THE INTERFACE BETWEEN TRUNK AND FEEDER SERVICES: LESSONS FROM SOUTH AMERICAN CITIES

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Abstract

Many cities in the developing world are engaged in efforts to reconfigure their public transport systems and improve qualities of service. With some notable South American exceptions, a characteristic shared by these cities is heavy reliance on paratransit services, which are often poorly regulated and operated as informal businesses. Current projects and initiatives aimed at transforming public transport systems, more often than not, ignore or downplay the role of paratransit services. While clearly beset by a variety of problems associated to poor regulatory frameworks and destructive competition, it has been argued that the intrinsic characteristics of paratransit operations offer important advantages in terms of adaptability to the changing urban structures of contemporary developing world cities and of service innovation, and that attempts to eradicate them may be neither pragmatic nor strategic.

This paper reports upon an analysis of selected contemporary projects in South American cities that include a trunk and feeder. Its main focus is on the role of the feeder element in trunk and feeder schemes. Case analysis includes a description of the prevailing regulatory frameworks leading to this option and its outcome. The paper draws lessons from the selected cases with regard to the strengths and weaknesses of alternative trunk and feeder arrangements, and to possible roles for paratransit services. With regard to the latter, three alternatives for the inclusion of paratransit services in a trunk and feeder scheme are identified: (1) area licensing; (2) reward mechanisms; and (3) concessions. It is argued that the acknowledgement and inclusion of paratransit services under any one of the three alternatives can, if appropriately implemented, lead to a complementary planned – paratransit service relationship that takes account of path dependencies in developing world cities.

1. Introduction

Many developing world cities are currently planning or implementing significant transformations to their public transport systems. This comes as a result of a crisis in the road-based public transport
systems as they experience decline in frequency service, loss of demand to private modes, increased operational costs, higher fares, amongst others (Figueroa, 2005). Transformation projects are usually based on the introduction of a new transport network meant to create significant changes in the overall transport system.

This paper reports on an analysis of selected case studies of public transport transformation. It is part of on-going research investigating developing world cities that are undergoing a significant overhaul of their transport systems, focusing particularly on interaction between incumbent operators and the newly implemented systems (most commonly bus rapid transit –BRT– systems). The main objective is to draw lessons from one interaction alternative –amongst others– in a modified system: the trunk and feeder model.

Three different arrangements to the trunk and feeder model were previously identified: (1) the rewards mechanism; (2) area licensing; and (3) concessions or franchises (see Salazar-Ferro et al., 2012). Selection of two of the cases studies (Santiago, Chile and Quito, Ecuador) resulted from a previous literature review. Visits to the cities were later conducted, as well as interviews with persons involved in the transformational process, in order to gather missing information. The third case (Valparaiso, Chile), representing a unique example in terms of mode integration and operating environment, was chosen while conducting a study tour of Santiago. Evaluating the relative success or failure of the overall transformation projects is less important in this research than understanding the nature of the trunk and feeder service interaction.

By analysing the three cases presented in this paper, the importance of context-conscious solutions in on-going public transport transformational initiatives is highlighted. Each one of the cases presents very different operating environments as well as different levels of engagement with existing operators, therefore depicting unique approaches to the implementation of a trunk and feeder scheme. The case analysis conducted allows reflection on advantages, shortcomings and lessons.

The paper is divided into five sections. The following section is dedicated to the analysis of Santiago’s new transport system, with particular focus on its road-based model. Section 3 then presents an analysis of Valparaiso’s recently implemented arrangement between a metro system and a privately operated bus system. Section 4 concerns the study of Quito’s transformational process, focusing particularly in the trunk and feeder scheme implemented in the Ecovia project. Finally, the fifth section of the paper is dedicated to discussion and drawing conclusions from the analysis of the cases presented.

