysis explain how much more (or less) value a PPP will bring to the deal, but it also determines the probability of the PPP being the best option.

3. **Qualitative analysis.** Usually less prescriptive than the quantitative analysis, the qualitative analysis is conducted after completing the quantitative analysis. It consists of interviews with the parties involved in the project analysis,
which gives them a chance to explain whether the value is likely to create VfM as a PPP or as a public work.

VfM requires comparing the private provision of the good or service with the alternative of public provision, which is the PSC. Therefore, the definition of the PSC is critical, as it sets the bar for assessing the appropriateness of private provision. The PSC traditionally consists of three components:

- **Raw PSC.** Base costs (the capital and operating expenditures required to produce the project) are considered in the same period as the PPP proposal was first made. To calculate these costs, the analysis must identify them and classify them either as direct (that is, they can be traced to a particular service or facility and categorized in terms of capital, maintenance, or operations) or as indirect (overhead costs). In addition, it considers third parties’ revenue, which is deducted from operating costs.

- **Competitive neutrality.** This component consists of removing the competitive advantages or disadvantages that the hypothetical public agency pursuing the project could have with respect to the private company in a PPP (taxes, rates, and other transfers that are neutral from the point of view of society).

- **Risk adjustment and valuation.** Value = value of consequence * probability of occurrence + contingency factor. The risk adjustment must differentiate between transferable risk (from the procuring agency to a private consortium) and retained risk (typically the same in a PPP and a PSC).

Other factors must also be taken into consideration, as VfM alone is not the final solution to this matter. A fiscal impact analysis, using tools such as the Public Fiscal Risk Assessment Model, may help to explain how much a government could afford in terms of long-term payments, according to its fiscal space and outstanding debt capacity. Another technique that can shed light on the issue is the pricing of contingent liabilities. Contingent liabilities are often the cause of a collapse or at least lengthy renegotiations on many PPP projects. A solid economic-benefit analysis can help with understanding all of the socio-economic benefits of a project, and this understanding has an impact on the amount of payments a given government may provide to its citizens. Finally, a capacity assessment is crucial to ensure that the authority can properly manage the contracts in the long term.

**REFERENCES**


PRACTICAL TOOLS AND FURTHER READING


APPENDIX C

Tools to Aid Decision-Making

This appendix provides tools—including templates, sample questions, and guidelines—to aid decision-making at both the planning and the preparation stages of public transportation projects.

**TOOLS FOR THE PLANNING STAGE**

<table>
<thead>
<tr>
<th>STAKEHOLDER</th>
<th>OBJECTIVE</th>
<th>RESTRICTIONS</th>
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<tr>
<td>Potential public transportation users</td>
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<td>Private transportation users</td>
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<td>Residents in project implementation area</td>
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<tr>
<td>Residents excluded from project service provision</td>
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<tr>
<td>Businesses in project implementation area</td>
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<tr>
<td>Businesses excluded from project service provision</td>
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<tr>
<td>Public transportation authority</td>
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<td>Mayor (city or metropolitan government)</td>
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<tr>
<td>Municipal or metropolitan council</td>
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<td>State government</td>
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<td>National government (transportation)</td>
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<td>National government (environment)</td>
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<tr>
<td>National government (finance)</td>
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<tr>
<td>Other national entities</td>
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<tr>
<td>Public financial institution 1</td>
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<tr>
<td>Public financial institution 2</td>
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<td>Development agency 1</td>
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<td>Development agency 2</td>
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<tr>
<td>Potential investors or financiers</td>
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continued
By the end of the planning stage, a project structure should be conceptualized. The questions outlined in Box C.1 can help to inform this process.

**Questions to ask when considering an urban bus public-private partnership**

*Technical elements: Is this the most adequate solution to achieve the project’s objectives?*

- Is this project aligned with the mobility and land use strategy for the area?
- Is there a clear diagnosis of the current service deficiencies?
- Will the project reduce the generalized cost of travel for transportation users compared with the existing system (for example, by reducing transfer and waiting times at stations and stops)?
- Are other expected outcomes clearly defined?
- Is there a consensus among stakeholders on expectations from the project?
- Does this project allow for future changes to the system (for example, does it allow for new bus routes or a metro line to be integrated into the system in the future)?
- What technical alternatives are considered to deliver better results or similar results more efficiently? Is the proposed solution the best technical alternative?
- Is there a clear description of the components and technical features of the project?
- Is the project likely to attract required private sector skills locally or internationally?
- Are preliminary cost estimates aligned with local and international experience?
- Are the key stakeholders identified, including their objectives and restrictions? Are these consistent with the project?

