Planning Public Transport Improvements in Mexico: Analysis of the Influence of Private Bus Operators in the Planning Process

by

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AUTHOR'S DECLARATION

I hereby declare that I am the sole author of this thesis. This is a true copy of the thesis, including any required final revisions, as accepted by my examiners.

I understand that my thesis may be made electronically available to the public.

Abstract

In Mexico, transportation planning deals with unique social, political, financial and cultural elements when promoting mobility solutions. These elements include the opportunity costs of public investments, institutional barriers and changes in the political agenda. Other important element is the influence of existing private bus operator. Bus provision is offered by a disproportionate number of small private enterprises, single concessionaries and unregulated providers. Today, many of these entities have gained political power and, often, resist attempts to improve public transportation. The recommended solution to overcome political problem created from the opposition from private providers includes the introduction of franchise systems. Franchising systems under strict institutional regulations support the incorporation of current private providers in the proposed projects. However, incorporating bus operators into any form of system under franchise system implies major changes in private providers' business and routines. Franchising implies moving from concession-owner-driver to simple employee or shareholder of the new system. Franchising also results in having to change routines associated with the operation. Understandably, these changes generate resistance, delaying implementations.

In this thesis it is argued that a framework from which the influence of these private providers on transport improvements may be evaluated is critically important. This framework can contribute to knowledge about the political feasibility of projects. Private bus operators can exert an influence on system technology and on the selection of areas for improvements. Based on qualitative and quantitative methods, this thesis frames, analyzes, formalizes and quantifies the impact of private bus operators in government attempts to improve transit provision. A fieldwork methodology was employed to identify the factors that influence private bus operators' reactions to transit improvements. Using a logistic regression, these factors are statistically evaluated. Results show that several variables in which the government exert a direct influence (that related with trust, the legal recognition to operate and taxation) on private bus operators' willingness to participate in transit improvements. Other important variables include those associated with the (i) characteristics of private bus operators; (ii) the nature of the business activity; and (iii) private bus operators' perceptions about business having created for extensive period of time. Rationalizing the influence of private bus operators' influence on the planning process of transit improvements contributes to maximizing the political feasibility of completion.

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To all those who have contributed to my better understanding of the public transport problems facing Mexican cities and cities in developing countries

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List of Abbreviations

BANOBRAS	National Bank for Infrastructure
BRT	Bus Rapid Transit
CAF	Andean Corporation of Development
CH4	Methane
CISA	Insurgentes Corridor S.A. de C.V.
CONTURMEX	Urban and Suburban Transport in the Mexican Republic Confederation
CTS-EMBARQ	Sustainable Transport Center – EMBARQ-Mexico
DF	Mexico City
GDP	Gross Domestic Product
IMCO	Mexican Institute for Competitiveness
INEGI	National Institute of Statistic and Geography
ITDP	Institute of Transport and Development Policy
MIT	Massachusetts Institute of Technology
NGO	Non-governmental Organization
OECD	Organization for Economic Co-operation and Development
PM2.5	Fine Particle
PPP	Public Private Partnership
PROTRAM	Federal Mass Transit Program
RTP	Passenger Transport Network Company
SCT	Federal Ministry of Communications and Transport
SCT-Tabasco	Ministry of Communications and Transport – Tabasco
SEDESOL	Ministry of Social Development
SETRAVI	Ministry of Transportation and Roads
SMA	Ministry of Environment in Mexico City
US	United States
US	United States
USD	American Dollars
VOCs	Volatile Organic Compounds
WHO	World Health Organization
WP	Willingness to Participate

Preface

The primary aim of this thesis is to examine the characteristics of the urban transport sector throughout Mexico with an eye toward identifying remedial strategies to current urban mobility problems. The work presented in this thesis provides various insights, particularly from the bus operator perspective, whose role and importance has been ignored or neglected in the transportation planning literature. The thesis also examines issues associated with political, legal and institutional elements in transportation planning whose influence, in the decision-making process for transport investments, has not been adequately addressed.

The need to address these elements has been made clear from the increasing interest amongst professionals, as well as global and local institutions concerned with road-based urban transportation problems in transitional economies. Although many scholars and my colleagues are working on this area of research, at present, there exists a dearth of texts of this kind. In addition, it is apparent, from the continuing delays in the application of available resources to improve transit in several cities in Mexico and throughout transitional economies – also referred to as developing countries –, that transportation planning requires fresh concepts and techniques.

The thesis has sought to be innovative because it suggests incorporating qualitative elements in conventional approaches and processes that are used in transportation planning to improve service and promote mobility. Conventional approaches – as appropriately appreciated by scholars and professionals such as Eduardo Vasconcellos, Harry Dimitriou, Ralph Gakenhaimer, Chris Zegras, Onesimo Flores – are mainly conducted with quantitative analyses, with greater focus on demand elements and on the cost of infrastructure. The thesis suggests that these approaches – although applicable in developing counties – are ill-suited, in theoretical and practical terms, to reflect and, consequently, address the complexity of the factors that influence the delivery of public transportation improvements in Mexico.

In Mexico, the road-based urban transport is mainly delivered by a large number of service providers who make a livelihood through road-based urban transport. When transit improvements are suggested by government officials, bus operators have various reactions that go from reluctance to willingness to participate in such improvements. Clearly, these reactions have an influence on the government's ability to plan, design and implement road-based urban projects. Moreover, other traditional elements also shape the planning exercise. Income levels and, in general, the degree of development in Mexico

are lower compared to advance economies, which creates issues associated with the opportunity costs. In addition, the country usually faces problems with political instability, poor enforcement of laws and regulations, high levels of bureaucracy and corruption, and inadequate legal frameworks that facilitate transit implementations. Thus, the planning exercise in this context becomes critical if these elements are not taken into account.

