A Critical Look at Major Bus Improvements in Latin America and Asia:
Case Studies of Hitches, Hic-Ups and Areas for Improvement; Synthesis of Lessons Learned

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Why this work?

- Many references about the famous successes of TransMilenio (Bogotá) and Curitiba but little information available about the shortcomings of similar systems.

- Understandably, few cities /experts are willing to describe these issues at seminars or in papers. This creates an information gap in the detriment of those who could learn from these lessons.

Consequently, this work focuses on the problems and shortcomings of bus based transit initiatives from a learning perspective - by no means it aims at diminishing the recognized merits of projects that have mostly been highly beneficial for the cities that implemented them.
This work aims at raising awareness among planners and decision makers about these same pitfalls when introducing BRTs.

The research included:

- Review of available material (existing papers, websites, media coverage)
- Field visits (Curitiba, Quito, Bogotá, Sao Paulo, León, México, Jakarta, Beijing, Pereira, Guayaquil, Santiago de Chile)
- Interviews with stakeholders, especially with members of implementation teams, operators and decision-makers.
- Deliverables: 7 case studies (Quito, Bogotá, León, México, Guayaquil, Pereira, Santiago) complemented with data from Beijing, Jakarta, São Paulo and Curitiba, a PowerPoint Presentation summarizing the main findings, an image bank, and a transversal paper to be posted on the World Bank Transport Sector external website.

The main purpose was to identify the problems faced or being faced, their origin, how they could have been avoided and how they were solved or will be addressed.
Presentation Contents

- General background and compared systems characteristics
- Synthesis of findings: lessons learned
  - Planning Issues
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  - Implementation Approach
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BRT comprises the systematic combination of infrastructure, equipment and operations to improve service quality.
The focus of most projects was to change structural elements of transit provision, not just to build and operate BRT corridors

<table>
<thead>
<tr>
<th>Business-as-usual*</th>
<th>Transformed Operations</th>
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<tbody>
<tr>
<td>Transit under private provision with permits or concessions granted by the authorities. Weak control and supervision</td>
<td>Private provision under binding contracts (concessions) with strong supervision by the authority (new agencies)</td>
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</tbody>
</table>
| ‣ Low-cost services with ample coverage  
  ‣ Mostly door-to-door services  
  ‣ Oversupply of buses, congestion  
  ‣ Inadequate vehicle size,  
  ‣ High average age of the fleet,  
  ‣ Long and winding routes with inefficient operation,  
  ‣ Lack of vehicle and infrastructure maintenance,  
  ‣ High number of accidents  
  ‣ High level of emissions,  
  ‣ Very low speeds | ‣ Fares similar to those of pre-existing services  
  ‣ Better match between supply and demand  
  ‣ Trunk-feeder network  
  ‣ Renewed bus fleet  
  ‣ Much fewer accidents  
  ‣ Decreased emissions  
  ‣ Significantly higher commercial speeds |
| Competition in the market (penny war or guerra del centavo) | Competition for the market (bidding processes) or consolidation of incumbents (through direct agreements) |

* These descriptors are not entirely applicable to Beijing transit system, which is under public operation, but has coverage and quality issues also. The new Beijing BRT line is also publicly operated.
The cities included in this review span across a wide array of diverse local conditions – all the bus systems reviewed include BRT components to various extents.

Photos by D. Hidalgo, A. Juarez (Curitiba), J. Ernst (Jakarta) O. Diaz (Beijing)
Compared characteristics

- Demand
- Performance
- Commercial Speed
- Operational Productivity
- Capital Productivity
- Capital Efficiency
- Fares
The review includes large systems - Sao Paulo - Interligado and Santiago - Transantiago, to small corridors - Quito - Ecovía, and Beijing - Beijing BRT

System usage is a function of city population and size, system coverage, corridors density and land uses, transit modal share and characteristics of alternative modes.
Performance is contrasted with very high loads observed in Bogotá and São Paulo (dual carriageways 20K+ pax/h/direction), medium corridors and small corridors (single carriageways 13K-3K pax/h/direction).

Passenger load is a function of the concentration of the passenger trips in a given section of the system - large peak loads require more infrastructure (segregation, dual lanes, larger stations), higher-capacity vehicles and larger bus fleets (articulated – bi-articulated).
Top commercial speeds are over 25 km/h, with most systems operating between 14 km/h and 20 km/h.