2. Santiago’s citywide trunk and feeder system

2.1 Overview of Santiago’s historical transformational process

Santiago’s 2007 public transport system overhaul attracted negative public perceptions at launch, which has arguably overshadowed some of Transantiago’s benefits. Some sectors of society have idealised the previous public transport system because of Transantiago’s initial implementation problems (Muñoz & Gschwend, 2008; Muñoz et al., 2008). The project is sometimes wrongly considered a BRT-only proposal and, consequently, some analyses fail to describe the plan as a relatively integrated citywide system that includes the metro network and a recently implemented bus-based network (leaving only collective taxis relatively isolated in the public transport system).

Santiago’s public transport system overhaul can be traced back to a tendering process in the early 1990s that first introduced a route concession model. After the deregulation process of the 1980s, Santiago’s public transport system was experiencing significant inefficiencies: private operators had doubled the private operating fleet that, at the same time, was composed of gradually smaller vehicles (see Table 1); and the fare was twice as expensive as before the start of the decade (Fernández, 1994). The characteristics of this public transport system were not all negative, however, as the territorial coverage was high and frequencies between buses, in part due to the oversupply and duplication of routes, were convenient to users (Fernández, 1994).
Table 1: Evolution of Santiago's bus fleet

<table>
<thead>
<tr>
<th>Year</th>
<th>Conventional bus fleet</th>
<th>Minibus fleet</th>
</tr>
</thead>
<tbody>
<tr>
<td>1981</td>
<td>4 197</td>
<td>2 222</td>
</tr>
<tr>
<td>1982</td>
<td>4 437</td>
<td>2 142</td>
</tr>
<tr>
<td>1983</td>
<td>4 828</td>
<td>2 590</td>
</tr>
<tr>
<td>1984</td>
<td>5 548</td>
<td>2 703</td>
</tr>
<tr>
<td>1985</td>
<td>5 648</td>
<td>2 700</td>
</tr>
<tr>
<td>1986</td>
<td>5 323</td>
<td>2 917</td>
</tr>
<tr>
<td>1987</td>
<td>6 884</td>
<td>3 378</td>
</tr>
<tr>
<td>1988</td>
<td>7 482</td>
<td>4 145</td>
</tr>
<tr>
<td>May 1990</td>
<td>6 545</td>
<td>4 577</td>
</tr>
<tr>
<td>Dec 1990</td>
<td>7 131</td>
<td>4 710</td>
</tr>
<tr>
<td>Jun 1991</td>
<td>5 271</td>
<td>4 322</td>
</tr>
<tr>
<td>Dec 1991</td>
<td>5 559</td>
<td>5 343</td>
</tr>
</tbody>
</table>


After significant obstacles that included a public transport operator citywide strike in April 1991, a first transformation strategy was put in place. Apart from reducing the public transport fleet and re-regulating the system, this strategy set the foundation for future public transport system transformation by successfully conducting a tendering process for 255 route services. Most of those services (82%) were assigned to incumbent operators that had previously created formal operating companies, and the rest (18%) were assigned to un-transformed companies that were given a six-month deadline to create formal operating companies (Fernández, 1994). This process provided the basis for later public transport initiatives as it encouraged a relatively early corporatisation of existing bus operators.

The first concessions experience of 1991 did not significantly affect the system’s territorial coverage and frequencies (Díaz et al., 2004). Most bus routes linked different areas in the city with the central area, providing direct services to users. As a result, very few transfers were needed; it is estimated that only 7% to 15% of trips required transfers during the morning peak hour (Forray & Figueroa, 2011). In 2001, the city had 316 assigned route tenders, of which 289 corresponded to Santiago’s characteristic yellow micro-buses (Díaz et al., 2004). Ownership of public transport vehicles was nonetheless still highly fragmented and, sometimes, informal: there were 8 000 buses operating in Santiago and around 4 000 operating companies (Muñoz et al., 2007).

A second transformational process, the Urban Transport Plan for Santiago (Plan de Transporte Urbano de Santiago) –PTUS– was then published in 2000. The plan included the implementation of a trunk and feeder system for Santiago’s road-based public transport network, Transantiago. The intention was for authorities and operators to radically change the overall transportation network.