To examine the influence of the aforementioned elements in the transportation planning exercise, the framework of this thesis combines theoretical elements from different disciplines – planning, economics, and transportation – and is supported with real case study examples. The selection of these cases was based on the availability of appropriate documentation, the possibility to conduct interviews and collect data through questionnaires, and availability of funding for the fieldwork.

Chapter 1
Introduction, Research Methods and Thesis Organization

1.1 Introduction

Today one of the major problems faced by cities is that of urban mobility. Rising income per-capita, auto-oriented policies aimed at accommodating traffic congestion as well as policies that promote urban sprawl have resulted in high motorization rates (Deakin, 1991; Ingram and Liu, 1999; World Bank, 2008; Bongardt et al., 2009). Alongside these elements, public transport systems have struggled to (1) meet current and new travel demands; (2) improve quality of service – frequency, area coverage, comfort, safety and system information; and (3) be an alternative to the automobile. Cities have also struggled to earmark more resources to alternative modes to the automobile and to strengthen the institutional and technical capacity of those departments dedicated to improve urban mobility. Evidence shows that the level of physical facilities and institutional capacity are not rising adequately to manage the pace of motorization.

While the problems of urban mobility persist worldwide, in developing countries these problems are of higher magnitude. Rapid urbanization and growing economic prosperity has brought about a higher rate of motorization compared to that observed in developed countries. The fastest growth of motorization has been experienced in Latin America and Asia with 4.5% and 2-3% annually, respectively. Vehicle ownership per 1,000 residents in countries such as Mexico, Colombia, India and China have tripled in the last 20 years and is expected to grow in the coming years (World Bank, 2012). Motorization is certainly an indicator of economic prosperity, but the disadvantages of motorization are serious: more pollution, more energy use, more car accidents and deaths as well as an undermining of public transport services.

Evidence from cities of both developed and developing countries has demonstrated that public policy can significantly influence current urban mobility trends. Particularly, over the last two decades, important progress has been made in terms of identifying and implementing policy measures – both push and pull techniques – to enhance urban mobility. These measures have come in various forms, including investment in transit systems, pricing and tax policies as well as regulatory and subsidy schemes. The practical feasibility of each of these measures has depended, however, upon the specific context that prevails in a country or city. Whereas push measures in the form of pricing

and tax policies have been effectively introduced in cities in developed countries (e.g. London and Singapore), in developing countries measures in the form of mass transit investments have been preferred. Push measures in transportation require sophisticated systems, regulations and controls that are available in only a limited number of places.

However, the implementation of mass transit improvements in developing countries has not necessarily been a straightforward strategy. First, in developing countries, a high cost of implementation has been identified. A fundamental problem about allocating resources to public transport in an environment of decreasing resources and increasing demands is the intense competition this type of spending typically faces from other public-provided services. The everyday role of the State is to determine the level of public spending dedicated to address society's needs such as education, safety, health, sanitation or other important services for the development of society. Experiences from countries, particularly in Latin America and Asia, show that decisions about allocating resources to mass transit investments have been preceded by intense political debate (Ardila, 2004; Ardila, 2008).

Another concern with public transport investment in developing countries is that of transit fares that may change as a result of these investment. Fares in these countries are usually kept low for political and social reasons. The State has a social responsibility to assure that the public transport service is affordable for the low-income population. Although annual average transport spending of the lower-income population varies widely within and between regions, it is estimated that this group spends between 15 to 30% in Latin American countries and to up to 50% in some countries in Africa (Sperling and Claussen, 2002; WRI, 2007)

In fact, travel time savings that could result from transit improvements – and be the rationale for increasing fares – can merely be translated into increased idle time in places with high unemployment rates. This situation gives rise to a paradox: improving transit runs the risk of worsening the social and economic condition of those in need of urban mobility. The problem of limiting rising fares is the influence this limitation exerts on the selection of technology. Conventional financial models that consider only economic benefits and not wider benefits of transit improvements for selection of technology strongly rely on the financial returns that result from fares and passenger volumes (Vuchic and Casello 2011).

A third problem facing cities in developing countries when improving urban mobility through capital investment in mass transit improvements – and the primary focus of this thesis – is that of the

nature of transit provision. Between 1960 and 1990, many cities in developing countries gave rise to private participation in service delivery. Today, governments in these countries are less involved in transit provision and, instead, the transit market is dominated by private providers that work under official agreements to provide for-profit transit services (Gomez-Ibañez & Meyer, 1993; Vuchic, 2005).

While private participation in public transport delivery has resulted in higher frequency of service over expanded area coverage, it has also resulted in several drawbacks that affect the quality of service. Several cities observe an oversupply of service – particularly with low capacity units – with low quality in areas of system integration and operational safety. Moreover, because of oversupply and for-profit motivation, private providers have developed incentives to maximize profits by adopting reckless driving behaviour and by operating poorly maintained vehicles, causing congestion, traffic accidents and environmental damage (Wirth, 1997; Cervero, 2000; Islas, 2000; Gakenheimer et al., 2002). As well, because of for-profit motivation, service provision often falls sharply during the night time or off-peak seasons.

The problem with improving public transport in an environment dominated by private provision is the opposition of these private providers to these potential improvements. Private providers fear being displaced because of the proposed improvement. Consequently, these providers defend their status quo and their means of making a livelihood to which they have been dedicated for extended periods of time. The opposition of these providers to transit improvements becomes more relevant for highly politicized cities. Improvements may be limited by the length of political appointments (Ardila, 2004; Ardila, 2008).

The recommended solution to overcome the urban mobility problem and the opposition from private providers includes the introduction of franchise systems. Franchising systems under strict institutional regulations can eliminate the oversupply of units and the economic incentives that compel bus operators to compete for passenger volume. Likewise, in corridors with high passenger demand, the introduction of mass transit systems – in the form of BRT systems – under franchising contracts as an alternative to small-capacity vehicles can improve economies of scale, reduce the environmental cost associated with aged units, promote travel time savings, and support the incorporation of current private providers in the proposed projects (Echeverry et al., 2005; Gwilliam, 2005; Hidalgo, 2005; Ardila, 2008).