Higher speeds are achieved as more BRT components are implemented - segregated busways, enclosed stations, level boarding, prepayment, larger buses, express services, centralized control.
Top operational productivity is over 10 boardings/bus-km with most systems between 5 and 8 boardings/bus-km

Operational productivity has a direct relationship with the density of the corridor and average trip length - higher operational productivities allow for lower user fares
Capital productivity is very high in some systems (2-3K+ pax/bus/day), while others are between 0.6K and 1.5 K pax/bus/day

Capital productivity has a direct relationship with bus programming (route length, peak/non peak frequency) and demand patterns (trip length, trip density, trip distribution over time, ratio between inbound and outbound peak demand) – higher capital productivities allow for reduced capital investment
Total capital costs vary from 1.35 million / km (Jakarta) to 8.2 million / km (Bogotá)

Systems with minor physical improvements to the roadway were in the range of USD 1.35 – 3.50 million/km. Systems with major reconstruction of corridor roadways and two lanes per direction (at least at stations) or special buses, required more capital investment: USD 4.8 – 8.2 million/km.
There have been different approaches to fund capital investments

- The infrastructure to support system operations was built through local agencies with local and external (state, national government, multilaterals) funds.

- León, México, Santiago also attracted private capital through concession contracts to implement intermediate stations and bus stops.

- Quito (Trolebús and Ecovía), Jakarta and Beijing purchased the buses with public funds and the México City municipality acquired 20% of the fleet for the public operator RTP.

- Quito and México fare collection equipments were also publicly funded.

- Other systems have privately provided equipment, paid back with user fares (concession agreements)
Capital efficiency (per unit of output) has been between USD 0.14/pax (México, León) to USD 0.65/pax (Beijing)

Note: Annual Equivalent of the Capital Costs divided by the annual ridership (12% discount rate, 10 year time horizon)
Fares in all systems were below USD 1.05 per trip - most systems with fares below USD 0.40 are either receiving subsidies or under financial stress.

Guayaquil has been able to operate the new system Metrovía with USD 0.25 without subsidies. Supervision and planning agencies are, in general, funded with the general budget of the municipality.
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The most relevant planning issues observed were

- Funding for planning was scarce
- Lack of experienced local staff/consultants was also an issue and caused delays. In addition, lack of familiarity with BRT concepts made planning difficult
- Once decisions were firmly made, planning became secondary to implementation
- Definition of low target fares set by the political authority made financial planning difficult
- In general, the teams coordinating the efforts were outside the existing bureaucracy
Decision processes were diverse, and faced technical, regulatory and financial constraints

- When the leader was a top official (Head of Government) implementation came about in few months.
- All cities reviewed required changes either in the regulations and definition of authority or in the creation of new institutions to plan, develop and control the projects.
- Providing adequate levels of funding for infrastructure was challenging, even though most projects were relatively low cost.
  - New mechanisms to provide funding and grants from Nat’l or Regional governments were key to spark project implementation.
There have been different project scopes – from single corridor to citywide route reorganization with full integration.

<table>
<thead>
<tr>
<th>Single Corridor</th>
<th>Several Corridors Feeder Routes</th>
<th>City Wide Route Reorganization</th>
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<tbody>
<tr>
<td>Integrated</td>
<td>Megabús – Mexico</td>
<td>TransMilenio - Bogotá</td>
</tr>
<tr>
<td></td>
<td>BRT – Beijing</td>
<td>Metrovía - Guayaquil</td>
</tr>
<tr>
<td>Non Integrated</td>
<td>Jakarta (1, 2, 3)</td>
<td>RIT - Curitiba</td>
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<tr>
<td></td>
<td>Quito (Trole, Ecovía, North)</td>
<td>Interligado – Sao Paulo</td>
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Private participation has been preferred to public take-over – approaches to achieve PPPs include:

- **Negotiation with existing operators (Curitiba, Mexico, León, Quito, Jakarta, Beijing)**
  - Includes all existing stakeholders in the project
  - Opposition from operators, even if they are few, can lead to project failure
  - May be tilted in favor of the existing operators, especially if time runs out
  - Interest of special groups is privileged over larger public interest

- **Limited Bidding – priority to existing operators (Bogotá, São Paulo, Pereira, Guayaquil)**
  - Includes a number of stakeholders in the project – those not interested are left out
  - Interested stakeholders help the project advance, specially if they see their interests taken into account
  - Existing operators may have low technical capacity and managerial abilities – may cause additional costs, but learning process seems to be very fast

- **Open Bidding – no priority to existing operators (trunk routes in Santiago)**
  - Experienced operators (generally from abroad) are considered – lower costs
  - Places public interest over special interests, but can cause early rejection and total project failure
Implementation was rushed, but most problems were solved within the initial weeks – some repetitive issues

- Infrastructure and fare collection systems delivery was delayed (short lead times; contractual problems; delays in approvals by different authorities)

- Little time between bus delivery and start of operations - drivers’ training was incomplete in many cases.