1 This concession model was later taken as a reference in Bogota’s relatively successful BRT implementation in 2000 (pers. com. Figueroa, 2012).

2 According to Díaz et al. (2004), the average number of vehicles per company was 2.11 vehicles. In 2001, the city had some 120 route concessionaires.
Authors argue that the main motivations for the implementation of Transantiago were the inefficiencies of the previous system, growing concerns over pollution in the city (Gómez Lobo, 2007) and the need to challenge growing car ownership with an efficient and relying public transport service (Morándé Lavín & Doña, 2007). These two justifications fit into what has been described as a discourse on modernisation of the transport system (Maillet, 2008).

In February 2007, the new integrated citywide system described in PTUS was put in place—with problems that, in some cases, still persist. The citywide overhaul of the public transport system, often referred to as the ‘big bang’ approach, was essentially introduced overnight: going from a direct services based network to a trunk and feeder model. On the launch date, the proposed centralised fare collection company was not yet ready (and therefore the integrated fare was still not possible) (Gómez Lobo, 2007). Furthermore, most of the exclusive road space initially proposed was still not built (Forray & Figueroa, 2011; Muñoz et al., 2008), just as stations were, in some cases, improvised. Apart from an initial poor public image and associated idealisation of the previous bus model, the implementation of Transantiago has delivered positive changes citywide (e.g. citywide fare integration, greater operational effectiveness of the system, pollution levels improvements, crash reductions, amongst others (Muñoz, 2012)). Furthermore, the citywide attempt at service integration is noteworthy in the context of typically non-integrated developing world public transport systems. Nonetheless, implementation of such a drastic change came with significant difficulties.

2.1. The trunk and feeder model: Trunk corridors and operational areas

The trunk and feeder model drastically modified the public transport network. Besides reducing the number of companies, the previous 370 road-based routes were replaced by 193 routes under the new scheme (Forray & Figueroa, 2011). Of those 193 routes, 83 corresponded to trunk services and 110 to feeder services. This meant that the total length of the network was reduced from approximately 12 000 kilometres to 5 343 kilometres (Forray & Figueroa, 2011); thus aiming at optimisation in the servicing of origin and destination travel demand patterns (Minteguiaga, 2006). However, the move from direct services to a trunk and feeder arrangement also increased the need to transfer: it is estimated that the percentage of trips requiring transfers increased from approximately 10% to around 60% (Gómez-Lobo, 2012). Since its implementation, transfers have therefore been considered to be a weakness of the system as they generate inconvenience to users (Forray & Figueroa, 2011; Briones, 2009).

Transantiago’s first tendering process included five road-based trunk operators and ten, later nine, feeder area operators. This model was meant to cover the entire urban territory of Santiago. With regard to trunk services, operations were assigned to two former bus operators (who had relatively large bus fleets), to two new international (Colombian) operators and to a newly established Chilean bus company (pers. com. de Cea, 2012). Areas assigned to feeder operators were won by former operators in Santiago (pers. com. de Cea, 2012).

The five concessions for trunk services in Santiago created a fairly dense trunk network, which has not required modification in response to travel pattern changes (Briones, 2009). At present, most trunk corridors are still missing exclusive infrastructure—as was initially planned—and they are, more often than not, operating in mixed traffic. According to the initial model, the BRT system was to have approximately 284 kilometres of exclusive infrastructure (Forray & Figueroa, 2011). Currently, the built exclusive infrastructure for buses of Transantiago is estimated to be composed of 90 kilometres of segregated corridors, 101 kilometres of bus-only lanes and, finally, 31 kilometres of exclusive roads during peak hours.

The current lack of exclusive infrastructure has undoubtedly had a negative impact on travel times. Similarly, this lack of infrastructure has also generated a reduction in the productivity of the system (Muñoz, 2012; Hidalgo & Grafiteaux, 2007).