Moreover, because of private providers' inclusion in the proposed service, franchising systems lessen the problem of earmarking public funds for the implementation of a proposed system. With franchising systems, private providers and governments share costs and responsibilities of the proposed improvements. Private providers are exclusively or predominantly responsible for purchasing new transit units. Constructing the required infrastructure – e.g. stations, shelters, terminals, system information – and enhancing regulations/monitoring are generally roles for the government (EMBARQ, 2006). Furthermore, the problem of fares that may increase because of the transit improvement is eased with the selection of buses instead of rail technology. Construction and operation of buses cost approximately one half when compared to rail technology such as light rail systems. Buses are more cost-effective in developing countries given low labour costs (Casello and Vuchic, 2009).

However, incorporating bus operators into BRT systems or any other form of system under franchise system implies major changes in private providers' business and routines. For instance, franchising implies moving from concession-owner-driver to simple employee or shareholder of the new system. Franchising also results in having to change routines associated with the operation, such as driving, cleaning and repairing the units. Moreover, franchise systems requires convincing private providers about the long-term economic returns associated with changing from a single concession (for life, in some cases) to one single-group concession (usually renewable every 10 or 20 years) (D. Hidalgo, personal communication, January 2010). Understandably, these changes may generate resistance, delaying implementations.

Given the problems associated with the nature of transit provision, this thesis argues that a framework from which the influence of private operators on public transport improvements may be evaluated is critically important. The traditional evaluation of public transport initiatives that usually follows quantitative techniques – to determine if a proposed improvement, as a package of benefits and costs, results in improved mobility – does not take into account the social and political context associated with private provision of transit service. Private providers in the evaluation process of transit improvements can certainly exert an influence – in the form of *indirect cost* as this thesis frames, analyzes and formalizes – on system technology and on the selection of areas for improvements. Rarely formalized in the literature of transportation planning for developing countries, these private providers' *indirect cost* may impede or delay the implementation of transit solutions.

1.2 Overall Focus of Study, Statement of Purpose and Significance

Overall, this research aims to develop a conceptual framework that effectively addresses the influence of private providers – henceforward private bus operators – in the evaluation of transit improvements. To develop this framework, this thesis work involves carrying out an analysis of recent transit improvements in developing countries. The focus of this work is on the negotiations that have arisen between private bus operators and government officials. Experiences in transit improvements, particularly from Colombia, Mexico and South Africa, have given evidence of *promising elements* associated with private bus operators that may lessen the likelihood that private bus operators may impede the planning and operation of upgraded transit systems (Ardila 2004; Nava and Ramirez, 2008; Schalekamp and Behrens, 2010). It has been also suggested by transport experts that network characteristics and the strategy used for engaging private bus operators are strong influences on these operators' willingness to participate.

1.3 Statement of Purpose and Significance

Particularly, the purpose of this thesis is to determine the elements associated with private bus operators that exert an influence in the planning process for public transport improvements. The research emphasizes the need for examining private bus operators' reactions – ranging from negative to positive – when government informs areas for improvements and when negotiations are taking place. This thesis argues that these reactions are often neglected in the decision-making process for the area to be improved. This study will combine theoretical analysis with relevant empirical research to determine, conceptually, how transportation planning can be improved from the incorporation of the private bus operators' reactions in the elaboration of plans.

The contribution of this research to the literature of transportation planning is two-fold. First, this research provides evidence of poorly examined elements (in the literature of transportation planning for developing countries)associated with benefits and drawbacks – from the private bus operator perspective – of current operation, management and ownership of private provision. Secondly, from the analysis of these elements, this research develops a methodology to quantify the influence of private bus operators on public transport proposals.

1.4 Research Questions

The research question which guides the research and justifies the methodological approach is:

- Under what circumstances is it possible to adequately include an assessment of the influence (or engagement) of private bus operators in public transport improvements?

In support of this, secondary questions are:

i. With regard to bus operators, organizational structures and network characteristics, what kind of factors have facilitated or made difficult the implementation of franchise systems?
ii. With regard to franchising systems, what is the set of legal strategies that exist to engage private bus operators in a proposed transit improvement? Which of these strategies minimize private bus operators' negative reactions to participate in such improvement?
iii. What are the operators' reactions – negative or positive – to the elements required to franchising systems?
iv. How, and in what proportion, do the characteristics associated with the current private provision and those that may be modified as a result of franchising systems influence the participation of private operators in a regulated bus service?

1.5 Research Methodology

Given the overall focus of the study, a mixed research methodology is applied with a case study framework. A case study framework offers the opportunity to explore several activities occurring in a specific area. Case studies allow researchers to collect detailed information using a variety of techniques in a given time (Creswell, 2009). Mixed research techniques in transportation planning are also gaining popularity because they can be used to guide and improve data collection techniques prior, during, and post quantification (Grosvenor, 2000). In particular, mixed methods have shown the potential to capture some of the complexities that arise when introducing public transport improvements in developing countries (see e.g. Ardila, 2004; Nava and Ramirez, 2008; Flores and Zegras, 2012).

Moreover, qualitative methodological approaches appear to offer the greatest scope for exploring people's perceptions and experiences; these perceptions and experiences are the key element in this thesis' aim to conceptualize the influence of private bus operators. In the evaluation of perceptions and experiences, qualitative research methods can be complemented by quantitative tools to produce valuable insights in transportation studies (Clifton and Handy, 2001; Creswell, 2009).

1.5.1 Research Methods

Several research reasons support the selection of a case study and a mixed methodology as the main research method for this thesis.