- User education was scarce - gradual implementation helped

- Public protests caused problems during planning and implementation in some cities. Strict enforcement of the laws to restore public order and sometime repression was required. Support from different levels of government helped solving citywide standoffs.
Main operational concerns are high occupation, pavement maintenance, and pickpockets

- Systems have been designed for very high occupation to keep operational costs as low as possible
- Feeders services usually have long waiting times
- Pavement and other infrastructure maintenance does not have recurrent funding
- Personal security concerns (pickpockets), associated with low employment rates and lenient legislation
- In most cities, there is a service quality gap between organized and traditional services (in favor of organized services)
The main structural problems are financial and regulatory

- Most systems do not have automatic mechanisms to update user fares – there is usually political interference that may possibly affect financial equilibrium
- Expansion of the systems is limited due to pressures by existing operators and lack of funds
- No earmarked funds for maintenance (existing funds dedicated to system expansion)
- Lack of integration between traditional services and the newly organized systems – large scale, city-wide route modifications are difficult to apply (e.g. Santiago)
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Conclusions – General Background

- Most systems reviewed have improved travel conditions and the quality and performance of public transport.
- The main achievement has been travel time savings as well as enhanced reliability and safety.
  - As efficiency has improved, systems have also reduced energy consumption and emissions.
  - Urban enhancements are also evident in Curitiba, São Paulo (Passa-Rápido), Bogotá, Quito Trolebús, Pereira and Guayaquil where the appalling conditions of the corridors prior to systems implementation have dramatically improved.

Source: http://www.curitiba-parana.com/arquitetura-urbanismo.htm
Conclusions – Hitches, Hic-Ups and Areas for Improvement

- Planning problems were recurrent
  - Limited institutional capacity (human capital and funding)
  - Lack of familiarity with BRT concepts
  - Opposition from very strong private operators under a perverse incentives structures

- Initial operations were problematical in all cases
  - Commissioning was usually rushed, but most of the early problems were solved during the initial weeks

- The systems may require continuous improvements
  - High occupation, pavement maintenance, and personal security concerns - systems face financial and social limitations to solve these difficulties
  - Most systems do not have automatic mechanisms to update user fares
  - Lack of integration between traditional services and the newly organized systems
Recommendations - Planning

- Combine financial, legal and environmental aspects with engineering
- After the decision to proceed is made (hopefully on the basis of solid information) plan/design with a strong implementation and operations focus, with emphasis on the specific aspects of implementation for the given corridor
- Dedicate enough resources (time, money) for appropriate preparation
- Use experience from other cities as a reference, but adapt system components and characteristics to local conditions
- Try to create special purpose teams for system planning and implementation, not affected by day-to-day responsibilities
Recommendations – Decision Process

- Get approval of high level decision makers early on in the process (commitment from the top speeds up the process and helps solving interagency conflicts)

- Give priority to regulatory issues, adapting regulatory framework if required

- Be creative in funding project development, using new taxes, loans and nontraditional sources –privatizations, special purpose bonds. Funding often conditions project scope

- Involve existing operators to mitigate conflicts, but keep open bidding processes to reduce user costs
Recommendations – Implementation Approach

- Only attempt citywide reorganization of transit services when strong authorities are in place and where there is large public support.

- Try to go for gradual implementation, adapting the project on the basis of initial “demonstration” experience.

- Design issues
  - To the extent possible, use existing right-of-way to reduce land acquisition and non-voluntary displacement.
  - Reinforce or replace pavement structures to avoid rapid deterioration.
Recommendations – Implementation

- Generate a credible time table and stick to it to prevent rushed implementation. Commissioning dates are usually “non-movable” as they are attached to the end of terms of elected officials.

- Have contingent plans ready if system components are not complete.

- Dedicate some funding to plan and implement user education programs.

- If there are protests, emphasize general benefit over special interests and strictly enforce the law.
Recommendations - Operation

- Use the intrinsic flexibility of buses to match supply and demand. Feeder-trunk operations might not be the one-size-fits-all answer to all transport conditions.

- Focus on system integration during planning and design (e.g. match vehicle floor and station platform heights)

- Design vehicles (e.g., size, internal configuration, number of doors) and other physical features for market and service plan.

- Be aware that pavement maintenance is a permanent issue.

- Use strong dividers to segregate traffic.

- Prefer median lanes and level access platforms with many doors to access the buses to increase speed and reliability.

- Allow time to adapt and implement advanced fare collection systems.