*Fiscal capacity: Can the public entity afford the project?*

- Are the proposed user fares consistent with local policy and context? Are transportation tariffs controlled? How are they updated?
- Are the demand projections sound and credible, given the local context?

**Box C.1 continued**
### Tools for the Preparation Stage

This section offers tools for each step in the preparation of a project.

#### Preparing Information

Planners should start with the preliminary project structure defined in the planning and identification stage and review the map of stakeholders' objectives and restrictions.

#### Listing Risks

Using the list of risks as a reference, planners should list all risks that apply, given the preliminary project structure. In doing so, they will (a) discard those risks that do not apply to the proposed preliminary structure and (b) brainstorm other, potential, risks that could affect the project. In brainstorming about potential risks, planners should consider specific contextual features. A map of stakeholders and objectives can also be useful for identifying additional risks.
Allocating risks

Afterward, planners should allocate risks according to the preliminary project structure and assess risk allocation. When allocating risks, planners should reassess whether the party bearing the risk is the most suitable to manage it. For this step, the list of stakeholders’ objectives and restrictions is particularly useful.

Analyzing and mitigating risks

For each risk, planners must assess the expected impact if the risk materializes and its probability of occurrence and discuss mitigation strategies consistent with the risk allocation.

Grouping components

Once that is done, policy makers can assess whether functions and risks need to be analyzed individually for different components or groups of components of the project. If that is the case, they must go through these steps for each component.

Using the Excel template

The risks set out in the analytical framework have been mapped into an Excel-based risk matrix (table C.2 provides a sample). This matrix provides a structure for assigning risks and tracking them across various aspects of the project. It also informs policy makers of potential mitigation strategies, the sources of these risks, and the impacts the risks can have on a project should they materialize. The risk matrix is organized in spreadsheets according to the different components of an urban bus project. The first element is a “Contents and Guide” sheet, which describes the contents of the risk matrix and provides more guidance on how to use it. The second element is a risk matrix for each project component and a general risk matrix for the entire project. The risk matrix includes the following project components:

- Exclusive lanes
- Bridges
- Stops
- Stations
- Multimodal stations
- Depots
- Control centers
- Fare collection
- Feeder buses
- Trunk buses.

The sheet for each project component presents definitions of specific risks, examples relevant to the project component, the optimal allocation of risks, the potential impact of risks, the probability of risks materializing, risk mitigation strategies, and risk severity. Table C.2 shows a sample of the risk matrix. Table C.3 presents a template for listing funding sources and financing instruments for each component. Table C.4 presents a template for the essential elements of an operation concession contract.
### TABLE C.2 Risk matrix template

<table>
<thead>
<tr>
<th>DEFINITION</th>
<th>EXAMPLES</th>
<th>RISK ALLOCATION</th>
<th>IMPACT</th>
<th>PROBABILITY</th>
<th>MITIGATION STRATEGIES</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project function 1</strong></td>
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<tr>
<td>Risk 1</td>
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<td>Risk 2</td>
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<td>Risk 3</td>
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<td>Risk 4</td>
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</tbody>
</table>

### TABLE C.3 Template for listing funding sources and financing instruments, by component

<table>
<thead>
<tr>
<th>FUNCTION OR COMPONENT</th>
<th>DELIVERING PARTY</th>
<th>FUNDING SOURCE</th>
<th>FINANCING INSTRUMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Provision</strong></td>
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<td></td>
</tr>
<tr>
<td>Exclusive lanes</td>
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<td></td>
</tr>
<tr>
<td>Bridges</td>
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<td></td>
<td></td>
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<tr>
<td>Stops</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Stations</td>
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<td></td>
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<tr>
<td>Multimodal stations and terminals</td>
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<tr>
<td>Depots and workshop</td>
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<td></td>
</tr>
<tr>
<td>Control center</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fare collection systems</td>
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<td></td>
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<td>Trunk buses</td>
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<td><strong>Operation</strong></td>
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<td>Exclusive lanes</td>
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<td>Bridges</td>
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<td>Stops</td>
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<td>Stations</td>
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<td>Multimodal stations and terminals</td>
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<td>Depots and workshop</td>
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<td>Control center</td>
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<td>Fare collection systems</td>
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<td>Feeder buses</td>
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<td>Trunk buses</td>
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### TABLE C.4 Essential elements of an operation concession contract