1.5.1.1 Semi-structured interviews

With the use of semi-structured interviews it was possible to extract detailed information about:

(1) The characteristics of private bus operators;
(2) The organizational structure and management characteristics of private bus provision;
(3) Cultural, social and economic elements associated with the status quo of private bus operators; and
(4) Others relevant to the understanding of the bus transit activity and provision.

As well, with the use of these interviews in conjunction with fieldwork inspection, it was possible to understand how all the actors involved in the provision of public transportation interact. A fieldwork methodology also brought about the possibility to attend different events where private bus operators, local and federal authorities, scholars and consultants gather such as annual conferences and bus association meetings.

With semi-structured interviews it was also possible to identify what sorts of elements are associated with:

(1) Conventional private bus operators that are not being part of any improvement;
(2) Private bus operators that are currently part of a franchise system; and
(3) Private bus operators that have acquired a more entrepreneurial vision over the years.

The understanding of these three types of operators allows this research to identify the elements that facilitate or impede the transition of conventional private bus operators to franchising systems.

The interviews were conducted orally in Spanish and were audio recorded. Main topics included in the interviews were:

- History and nature of public transport;
- Bus transport concession;
- Valuation of business and operations;
- Working environment and health;

- Relationships with government and consultants;
- System operations;
- System information, transfers and quality;
- Public transport improvements in the past;
- Public transport Improvements – today;
- The role and characteristics of bus associations;
- Employment opportunities ; and
- Other considerations.

Semi-structured interviews were also relevant for the better understanding of contextual elements that influence public transport improvements and the current situation of public transport. These interviews were conducted mainly with transport experts, consultants, leaders of private bus operators and government officials. Main topics included in these interviews were:

- Funding, opportunity cost and future improvements;
- Political appointments;
- Institutional and legal barriers;
- Decision-making process of areas for improvement; and
- Other considerations.

It is important to mention that the topics included in these interviews are representative but not exhaustive. During fieldwork many of the questions related to these topics were excluded or modified: transport experts and local consultants suggested both including other considerations in these semi-structured interviews and reframing some of the proposed questions. These experts and consultants' suggestions provided me with the opportunity to *customize* how to approach the key actors. Annex A shows a large sample of the questions included in these interviews.

It was my intention to develop a large sample of questions. My aim was to address particular issues in public transportation in Mexico in a very casual and informal approach. It was important for me to follow this approach in order to obtain the confidence of the interviewees and enrich the analysis of this thesis. Evidence of public transportation topics are hard to obtain because these are usually sensitive topics in Mexico as they embrace several political elements. On the one hand, government officials are sometimes reluctant to mention issues that may compromise their job positions. Government officials also avoid mentioning elements that are part of *political strategy* that govern the

city. On the other hand, private bus operators are reluctant to reveal information that could risk their legal concession or working environment. Government officials sometimes take legal actions against challenging groups.

Interviews took place in several locations and lasted between 1 to 3 hours. Interviews followed local consultants' recommendations to approach key actors. Most of the interviews took place out of the working environment of these actors, particularly interviews with government officials and leaders of private bus operators. Interviews with private bus operators took place in dispatching areas, during annual meetings and in their home places. In some cases interviews took place in these operators' transit units during operating hours.

1.5.1.2 Questionnaires

Following the identification of *promising elements* associated with private bus operators' reactions to transit improvements through semi-structured interviews, a second stage included the use of open-ended questionnaires. The aim of these questionnaires was to undertake statistical sampling to evaluate the elements and the magnitude of these elements that are influencing private bus operators' reactions to transit improvements.

Two different types of questionnaires were applied to private bus operators. The first questionnaire was designed for a pilot survey. This aim of this pilot was two-fold. First, it helped to evaluate key elements associated with private bus operators' willingness to participate in bus transport improvements. Second and most important methodologically speaking, the pilot survey gave me the opportunity to evaluate private bus operators' willingness to participate in a larger questionnaire. This survey also helped me to comprehend what sort of missed elements should have been included in the larger version. Chapter 5 includes details about participants.

Main topics included in the larger questionnaire are:

a) General information: education, age, family;
b) Information about the bus provision activity and their role in a bus association ;
c) Information about maintenance of units;
d) Ownership model and the role of drivers;
e) Fleet characteristics and bus renewal plans;
f) Characteristics of the legal right to operate or bus concession;

g) Views about: current and new transit units, current business organization and operation; the role of government in regulating the bus activity; new business organization models (franchise systems); relationship with drivers;
h) Understanding about bus improvements in the city and in other cities;
i) Willingness to participate in bus improvements;
j) Relationship with governments;
k) Additional income sources; and
l) Other considerations.

It is important to mention that no specific sampling techniques were used for the survey exercise. A proper sample technique would have made this research impossible for several financial and technical reasons. On the technical side, there is no accurate data about how many private bus operators are in the country. Data about how many concessions are owned for a single person is also unavailable. Financially speaking, this research was conducted with a tight budget. For this reason, questionnaires were filled in places where private bus operators gather, including:

a) Bus dispatching areas;
b) Private bus operators' home places;
c) Annual meetings; and
d) In places where private bus operators meet, including restaurants and cafes.

The selection of these sites was done with the help of local private bus operators who guided me to the places where private bus operators gather and with the help of leader of private bus operators including local consultants. Annex B and C show a sample of these two questionnaires.

1.5.2 Case Study and Fieldwork Methodology

In this setting, research was undertaken during five visits to different cities in Mexico over a period of two years (June 2010 – March 2012). Mexico presents a unique opportunity to address the research questions of this thesis. First, Mexico is representative of the socio-economic characteristics of many developing countries – although with differences in terms of the magnitude. As well, as presented in Chapter 2, public transport in Mexico is usually privately provided and highly decentralized (with a large number of private providers).