- Use advanced transit management systems if operations are complex, and apply them as tool to control reliability, not just as a means of acquiring operational data.
Recommendations – Structural Issues

- Try to provide mechanisms for technical (automatic) definition of fares without political interference

- Make a strong effort to stick to operating contracts – permanent renegotiation is often tipped in favor of the operators

- Involve other transport initiatives and urban development concepts to enhance positive impacts and help project continuation

- Have a clear vision for system expansion and integration with other transport initiatives and services
Further potential studies

- Impacts on the poor
- The fare-versus-quality of service dilemma
- Acceptable levels of service (bus occupation, minimum frequency) for developing countries conditions
- The network design – feeder-trunk as opposed to diametric services with reduced transfers
- Regulatory frameworks / incentives structures – long term sustainability
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General Characteristics of each System

- Curitiba, RIT
- Quito, Metrobus-Q (Trolebús, Ecovía, Corredor Central Norte)
- Bogotá, TransMilenio
- Sao Paulo, Interligado
- León, Optibús
- México, Metrobús,
- Jakarta, Transjakarta
- Beijing, Beijing BRT
- Pereira, Megabús
- Guayaquil, Metrovía
- Santiago, Transantiago

- Features a wide range of services
- 65-km median busways, 139 stations, 26 terminals; a 22-km busway is under construction
- 340 Km of feeder routes, 185 Km of inter-district circular routes, 250 Km of ‘rapid buses” (express) routes; 340 bus lines, 1,100 kms of bus route
- 1,677 units, 114 bi-articulated diesel, articulated, conventional, small buses, special buses
- Electronic Fare collection, USD 0.76 flat rate per trip (discount for special groups)
- 1.2 million pax/day
- 7 private operators under agreements with a public authority

Population: 1’900,000 inhabitants

Source: City of Curitiba, 2002

- Three BRT corridors
- 37 Km median busways
- 68 stations, 9 terminals
- Integrated feeder services (each corridor)
- 189 articulated buses (113 trolley buses); 185 feeder buses
- Coin-based fare collection
- 440,000 pax/day
- USD 0.25 per trip (discount for special groups)
- Public operator/ owner (Trole, Ecovía); Private Operator (Central Norte)
- No fare integration among corridors.

Population: 1’600,000 inhabitants

Source: Transport Directorate, Quito, 2006
Bogotá, TransMilenio (Phase I 2000, Phase II 2003)

- High capacity BRT system
- 84 Km median busways;
- 104 stations; 10 integration points,
- Integrated feeder services
- Advanced centralized control
- 841 articulated buses; 344 feeder buses
- Electronic fare collection system
- 1,220,000 pax/day
- USD 0.51 per trip (flat rate includes integration)
- Five private groups partially formed by some traditional operators - 7 trunk, 6 feeder zone concession contracts

Population: 6’400,000 inhabitants

Source: TRANSMILENIO S.A., 2006
São Paulo, Interligado (2002-2005)

- Integrated system under single fare with BRT treatments in some corridors (Passa-Rapido)
- 104 Km median busways; preferential buslanes
- 327 transfer stations; 24 terminals
- 13,711 buses: Articulated 1,073 / Padron 5,599 / Conventional 2,423 / Microbus 3,063 / Minibus 1,553
- Electronic fare collection system “bilhete único”
- 5,761,000 pax/day
- USD 1.05 per trip (flat rate includes integration during a 2-hour period)
- Private operators under concession contracts with the public agency SPTrans

Source: Prefeitura de Sao Paulo, 2004
León, Optibús (2003)

- Three BRT trunk corridors
- 25 Km median busways (60% segregated)
- Three terminals, 51 stations
- Integrated feeder services
- Centralized control
- 52 articulated buses; 500 auxiliary and feeder buses
- Electronic fare collection system
- 220,000 pax/day
- USD 0.50 per trip
- 13 historic private concessionaries formed 4 new operators for trunkways and continue operation of feeder services

Population: 1’135,000 inhabitants

Source: Transport Directorate, León, 2006
México City, Metrobús Insurgentes (2005)

- One BRT Line
- 20 Km median busway
- 34 stations
- 2 terminals
- Centralized control using IT
- 84 articulated buses
- Electronic fare collection system
- 260,000 pax/day
- USD 0.35 per trip
- Two operators, one private, one public
- Physical integration with regional buses and Metro.