Regarding feeder services, the city was divided into licensing or operational areas where a particular bus company would operate bus routes limited to that area. Through a tendering process, all nine feeder areas were assigned to incumbent operators. These operators had previously formed formal operating companies (mostly during the 1990s transformation) or were given a limited timeframe to
switch from groups of associations to formally established bus companies (pers. com. de Cea, 2012). Authors refer to this type of structure as areas served by ‘mono-operators’ (Briones, 2009). All routes inside the designated area and operated by a particular bus company are considered feeder services. This type of arrangement effectively eliminated competition ‘in the market’, which removed destructive competition between operators, but also arguably resulted in a decline in service effectiveness associated captive passengers and a lack of competition in the area (Briones, 2009).

The territorial division of the city (see Figure 1) defines the nature of integration in the model. Confined to each operational area, feeder services connect urban neighbourhoods of Santiago to either trunk bus services or the metro network. Nonetheless, as could be expected, an operational optimisation of bus routes following an area division of the territory also led to a loss of capillary services in the peripheries (inhabitants were initially forced to walk longer distances with the new system) (pers. com. Figueroa, 2012; Forray & Figueroa 2011; Briones 2009).

The initial territorial division of the urban territory into operating areas did not come without problems. Critics to this division argue that it resulted in a mismatch between operating areas and the catchment areas of public facilities (i.e. hospitals, schools, etc.) (Forray & Figueroa, 2011). Overall, the area division resulted in an excessively rigid system. Santiago is currently in the process of renegotiating the operational contracts; one of the main discussion points in the relaxation of the areas scheme (Muñoz, 2012) to allow for ‘intermediate’ or ‘complementary’ routes that link different areas without requiring the use of existing trunk services and reducing the need to transfer.

**Figure 1: Transantiago’s operational feeder areas**

![Transantiago’s operational feeder areas](http://commons.wikimedia.org/wiki/File:Transantiago.svg, visited in June 2012 and authors.)

3. Valparaiso’s metropolitan region rail-based services and feeder buses

3.1 General description of the transformational process

In November 2005, the metropolitan region of Valparaiso, in Chile, inaugurated a rail-based public transport corridor. As is presented in Figure 2, the 43 kilometre network operates in the metropolitan area of Valparaiso and links it to the municipality of Limache to the east. The system
can be considered a mixture of metro-type service between the Puerto and El Salto stations and between the Quilpué and Peñablanca stations; and it can a suburban service elsewhere.

Figure 2: Valparaiso's metropolitan rail network

The new system revitalised a pre-existing rail service that had become outdated and required urgent infrastructural investments. During the last operational years of the previous rail service, old rolling stock (some vehicles were 40 years-old) resulted in frequent system failures and interruptions (Merval S.A. – Gerencia Etapa IV, 2006). In 2001, the rail system was responsible for carrying a relatively low demand (8.6 million passengers per annum), with peak demands of approximately 2 400 passengers/hour/direction (Merval S.A. – Gerencia Etapa IV, 2006). Initially the new system considered arrangements with existing bus operators in the greater urban area to allow for complementarity between existing road-based services and the new metro network. Ultimately this was not achieved because of incompatibilities between an on-going route concession project that was still unresolved in 2006 (pers. com. Coeymans, 2012). In Limache, unlike other municipalities involved in this system, planners managed to implement a scheme that encouraged complementarity between the newly rebuilt rail system and the incumbent private bus operators. This integrated scheme is referred to as Bus+Metro. The scheme mixes elements of a rewards mechanism and of a concessions model as four private bus operators bring passengers from Limache, and from nearby towns of Quillota, La Calera and, more recently, Olmué (three of them to the east of Limache, not shown in Figure 2) into the new metro system station. Each operator is responsible for a bus route that was modified and slightly shortened (compared to the previous route) in order to better function as a feeder to the rail system (pers. com. Coeymans, 2012; pers. com. Obando, 2012). Operators are paid by the rail company who collects all fares. The income is based on the number of passengers transported along a certain distance.