A third characteristic of Mexico, and perhaps the most relevant to this research, is that related to transit improvements. In recent years, several cities in Mexico have embarked on a series of public

transport initiatives to improve operations in urban transportation. In 2008, the Mexican Federal Government instituted the Mass Transit Program (PROTRAM) to promote mass transit systems (BRT and rail technology) in cities with populations over 500,000 people. Since the introduction of PROTRAM, 40 feasibility studies on mass transport in 27 states have been financed through this national program. Of this total, 12 projects have been constructed or are being constructed, 20 projects are in preparation and the remaining eight projects are in the phase of identification or evaluation. The total value of these projects is approximately USD$9 billion dollars. Of this total, it is estimated that approximately USD$3.5 billion dollars will be non-recoverable funds. These non-recoverable funds are earmarked for feasibility studies and fixed infrastructure (Banobras, 2012).

In addition, at the state level, significant progress has been made in terms of urban public transport improvements. Public transport improvements have effectively addressed the problem of having a large number of private bus operators and oversupply with the introduction of franchise systems. These improvements have also involved (1) the substitution of low-capacity units for vehicles with higher capacity with better technology; (2) the establishment of centralized fare collection system; and (3) improvements in the infrastructure dedicated to transport. Franchise systems have been introduced in cities such as (1) León (OPTIBUS) in 2003; (2) Mexico City (Metrobus) in 2005; (3) Guadalajara (Macrobús) in 2009; and in 2010 in cities such as (4) Tuxtla Gutierrez (Conejobus), (5) Villahermosa (Transbus) and (6) in the State of Mexico (Mexibus).

1.5.3 Selection of Cities

Cities for fieldwork were selected according to the following attributes:

1) *Public transport improvements.* Field work was conducted in cities with recent or ongoing improvements to their public transport systems. Government officials' experiences regarding the planning process and private bus operators' reactions to the implemented process were documented. A fieldwork methodology also assisted to examine bus operators' reactions towards participating in ongoing improvements – in areas with no improvements (within the city). The legal strategy to engage private bus operator's in the proposed project was also identified for each of the selected project. Cities with these characteristics included:
    i. *Mexico City, Federal District (DF);*
    ii. *Villahermosa, Tabasco; and*
    iii. *Tuxtla Gutierrez, Chiapas.*

Semi-structured interviews were also conducted with private bus operators who have participated in public transport improvements in cities other than those listed here. These interviews took place at various annual forums.

2) *Poor public transport improvements or initiatives for improvements.* Field work was conducted in cities with significant opportunities to enhance their systems. Research methods were used to analyse (1) private bus operators' opinions to current system functioning; (2) private bus operators' reactions to public transport improvements in other cities; and (3) private bus operators' reactions to participate in public transport in franchise systems. Government officials' opinions about the difficulties or plans to improve their systems were also captured. Cities with these characteristics included:

    i. *Morelia and surrounding areas,(Michoacan)*
    ii. *Veracruz,(Veracruz)*

    Similar to number *1)* of this list, interviews with private bus operators were also conducted in various annual meetings and conferences.

Other elements that influenced the selection of cities included:

1) *Information availability:* Local authorities' willingness to provide information about past and current issues associated with the public transit in the city.
2) *Impact Factor:* The importance of both the city and the improved transport system at the national or regional level.
3) *Personal Safety:* Mexico has experienced a period of severe security issues. The selection of cities considered cities with low indices of insecurity.
4) *Proximity:* Because of budget restrictions and time limitations, the selection of cities was also based on how close they are to each other.
5) *Financial support:* Although several institutions and agencies contributed to the cost of my fieldwork, this research had some budgetary restrictions.
6) *Familiarity with the area of study:* A good understanding of the area for study facilitated the mobility within the city and reduced the number of days spent in field work.

1.5.4 Field Visits

Table 1 shows the periods during which field visits were completed; the table also contains basic information about the type of interaction (or methods used to obtain information) with all the actors involved in the implementation of transit improvements.