Population: 7’000,000 inhabitants
39% of the Metropolitan Area

Source: Metrobus, México, 2006
Pereira, Megabús (2006)

- Integrated System for a Small Metropolitan Region
- 27 Km buslanes, 38 stations, 2 terminals
- 51 Articulated Buses, 81 Small Feeder Buses, Electronic Fare Collection and Control
- 155,000 pax/day; 5,000 pax/hour/direction
- Electronic Fare Collection System – station ticketing for trunk buses / on board ticketing feeder buses (off board sales/recharge)
- Centralized Control (trunk buses with transponder)
- USD 0.48 per trip (integrated)
- 2 private operators of buses, 1 fare collection concessionaire

Population: 750,000 inhabitants

Source: Megabús, Pereira, 2006
Guayaquil, Metrovia (2006)

- 15.5 km exclusive buslanes on the median or left side on one-way streets, 36 stations, 2 terminals (system under expansion in 2007)
- 40 articulated buses and 10 conventional buses for trunk operations, 44 feeder buses
- Electronic fare collection system (on board feeders, in stations)
- Centralized control
- 96,000 pax/day, 5,000 pax/hour/direction
- One private concessionaire of bus operations (combined feeder/trunk); one fare collector and technology provider

Population: 2’000,000 inhabitants

Source: Transport Direction, Guayaquil, 2006
Santiago, Transantiago (2007)

- The system seeks integration among all transit services in the Metropolitan Area and optimization of transit provision (number of buses, kilometers run, travel time, emissions)

- Road based infrastructure: 18.8 Km of segregated corridors, 4.6 Km of new road connections, 62.7 Km of improvements in road geometry and pavements (in seven corridors, and improvements in intersections, 70 large bus shelters along the main corridors, and two intermodal stations)

- 1,200 new low-floor articulated buses, 1,500 conventional trunk buses (to be gradually replaced by new low-floor buses), and 2,300 feeder buses. Privately operated through 14 concession contracts.

- Integrated financial system to sell, validate, consolidate and report transactions, using contact-less cards (off board sales, on board validation). Privately operated.

- Integrated information systems for operational control and user attention. Privately provided.

- Metro network expansion of 66 Km and 68 stations before year 2010. 45 km were built between 2000 and 2006.

- Integrated User Fare of USD 0.70 per trip (initially flat fare)

Source: Sectra, 2006
Summary of Main Issues in selected systems

- Quito, Metrobus-Q (Trolebús, Ecovía, Corredor Central Norte)
- Bogotá, TransMilenio
- León, Optibús
- México, Metrobús,
- Pereira, Megabús
- Guayaquil, Metrovía
- Santiago, Transantiago

**Things done well**

- The concept of organized feeder-trunk operations has evolved as the paradigm of public transport in Quito
- The infrastructure costs have been very low
- Inclusion of electric trolleybuses for the first corridor – good environmental performance and distinctive image
- Adaptation of narrow streets in historic district, giving priority to public transport
- High performance

*Things that perhaps should have been done differently*

- Corridors do not have physical and fare integration yet.
- Fares are politically defined and do not cover operation and bus capital costs.
- A transition to private operation could be beneficial, but no adequate mechanisms have been used.
- Some infrastructure problems: pavement rutting and station floor deterioration; Corredor Norte has not been completed yet.
- Implementation of advanced fare collection technologies has been delayed.
- Invasion of the busways by general traffic and pedestrians

Photos: D. Hidalgo 2006

**Critical positive enablers**

- International cooperation, e.g. UNDP and the Government of Spain
- Decentralization of transport authority from the National government to the municipality of Quito.
- Continuous mayoral support, even with changes in political parties.
- Initial leadership of project director César Arias; continued leadership of Architect Hidalgo Nuñez
- Initial success of the Trolebús corridor

Photos: D. Hidalgo 2006

**Critical barriers**

- Opposition from existing transit operators
- Negotiations with historic operators have brought unbalanced results for the city.
- Not enough capacity has been built in public authorities, also limited by remuneration scales.
- Very low fare (USD 0.25) does not cover capital investment in Trolebús and Ecovía, and may cause financial problems to private operators in Central Norte
Bogotá, TransMilenio (Phase I 2000, Phase II 2003)

Things done well

- Planning and implementation in a very short time.
- Adequate distribution of responsibilities, incentives and risks for public-private participation
- Regulation and control through binding contracts awarded after a competitive process.
- No operational subsidies required.
- High performance

Photos: D. Hidalgo 2006
Bogotá, TransMilenio (Phase I 2000, Phase II 2003)

Things that perhaps should have been done differently

- Some pavement structures and station floors had early deterioration
- Implementation was rushed; several details had to be adjusted with the system under operation.
- Fare collection implementation could have had longer timetable and stronger supervision.
- Infrastructure for Phase II could have been designed and constructed at lesser cost.
- Implementation for Phase II could have been preceded by large scale user education campaign.
- Better reorganization of remaining routes and actual reduction of capacity in traditional system.