<table>
<thead>
<tr>
<th>ITEM</th>
<th>INCLUSION IN CONCESSION CONTRACT</th>
<th>COMMENTS</th>
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<tbody>
<tr>
<td><strong>Regulation</strong></td>
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<tr>
<td>Applicable regulations</td>
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<td>Concession scope</td>
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<tr>
<td><strong>Technical</strong></td>
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<td>Definition of the services that will be provided</td>
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<tr>
<td>Stations (location, type, number)</td>
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<td>Road infrastructure (route, extension, type of lane)</td>
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<td>Rolling stock (characteristics, specification, type, number of units)</td>
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<td>Depots and workshops (confinement, maintenance)</td>
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<td>Equipment (collection, equipment of units)</td>
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<td>Variables of quality indexes (operative, administrative) and performance indicators</td>
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<tr>
<td>Systems (user information, control)</td>
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<td><strong>Operational</strong></td>
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<td>Service operation programs</td>
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<td>Form of operation of the service (technical characteristics)</td>
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<td>Remuneration systems and adjustment mechanisms (payments)</td>
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<td>Monitoring and evaluation mechanisms (inspection visits, monitoring, reports, audits)</td>
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<tr>
<td><strong>Economic and financial</strong></td>
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<td>Systems of resource management and financial management</td>
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<td>Economic balance clauses</td>
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<td>Guarantees and bonds of compliance (conventional penalties, deposit tickets, bank deposits)</td>
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<tr>
<td><strong>Regulatory and institutional</strong></td>
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<td>Competent authorities</td>
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<td>Obligations and rights of the concessionaires and other subjects of the concession</td>
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<td>Term of the concession</td>
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<td>Causes of termination of the concession-and-extinction procedure</td>
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<tr>
<td>Mechanisms for dispute resolution and interpretation</td>
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*Source: World Bank.*
The World Bank Group is committed to reducing its environmental footprint. In support of this commitment, we leverage electronic publishing options and print-on-demand technology, which is located in regional hubs worldwide. Together, these initiatives enable print runs to be lowered and shipping distances decreased, resulting in reduced paper consumption, chemical use, greenhouse gas emissions, and waste.

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Many cities have sought to replicate the urban bus public-private partnership (PPP) structures that succeeded at the beginning of the millennia, such as those implemented in Brazil, Colombia, and Mexico. These cities improved their public transportation systems in the face of rapid urbanization, rising air pollution, and increasing road safety incidents through these PPP interventions.

Examining these past international experiences, and others, *Public-Private Partnerships in Urban Bus Systems: An Analytical Framework for Project Identification and Preparation* first challenges the assumption that PPP structures are always the optimal approach for improving urban bus systems. The authors use relevant case studies to demonstrate that structuring such PPPs in cities in the developing world requires tailor-made interventions that respond to local contexts. The authors identify essential elements for PPP feasibility and invite readers to consider alternative solutions for achieving the desired objectives.

This book presents an analytical framework that public transportation practitioners can use to support the process of identifying and preparing appropriate technical, financial, and legal structures to improve urban mobility if a PPP is the preferred solution. It follows a detailed, risk-based approach to thoroughly analyze the challenges that might be experienced by cities that pursue private participation in proposed urban bus interventions.

Using specific examples, the authors thoroughly analyze the risks and the specific potential planning-stage challenges likely to be encountered and suggest strategies for practitioners to respond to the specific local contexts and the various alternative solutions. This study builds upon international experiences, predominantly in Latin America and in PPPs focused on streamlining fleet provision and operation. Finally, the book helps to identify and define bankable project structures that could respond well to local contexts and minimize risks.