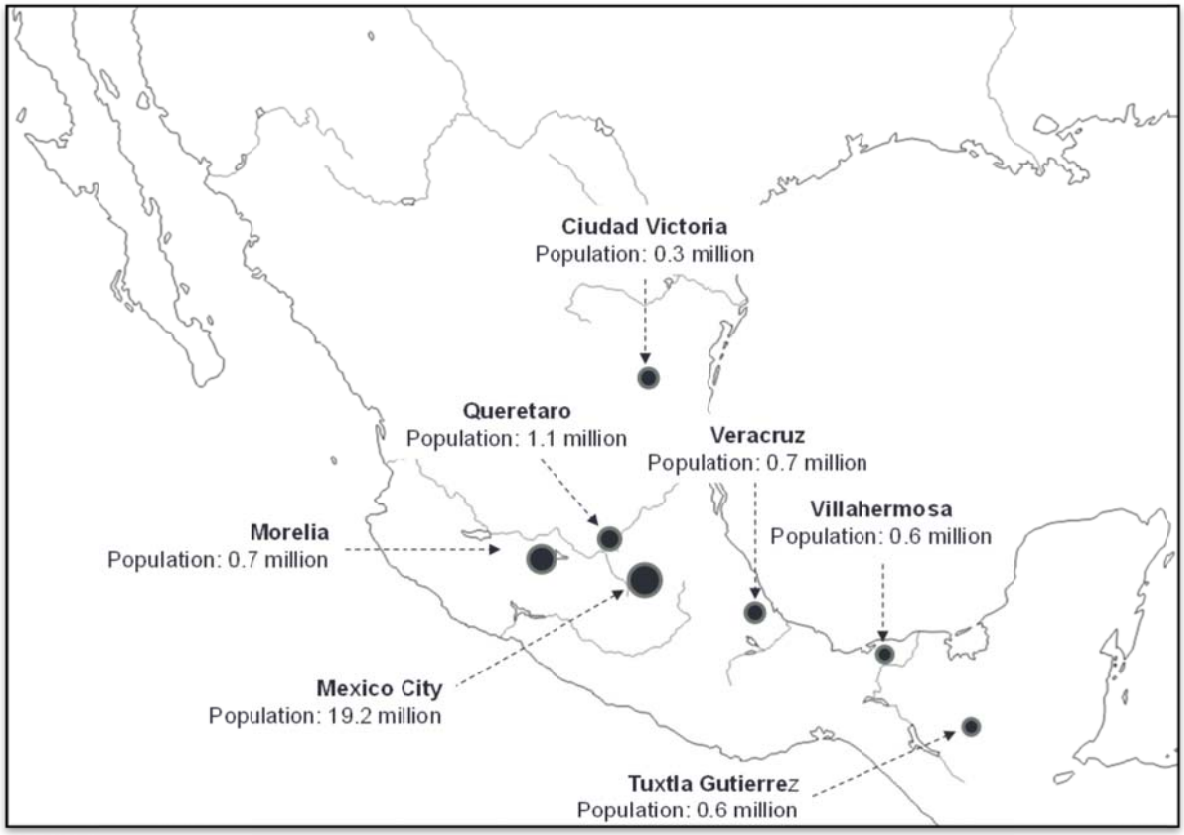
Table 1 - Field Trips to Mexico

City	Visits	Type of Interaction
Greater Mexico City	June, 2010 October and November, 2010 June, 2011 October and November, 2011 February and March, 2011	Interviews with government officials, experts, scholars and private bus operators. Surveys to private bus operators in the field and in bus association meetings
Queretaro	October, 2010 October, 2011	Interviews with government officials, experts and private bus operators. Surveys to private bus operators in the field and in bus association meetings
Morelia and surrounding areas	October, 2011	Interviews with government officials, experts and private bus operators. Surveys to private bus operators in the field and in bus association meetings
Villahermosa	October, 2010	Interviews with government officials, experts and private bus operators.
Tuxtla Gutierrez	November, 2010	Interviews with government officials and private bus operators.
San Luis Potosi	October, 2010	Interviews with private bus operators and surveys to private bus operators during an annual meeting
Puerto Vallarta	June, 2010	Interviews with private bus operators and experts during an annual meeting
Ixtapa Zihuatanejo	June, 2011	Interviews with private bus operators and experts and surveys to private bus operators during an annual meeting
Veracruz	February, 2012	Interviews with private bus operators, scholars and surveys to private bus operators
Ciudad Victoria	March, 2012	Interviews with government officials

** Several interviews with experts were conducted in Washington, D.C. during the 90th and 91th Annual Meeting of the Transportation Research Board*

Figure 1 shows a map with the actual location of cities and information about population.

Figure 1 - Fieldwork Visits



The first visit took place in June 2009, and lasted two weeks, with the purpose of scoping the possibility of doing the research in Mexico; this visit was followed by four research trips. As well, the aim of the first visit was to establish some connections with those involved in the provision of public transport and in the promotion of improvements. In addition, the first visit served as the basis for the logistics of the following research trips. During the following four visits the bulk of this research was carried out. My main research activities included:

1) Site visits to the improved system or areas for improvement;
2) Semi-structured interviews with the actors involved in the provision of public transport and in the promotion or implementation of improvements;
3) Collection of data through survey instruments to private bus operators; and

4) Gathering relevant research documents to support the thesis arguments.

Fieldwork was also useful to develop a rigorous understanding of the current situation of public transport in Mexico. Those findings are presented in Chapter 2.

1.5.5 Actors

A set of key participants was identified during the first research visit. Key respondents were selected based on their roles in understanding the dynamics of the proposed research. As for the interviews, local consultants and transport experts suggested the names of the actors to be interviewed. These consultants also suggested names of private bus operators and government officials that are more willing to participate in research projects. Based on the analysis of newspapers articles, actors were also identified according to their relevant importance in government actions associated with transport improvements. These respondents included:

1) *Private bus operators:* A total of approximately 50 private bus operators were interviewed in different cities and events. A total of approximately 250 private bus operators participated in a formal survey. Interviews were also conducted to bus operators' leaders. These interviews also aimed at finding out how private bus operators are organized and the role and functions of bus associations.
2) *Government officials:* Several government officials were interviewed in different cities. These officials were selected according to their involvement in the identification and negotiation process of public transport improvements.
3) *Consultants, experts and academics*: A total of approximately 25 national and international experts on public transportation in developing countries – highly qualified and recognized – were interviewed in different cities and national and international events.

In numerical terms, the group of respondents with the strongest representation was private bus operators. This bias was deliberate because of the research focus is on this group of study. Finally, it is important to indicate that this study was reviewed and received ethics clearance through the Office of Research Ethics at the University of Waterloo.

1.6 Thesis Organization

The main body of this thesis is based on a series of three peer-reviewed academic articles – one published in the Journal of the Transportation Research Board, one conference proceedings at the

Transportation Research Board, and the third article in press for the Journal of the Transportation Research Board. Chapter 2 of this thesis includes an analysis of the current situation of public transport systems in Mexico. The work is based on data and documents that were obtained while performing consulting work in urban development for the Mexican Federal Government. This work is currently being written for the World Bank; I am a co-author. The content of this section was provided by transport experts, scholars, state and municipal authorities, and by the CTS-EMBARQ-México, which is an NGO in Mexico that focuses on urban mobility. Fieldwork conducted in Mexico – as described in section 1.5.3 of this Chapter – strengthened the development of Chapter 2.

The chapters effectively address the primary and secondary research questions. Specifically, Chapters 3 and 4 address secondary question *i, ii, iii* and Chapter 5 addresses secondary question *iv*. The primary research question is addressed by the analysis presented in this thesis as a whole.