Photos: D. Hidalgo 2006
Bogotá, TransMilenio (Phase I 2000, Phase II 2003)

**Critical positive enablers**

- Leadership of Mayor Enrique Peñalosa, continued in succeeding administrations
- Conformation of a planning and implementation team outside the existing institutions
- Dedication of time and effort to carefully design system components (technical, financial, legal, regulatory)
- Existence of basic planning data from previous studies
Bogotá, TransMilenio (Phase I 2000, Phase II 2003)

**Critical barriers**

- Opposition from existing operators, especially bus owners. Priority was given to existing bus companies (and bus owners in Phase II).
- Buses were initially considered unsuitable for very high demand transit corridors. Operational design of express and local routes with very high capacity.
- Busways had a very bad perception. It was necessary to improve the urban space and develop a distinctive image.
- Low prevailing transit fares, required the highest efficiency and even redefine components to match cost and revenues.
- Interference from non project participants within the government – solved through leadership of the Mayor.

Photos: D. Hidalgo 2006
León, Optibús (2003)

**Things done well**

- City wide transformation with the participation of all the traditional operators.
- The infrastructure costs have been very low.
- High performance/good users’ ratings
- Integrated fare collection systems preceded the implementation of high capacity corridors
- Fares are defined by technical formulae. The system does not require public subsidies
León, Optibús (2003)

*Things that perhaps should have been done differently*

- Implementation was rushed. Most problems were corrected in the first months of operations.
- Some pavement rutting, conflicting left turns to general traffic, downtown bottleneck in Av. Alemán,
- Invasion of the busways by the general traffic, especially at intersections/lack of enforcement and driver’s education.
Critical positive enablers

- Support to transport studies by the National Government with IBRD loans in the early 1990’s gave planning background information and basic concepts.
- Gradual decentralization of transport authority from the State level to the municipality of León.
- Leadership of Luis Enrique Moreno.
- Grouping of the traditional companies into a single syndicate “Coordinadora de Transporte”.
- Creation of a trust fund with a contribution from passenger fares enabled several improvements and studies.
León, Optibús (2003)

**Critical barriers**

- Changes in state laws were required to allow transition of authority form the State to the Local level, and creation of a capable agency within the municipal structure.

- Initial opposition of traditional operators; they eventually found out that change was also positive for their own interest.

- Funding for system infrastructure (initial and phase two). Creative financing, such as the concession of stations and bus stops for advertisements.

- Lack of control of invasions of the busways by general traffic.
México City, Metrobús Insurgentes (2005)

*Things done well*

- Planning and implementation took a very short time.
- Infrastructure costs were relatively low.
- Showed the potential of high capacity/better quality bus operations.
- Involves private operators formed out of existing concessionaries.
- High performance/ good users’ ratings

Photos: D. Hidalgo 2006
México City, Metrobús Insurgentes (2005)

*Things that perhaps should have been done differently*

- Implementation was rushed. Most problems were solved during the first weeks of operation.
- Financial planning was too tight (little room for contingencies) and assumptions were on the optimistic side – operational deficit.
- Early destruction of several segregation devices, bad alignment of some stations, conflicting turning bays for general traffic, and interference in *Glorieta Insurgentes*. Pavements were not initially reconstructed.
- Fare collection implementation could have longer time-table and stronger supervision.
- Direct assignment of the bus operation contracts and fare collection administration.
México City, Metrobús Insurgentes (2005)

Critical positive enablers

- Leadership of Secretary Claudia Sheimbaum – creation of a planning and implementation team outside the existing institutions

- Constructive pressure from environmental groups - NGOs, international development institutions,

- Selection of a highly visible corridor with low technical and political requirements for initial implementation.
México City, Metrobús Insurgentes (2005)

**Critical barriers**

- Opposition from existing concessionaries. Good conditions were negotiated with them.

- Low technical capacity and hands on experience of the implementation team and consultants. Technical cooperation partially covered the gaps.

- Low target fare (USD 0.35) generated financial difficulties for the corridor to be self-sustainable.

- Interference from non project participants within the government, required the intervention and leadership of the Head of Government.
Pereira, Megabús (2006)

Things done well

- Metropolitan implementation covering two municipalities
- Good technical preparation with the support of competent consultants
- The institutional arrangement provides an adequate distribution of responsibilities, incentives and risks in project development and operation
- Regulation and control instrumented through binding contracts awarded after a competitive process. Priority to existing operators and bus owners.
- No operational subsidies required. The fare of USD 0.48 is the same as for traditional services (includes integration with feeder buses)
- High performance: trunk commercial speed of 20 km/hour; more than 3,000 pax/per bus per day.
- Project complements urban renewal initiatives.
Pereira, Megabús (2006)

*Things that perhaps should have been done differently*

- Infrastructure delays: Timing of national and WB approvals; slow approval of intervention in utility networks, initial inexperience of the implementation team, discussions with the local engineering trade union, and changes in project scope during the implementation process.