3.1. The trunk and feeder model: Rail-based trunk and road-based feeder
Current feeder operators on all four routes involved in the scheme were former private bus operators. Participation in the trunk and feeder arrangement was voluntary but required bus businesses to be compliant with Chilean employment laws (pers. com. Obando, 2012). According to metro authorities, the scheme has been beneficial to bus owners and bus drivers alike (pers. com. Obando, 2012). Bus drivers have seen their working conditions improve while bus owners are receiving enough income to be able to renew their fleet (as required by the contract with the metro authority) (pers. com. Obando, 2012). Similarly, metro operations have found significant benefits from the scheme as ridership has increased without increasing the rail network coverage, and as result new bus feeder routes are being considered (i.e. Olmué’s recently established bus link).

The complementary scheme has resulted in operational and capital costs savings: the non-construction of the rail link between Limache and La Calera (through Quillota) has reduced the
initially envisioned overall capital costs of the system without significantly compromising patronage. Estimations from 2005 suggested that the demand for public transport between Quillota and Valparaiso was approximately 5.1 million passenger trips per annum (Merval S.A. – Gerencia Etapa IV, 2006). The link between La Calera and Valparaiso did not have reliable data, but analyses suggested that the actual passenger demand would be in the 0.7 million per annum to 1.1 million per annum range (Merval S.A. – Gerencia Etapa IV, 2006). When first proposed, the system (that included rail-based links to Quillota and La Calera) was expected to serve 20 million passenger trips per annum (pers. com. Coeymans, 2012). However, before the implementation of complementary services between the three first bus links and the rail system, the corridor was carrying an annual ridership of approximately 12-13 million passengers (pers. com. Kausel, 2012). Currently, after integration, the metro line is now responsible for approximately 17-18 million passengers per annum, most of this increase is considered to be the effect of the Bus+Metro arrangement (pers. com. Kausel, 2012). Figure 3 presents the demand evolution of the system.

As the patronage evolution shows, the increase in demand happened relatively quickly. Nonetheless, this is not the case for most transport projects. Explanations for Valparaiso’s relative success can be found in its operating environment characteristics. The Bus+Metro arrangement was introduced in areas with low demands: all four municipalities can be broadly defined as small rural towns. Densities are relatively low when compared to nearby cities: Quillota’s urban density is approximately 2.5 inhab/ha while Valparaiso metro’s density is roughly 53.0 inhab/ha (Demographia, 2010). Accordingly, urban activity areas are not as intense as in other parts of the rail network catchment area. The previously developed public transport system presented few options when travelling between towns. Consequently, the introduced feeder buses broadly reproduced previously existing inter-town links and, therefore, passenger trips did not require major changes and/or adaptation. Furthermore, users were able to transfer quickly and relatively cheaply in the intermodal station.
4. Quito’s BRT corridors and feeder services

4.1 Transformational process based on BRT corridor implementation

Like many developing world cities, before the implementation of its first public transport transformational process, Quito was dependent on a problematic bus-based system. The system was characterised by low quality services (inadequate and old vehicles), and a lack of planning, regulation and control (Hidalgo & Grafiteaux, 2006). The first project built in Quito was the Trolebus project, in 1995. This initiative appeared out of an acknowledged necessity to improve existing conditions (pers. com. Arias, 2012). From the start, buses were operated by the Quito municipality and it was expected that this first corridor would serve as an example to private operators. More than 1,000 privately operated paratransit vehicles were removed from the roads of the city, affecting in one way or another approximately 80% of routes of the existing public transport system (pers. com. Castillo, 2012).