The thesis is organized as follows. Chapter 2 presents a thorough examination of urban mobility problems facing Mexican cities and identifies factors that have influenced and are influencing current mobility patterns. Chapter 2 also analyzes the main characteristics of public transportation in Mexican cities and provides relevant indicators associated with current performance. Chapter 3 reviews the planning process to evaluate transit improvements and comments on its applicability to the context of countries with characteristics similar to Mexico. In Chapter 3, a conceptual planning framework that considers the influence of private bus operators is also presented. Finally, Chapter 3 also analyzes the main characteristics of legal strategies for franchising systems.

Chapter 4 begins with a description of private bus operators' operating and management characteristics and associates these characteristics with their reactions – negative and positive – to public transport improvements. Chapter 5 formalizes a Logit model to quantify the impact of private bus operators in the planning of public transport improvements. Based on estimating the likelihood to participate in a transit improvement, Chapter 6 provides evidence of the elements or circumstances through which it is possible to adequately consider the influence of private bus operators in public transport improvements. Conclusions, recommendations and areas for further research are presented in Chapter 6.

Chapter 2
Current Situation of Public Transport Systems in Mexico

Overview

This chapter analyses the main characteristics of public transportation in Mexican cities and relevant indicators associated with current performance. The chapter begins with an examination of transport and urban development characteristics which are then categorized based on urban population into six groups. The aim of this categorization is to show that public transport and urban mobility as a whole differ from place to place; the decisions about improving transport or mobility should not be based on a blanket treatment with conventional “remedies”. The chapter, however, shows some common issues that are affecting public transport nationwide. First, most cities demonstrated a limited capacity to improve public transport. Second, budget earmarked to improve mobility is usually allocated to projects that promote automobile use. Third and most important to this research is the current situation prevailing in public transport and the influence of private bus operators in the planning process of transport improvements. Public transport business structures include characteristics of informality with no responsibility to user experience. The traditional and still prevailing model of operation and management of public transport service is known as "man-and-his-bus”. In most cities, public transport is provided by individual owner-operators of small buses that compete for customers within the market, and their day’s pay depends upon passengers carried. These factors are responsible for the current undesirable impacts observed in the majority of Mexican cities. Some of these factors have an influence on government plans to build and improve mobility through investments in public transport.

2.1 Introduction

Mexico is a country where most of the population lives in cities. While in 1960, most of the population was rural, today, approximately 80% of Mexicans live in urban areas. In Mexico, as it is in the rest of the world, cities are sites that boost productivity of individuals and are the engines of the economy of the country. Cities are also engines of social development, areas of concentration of knowledge and innovation and cultural exchange. Recent reports indicate that urban areas with over 200,000 inhabitants contribute to more than 70% of Mexico's GDP. Three cities - Mexico City, Monterrey and Guadalajara- contribute approximately one third of the total GDP in the country (INEGI, 2010; INEGI, 2012; IMCO, 2012).

However, over the last two decades the productivity and competitiveness of Mexican cities have been under threat. The ability of these cities to raise the quality of life of its inhabitants in the medium-to-long term has been limited by several factors. Particularly, these factors include (1) the poor performance of the institutions responsible for ensuring the well-functioning of the places they govern; (2) a weak legal framework that prevails in most places, particularly that of the metropolitan areas; (3) the highly politicized decision making process; and (4) the limited or misdirected resources – human and financial – available for the development and provision of services (Zentella, 2007; Negrete, 2010; IMCO, 2012; ITDP, 2012b).

The effects of the poor performance of cities in Mexico are notorious in many ways. In most of the cities, urban development has taken the form of urban sprawl through remote housing enclaves that are disconnected from the rest of the city (SEDESOL, 2011). The streets in most of the places are saturated with vehicles – private cars, public transport and freight transport units – that generate congestion, air pollution as well as traffic accidents (Johnson et al., 2009; ITDP, 2012). Water supply does not cover the entire population and the public spaces look dilapidated and abandoned (Connolly, 1999; Tortajada, 2006). Cities also suffer from poor performance in terms of waste management and of efficiency in urban logistics (Buenrostro and Bocco, 2003; Martinez, 2009; Lopez de Alba, 2010). More recent reports also highlight the problem of safety (IMCO, 2012).

Amongst all the problems facing Mexican cities, transport is one of the most critical for developing a more livable urban future (Islas, 2000; Johnson et al., 2009; World Bank, 2010; ITDP, 2012; Suzuki et al., 2012). Transport differs from other problems facing Mexican cities because, usually, it gets worse rather than better with economic development while the performance of other service deliveries such as sanitation, education and waste management improve with economic growth (World Bank,

2012). The growth of both the economy and per-capita income has had as one of its purposes increasing motorization (INEGI, 2012).

2.2 Transport and Urban Development Characteristics

The situation of urban mobility and the characteristics of transport systems vary across the country; Mexican cities have differences in their structure, behavior and mobility patterns.[1] This classification includes:

2.2.1 Large Cities

Large cities in Mexico usually have consolidated urban centers with an acceptable legal framework and interjurisdictional collaboration to accomplish their urban policy objectives. Urban development presents moderate levels of density and the quality of roads is usually at an acceptable level. Traffic congestion can be observed during peak periods. Traffic congestion is also observed at some intersections and in roads that give access to the city. Public transport is both publicly and privately provided. Public sector usually owns, operates and manages mass transit systems. Private participation is found in bus provision. These cities have an acceptable bus network and provide a good quality of mass transit service. Recently, mass transit investments – particularly bus technologies – include both public and private participation. These cities include Greater Mexico City, Monterrey and Guadalajara.