- Construction delays caused pressure to initiate operations with only partial infrastructure and temporary facilities.

- Insufficient stock of farecards made it necessary to start operations with low-security paper tickets.

- System success was hampered by poor route reorganization of the traditional bus system. Better coordination between the transport authority (AMCO) and Megabús S.A. is required.

- Temporary terminals were too small causing operational problems.
Pereira, Megabús (2006)

Critical positive enablers

- National policy supporting BRT development. Synergies obtained from National Urban Transport Program.

- Continued mayoral support in the city of Pereira over three different administrations. Leadership of Mónica Vanegas.

- Conformation of a planning and implementation team outside the local transport and public works departments, with enough capacity to develop system components.

- Participation of all the transport companies (seven) and some vehicle owners. Competitive bidding process.

- Resettlement policies that minimized social disruption and gave fair compensation to all affected groups, including vulnerable population.
Pereira, Megabús (2006)

Critical barriers

- Initial opposition from existing operators, later transformed into collaboration as they became members of the new transport companies.

- Urgency of transport reform was not perceived critical, as travel times and transport conditions appeared acceptable. Nevertheless, the old incentives structure was prone to cause rapid deterioration of passenger services.

- Low public transport fares (USD 0.33) and difficulties to raise them. It was necessary to design the system for the highest efficiency and even to redefine components to match cost and revenues. Nevertheless, final fares were 40% higher than initially expected, because operators were required to cover part of the infrastructure costs, and because the authority was assigned a relatively high percentage of total fare revenues.

- There was political interference and fierce competition among stakeholders.
Guayaquil, Metrovía (2006)

**Things done well**

- Clear objectives and leadership of the Mayor Jaime Nebot, with an adequate arrangement of responsibilities according to the local conditions.

- Technical preparation of the system components, using adequate transport engineering methods and assistance of competent consultants.

- Regulation and control are instrumented through binding contracts. Priority to existing operators and bus owners was given in the selection process.

- No operational subsidies required. The fare of USD 0.25 is the same than traditional services and allows for full integration within the system.

- High performance: trunk commercial speed of 22-25 km/hour; more than 12,000 pax/per direction, and 2,600 pax/bus/day (expected).

- Creation of a solid institutional structure through a innovative arrangement involving key representatives of the private sector.
Guayaquil, Metrovía (2006)

*Things that perhaps should have been done differently*

- The system fare is set by a national body and does not have any connection with system costs. If the system cost becomes greater than the national fare of USD 0.25, the system will face financial stress.

- Rushed implementation. The political agenda resulted in very tight timetables, difficult to comply with for system participants, specially the technological integrator (control, fare collection).

- Implementation was not preceded by an adequate user education campaign, resulting in problems and frustration during the first days of operation.

- Sequential approval of infrastructure design by different agencies (public works, urban planning and utility companies) caused unnecessary delays.

- Turnstiles were acquired directly by the municipality and there were problems in systems integration.
Guayaquil, Metrovía (2006)

**Critical positive enablers**

- The recent administrative successes by the previous Mayor León Febres-Cordero (1992-1996 and 1996-2000), created a positive image of the municipal administration and generated support from the general public.

- The continuous leadership and oversight of Mayor Jaime Nebot.

- The credibility generated in public transport operators by previous projects in Ecuador and Colombia (TransMilenio).

- Existence of an Urban Development Regulatory Plan, which provided an adequate framework for system design and implementation.

- International technical cooperation through the United Nations Development Program UNDP and UN-Habitat. Participation of knowledgeable international consultants and fast learning process of local universities and professionals.
Guayaquil, Metrovía (2006)

Critical barriers

- Initial opposition from existing operators; later transformed in participation of all traditional transport providers.

- The tradition for car-oriented road construction, including tunnels, flyovers and interchanges. This was replaced by a vision of sustainable transport, connected with urban regeneration and orderly development.

- Contracting system in Ecuador, which is very inflexible. This was mitigated by the participation of international cooperation agencies and the creation of new type of agencies, with private contracting rules but under the supervision of control agencies.

- Scarce technical capacity of local professionals, mitigated with international technical cooperation and the participation of the local universities. There was a fast and productive learning process.
Santiago, Transantiago (2007)

Things done well

- Citywide and systemic approach for overall service improvements, including total integration of bus and metro services.

- Technical approach to the solution of transport service provision, using state-of-the-art planning tools and using the extensive Chilean experience in private participation in the provision of infrastructure and utilities.