Responding to a linear urban form, a second project, Ecovia, was planned and implemented in 2001 along a road parallel to Trolebus (Figure 4). Initially projected as a corridor to be operated by private traditional operators, Ecovia’s implementation was slow and difficult, and eventually required significant changes to the initial idea resulting in authorities taking over as trunk service operators (Hidalgo & Grafiteaux, 2006).
After the implementation of the Ecovia project, in 2005, a further BRT project (Central-Norte) was built. The new corridor operates in another essentially parallel corridor to the Ecovia and Trolebus corridors. Because of Quito’s linear shape and its activity concentration in the centre of the city (Municipio del Distrito Metropolitano de Quito, 2009), trunk services carry sufficient demand along their exclusive corridors. The three corridors have not achieved integration: they basically operate independently from one another3 (Pardo, 2009). There is, however, integration between the trunk and feeder services of each corridor (Trolebus, Ecovia and Central-Norte).

3 There is, nonetheless, one bus service connecting Trolebus and Ecovia corridors. But this service only links the terminal station of Trolebus with Ecovia’s final regular station and its terminal station.
The interface between trunk and feeder services in Quito occurs at specific urban locations. Trunk buses and feeder buses operate separately and are easily differentiated. At the end of each corridor, a terminal station was built. Very few feeder buses operate routes that do not include the terminal station. Feeder services are mainly meant to provide access to and from mainly residential peripheral areas.

Central-Norte Corridor is currently being operated by private bus companies. However, according to authorities, private operation of this corridor is problematic (in the form of disruptive ‘in the market’ competition) and the municipality is currently looking at options in order for the municipality to take over as operator (pers. com. Castillo, 2012). Newer corridors (i.e. Sur-Oriental Corridor, implemented in 2010, and Sur-Occidental Corridor, implemented 2012) are being currently operated by the Quito municipality (pers. com. Castillo, 2012).

The current situation of BRT corridors in Quito also shows the difficulties when engaging with the existing operators. There is a significant trust issue between the remaining traditional paratransit bus operators and authorities; authorities argue that paratransit operators are simply not ready to take over as BRT trunk operators (pers. com. Castillo, 2012); while paratransit operators claim that authorities are not providing them with clear directives on tender objectives, and do not recognise the degree to which they have corporatised (pers. com. Arias, 2012).

4.2 The trunk and feeder model: Evolving from a rewards scheme

Different from each corridor’s trunk services, feeder services are operated by traditional paratransit operators. Somewhat uniquely in Latin American cities, these feeder services are licensed to individual bus owners and not to companies or owners associations (pers. com. Arias, 2012; pers. com. Castillo, 2012). Metropolitan authorities license bus owners to operate along feeder routes; operators in turn receive a monthly payment that can be increased if the demand along a certain route increases significantly (pers. com. Castillo, 2012).

This type of arrangement evolved from an initial Ecovia scheme where operators were rewarded according to the number of passengers brought to the BRT station. Traditional paratransit bus operators that were not necessarily included in the transformational process were functioning as feeders to the system and they received cash rewards for every passenger transported from nearby residential areas into the Ecovia terminal station. This allowed authorities to avoid the need to invest in feeder service infrastructure and vehicles, while still providing a relatively convenient service to users. The arrangement prove to be, however, only temporary.

This rewards mechanism required a certain amount of control and regulations that were not necessarily consistent with the business practices of paratransit bus operators of Quito. Because the arrangement was relatively informal (i.e. it did not have a proper contract with payment and service specifications), both sides could quickly terminate it leaving the system without an essential service element. Furthermore, traditional paratransit operators were not fully regulated and authorities found it a problematic arrangement in terms of frequencies and fleet availability.

The mechanism then evolved into a more structured agreement. Nonetheless, as stated above, it has one important particularity: feeder licenses are given to owners and not to companies or route associations. This means that for every route, a certain number of licenses are issued instead of just one contract with an operating company. This type of arrangement provided a role for traditional operators who otherwise would likely have been excluded from the system.