- Open, competitive process to award concessions (bus operations) with flexibility to introduce changes and adequate support to the participants.

- High quality Metro expansions (45 Km), completed at a relatively low cost in a very short time.

- Strict law enforcement to overcome the violent opposition of traditional transit providers (2002).
Santiago, Transantiago (2007)

Things that perhaps should have been done differently

- Lack of a strong planning and implementation team from the beginning with coordination authority and continuity

- Unclear definition of the priorities – Metro expansion emerged gradually as the backbone of the system and displaced the bus system from the priority list in terms of funding.

- Design principles of the reorganized route system prioritized reduction in costs and environmental emissions over passenger convenience. The resulting operations increased walking, waiting and transfer times, and led to overcrowding, both in buses and the metro network.

- There was no real open competition for the financial administration concession. Changes in the conditions led to a single proponent, with large leverage over public authorities.

- Transition phase (October 2005- February 2007) was poorly defined and resulted in several operational problems, financial losses and lost of public confidence in the Transantiago system.

- Planning delays generated the need for a very short implementation time table. Infrastructure and support systems were neither ready for the initially established date (October 2006), nor for the final date (February 10, 2007).

- User education was not enough for the large changes introduced in route itineraries and frequencies.
Santiago, Transantiago (2007)

**Critical positive enablers**

- The plan was a priority for President Ricardo Lagos; he provided the leadership to give adequate momentum to the project. Implementation became a priority to the government of President Michelle Bachelet after the implementation difficulties in February 2007.

- Strong institutions and knowledgeable professionals supporting the decision making process, planning, implementation and oversight. Adaptation and improvements were possible after implementation difficulties in February 2007.

- Strong planning abilities of government institutions, local universities and consultants and availability of information (Origin-Destination Matrix 2001).

- Good economic conditions provided an adequate setting for long term concessions and direct foreign investment.

- Large scope of the project (1,000+ new articulated buses, gradual replacement of 3,000 conventional units) was very attractive for bus manufacturers, which made a significant effort to provide adequate conditions and to finance project participants.
Santiago, Transantiago (2007)

**Critical barriers (I)**

- Coordination among several government institutions. This was partially solved through the creation of a decision making ministerial committee and a technical secretariat (Transantiago). Still, differences in views and interests of different agencies and government officials resulted in strong changes in project scope, definitions and funding.

- Metro agenda. The officials in the Metro Company feared loss of corporate privileges (fare definition, planning for expansions), and wanted to re-invest operational surpluses in Metro (extensions, expansions). This agenda prevailed, and large capital investments in Metro (USD 2,500) were approved and implemented. The bus component did not receive the same level of funding and had more implementation difficulties due to the intrinsic complexities of bus institutional framework and to the lack of political priority.
Santiago, Transantiago (2007)

**Critical barriers (II)**

- Existing dispersed operations and lack of regulatory instruments. Partially solved with a good mix of incentives (guaranteed income, use of existing fleet), use of the principle of authority (violent protesters were brought to justice) and continued help from the project implementation team. Despite this, external providers were able to offer improved conditions (large financial deposits in the contingency fund), and most traditional providers were left out, staging new protests in 2006 and looking for mechanisms to continue their traditional operations.

- User and public opinion. Given the appalling service conditions, transformation of the bus operations was perceived as a major requirement by the population at large. Nevertheless, there was low credibility of government institutions on their ability to make large scale modifications of the transport industry (different than Metro expansions). This barrier was not removed when Transantiago got fully in operation and is still a large liability.
Interesting developments in 2007

- Curitiba – implementation of the new BRT corridor and integrated electronic fare collection system – regulatory issues
- Quito – discussion on the replacement of the trolleybus corridor by a Light Rail Transit system – System integration – Complete implementation of the North Corridor
- Bogotá – Phase III Expansion of TransMilenio - Integration of Conventional Services to the Mass Transit System – Discussion of rail alternatives including a regional rail system
- Sao Paulo – Impact of Metro Expansion – Consolidation of the Integrated Fare Collection System
- León – Phase II Expansion to cover all transit needs (GEF-funded studies underway)
- Jakarta – Expansion to additional corridors – Integration – complementary policies (public space, urban tolls to general traffic)
- México – Expansion to additional BRT Lines (10 lines being planned for the next four years)
- Beijing – Expansion and integration of new planned corridors
- Pereira – Finalize construction of infrastructure and urban development initiatives – integration/competition from traditional services
- Guayaquil – Completion of System Implementation (2007-2009)
- Santiago – Solution of implementation problems in the short and medium term (increased capacity, dedicated infrastructure, user information systems, contractors performance)
- Systems being implemented in other cities (China, Colombia, Tanzania, South Africa…)