5. Discussion and conclusions

The objective of this paper was to draw lessons from experiences of public transport transformation projects in Latin American cities that featured trunk and feeder service arrangements. The variation of trunk and feeder arrangements in the case cities presented in the paper shows, on the one hand, that a variety of alternative trunk and feeder arrangements are possible, and on the other, that
solutions and schemes are highly dependent on pre-existing contextual conditions. Consequently, solutions applied in one particular case are not directly reproducible in other cities. Many developing world cities are undergoing important transformational processes that can benefit from analyses of international experiences instead of from a reproduction of models already implemented somewhere else in the world. Furthermore, if one alternative is considered viable as an option, it requires modifications that take account of the operating environment into which the solution is expected to be introduced. Lastly, it is important to note that trunk and feeder systems should be implemented in a suitable operating environment and that they are by no means the only possible approach.

The level of development of the existing public transport system is a significant factor in establishing whether the context is suitable. More often than not, a trunk and feeder model will require cooperation or involvement of existing operators; even if, in most cases, they are required to engage in corporatisation processes. Without disregarding the fact that along the way many of the smaller operators are likely to be taken out of the system, the implementation of a new system necessitates an extensive prior negotiation with existing operators. The form of the negotiation process, along with the level of corporatisation of incumbent operators, will partially determine the role of such operators in the new system. Santiago’s existing operators had undergone a previous attempt at corporatisation that saw them participate in a route bidding process. This experience set the basis for Transantiago’s trunk and feeder bidding process. Quito’s experience is significantly different: an important trust issue between operators and authorities still hampers negotiations, especially in terms of trunk services. As a result, in Quito, feeder licenses appear more stable (as far as contracts and service provision are concerned) than trunk concessions. This is in contrast to the case of Santiago where trunk concessions have been less criticised than feeder concessions.

In most cases, the feeder element of trunk and feeder arrangements is where original approaches are found. In this paper, reward mechanisms (Quito and Valparaiso) and area licensing (Santiago) were reviewed. In all cases, existing paratransit operators have been —more or less— included in the final version of the project. These cases thus highlight that incumbent operators have a role to play in the transformation of the public transport system generally, and in a process based on trunk and feeder arrangements more specifically.

Nevertheless, when including existing operators in a trunk and feeder arrangement, the rewards mechanism appears to be an interim solution. Under such schemes, authorities are unlikely to be able to fully regulate the feeder services provided by incumbent operators. The case in Quito is revealing: feeder buses did not provide adequate services in terms of quality, frequencies and fleet, thus potentially hampering the performance of trunk services and undermining the operational integration of the system. For this reason, the arrangement quickly evolved into a concession-type scheme where authorities were able to exercise adequate regulation of feeder services.

The review of the three South American cases also revealed important similarities. All three cases ultimately decided to approach trunk and feeder integration through a concessions mechanism, albeit with some uniqueness in each case. Even though other cities in the region have opted for concession schemes in feeder services (e.g. Bogota for its Transmilenio’s feeders), this does not imply that concessioning is the only option when designing trunk and feeder arrangements.

It should be noted with caution, however, that the implementation of a trunk and feeder scheme can impose major changes to previous passenger travel patterns in the city as direct services are replaced by services requiring more transfers and longer waiting times, as well as major changes to the nature of services provided by incumbent operators. Consequently, the envisioned outcomes of the transformational process —positive and negative— are likely to take some time to appear, if they
appear at all.
Public transport system overhauls therefore require time as well as flexibility in approach. Developing world cities can experience changes in their urban structure and travel patterns more rapidly than developed world cities. Flexibility of the public transport system (in terms of routes and services as well as arrangements with existing operators) is a feature in most paratransit-dependent cities as it responds effectively to changes in urban structure; this advantage should be taken into account during transformational processes. The trunk and feeder scheme provides opportunities to include incumbent operators in public transport system reform, as in most cities higher demand – trunk– corridors remain relatively stable but lower demand –feeder– roads are subject to greater changes in demand patterns. Adaptability characteristics and demand knowledge on the part of incumbent operators can prove to be beneficial in feeder service provision. If appropriately implemented, trunk and feeder schemes can facilitate healthier relationships between existing and new public transport modes.

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