In the city of Monterrey and Guadalajara, bus provision includes buses with capacity for up to 50 people including standees, mainly. In contrast, approximately 85 percent of the total bus provision in Greater Mexico City includes low-capacity units. In some areas of Greater Mexico City it has been

[1] The analysis of the transport and urban development characteristics follows the classification presented in a workshop conducted by the World Bank in Mexico City. Information about transport and urban development characteristics and some of the problems urban transport faces at the institutional level were obtained (i) from the information provided in the aforementioned workshop (World Bank, 2012a); (ii) from several interviews with Angel Molinero, a senior transport specialist in Mexico (A. Molinero, personal communications, June 2011); (iii) from interviews with Barbara Almorejo, a legal transport specialist in Mexico; and (iv) from attending various annual meetings and workshops about public transport and urban development in Mexico, including informal chats with transport and legal specialists. It should be highlighted that the information provided is also the result of consulting work – all related to urban transport – I have accomplished for the World Bank. Information about fares was obtained from data presented from "Corredor Insurgentes" (CISA) in several workshops (CISA, 2012) and from Angel Molinero. Data regarding modal share, total vehicle fleet and average fleet age was obtained and estimated by Angel Molinero for a consultancy work to the World Bank and from CTS-EMBARQ Mexico, a NGO on urban transport and mobility. Information about future improvements was obtained from the Mass Transit Program in Mexico (BANOBRAS, 2012) and from CTS-EMBARQ Mexico.

documented interference by criminal groups in the provision of service. Particularly, in the municipality of Nezahualcóyotl, private bus operators pay approximately US$16 per month per unit for the “right to operate” (Reforma, 2013).

2.2.2 Northern Border Cities

Northern border cities are urban areas located in close proximity to the United States (US) border. These cities usually contain an urban development that follows the US model of dispersion and low density. Housing developments – particularly those found on the periphery – are often distant and disconnected from each other. Infrastructure includes roads with high capacity to accommodate automobile flows. Motorization rates as well as accident levels are above the national average.

Inhabitants in these cities typically have easy access to cars, particularly second-hand cars. Public transport is privately provided in US school bus type units (usually second-hand units). Low-capacity vehicles – such as vans – also operate in cities such as Reynosa (Tamaulipas) and Matamoros (Tamaulipas). Some mass transit investments – based on bus technology – are under construction in some metropolitan areas. Public transport is generally poorly regulated. In some areas, there is also the interference of criminal groups controlling public transportation. Fares levels are above the national average.

It should be highlighted that in these cities, criminal groups charge a monthly "operating fee" to private bus operators per transit unit. Non-payment of these "fees" may result in the total destruction of the unit; the life of the operator may be at risk as well. Criminal groups also “allow” illegal transport to operate in certain corridors. In exchange of a "monthly fee", these groups offer protection against government officials.

2.2.3 Northern Cities

As in the northern border cities, the urban development in Northern cities also follows a model of dispersion and low density. As well, housing developments are distant and disconnected from each other. Roads generally present high capacity to accommodate motor-vehicle flows. Motorization rates are also above the national average with high levels of imported second-hand cars (usually in poor mechanical condition). Public transport is privately provided and operates within an acceptable range of quality. Vehicle fleet include mainly buses with capacity for up to 50 people including standees. In cities such as Ciudad Victoria (Tamaulipas) vehicle fleet also include minibuses, approximately 80 percent of the total vehicle fleet. Public transport is poorly regulated and fare levels

are adequate to service quality. Notably, in the city of Zacatecas (Zacatecas), which has a consolidated historic center and roads with limited capacity for vehicle movement, vehicle occupancy levels in public transport is very low. Conventional buses with capacity for up to 50 people struggle to operate in the city center. This situation makes public transport very unattractive to users.

Improvements in operation can be found in some routes in cities such as Saltillo (Coahuila), where private bus operators do not compete for passenger which limits the practice of unsafe driving. Mass transit investments in the form of BRT systems are under construction or are in the phase of identification in cities such as Chihuahua (Chihuahua), Zacatecas (Zacatecas) and Tampico (Tamaulipas).

2.2.4 Center Cities

Center cities have a consolidated historic center. Urban development follows planning practices that promote compact cities with medium to high densities, particularly in the core of the city. Road infrastructure includes roads with low capacity to accommodate vehicle flows particularly in historic centers. Motorization rates in these cities are within the national average with traffic congestion in roads that give access to the city center. Public transport is privately provided with an acceptable quality of service, particularly in cities such Aguascalientes (Aguascalientes), San Luis Potosi (San Luis Potosi) y Queretaro (Queretaro); buses with some technological advances and progress in areas of management and operation improve travel experience. However, in some areas bus service presents overlapping routes on principal avenues.

Public transport is largely atomized, which means that service is provided by a large number of single private concessionaries.[2] Low capacity units for transit can be also found in several cities in the state of Michoacán with some sort of interference by criminal groups in the provision of service. In the city of Morelia, the capital city of the State of Michoacan, private bus operators pay approximately US$8 per month per unit for the “right to operate”. Publicity in units – which is an additional source of income for private bus operators – is also controlled by these criminal groups. In other cities in the State of Michoacan, criminal groups control the supply of bus service and the planning of routes. Fares levels in center cities are within the national average (name withheld, personal communication, October, 2012).

[2] The term atomized (in Spanish “atomizado”) is used in the literature of public transport for developing countries to indicate that the transport service is fragmented or is being provided by many, independent, singular vehicles with little regulation.

Mass transit investments – BRT technologies – have been introduced in the city of Leon (Guanajuato). Other BRT implementations are under construction or are in the phase of implementation in cities such as Puebla (Puebla), San Luis Potosi (San Luis Potosi) and Pachuca (Hidalgo).

2.2.5 Cities in the South

As in the case of cities located in the central part of Mexico, southern cities often have consolidated historic centers and an urban development that follows planning practices that promote compact cities. Roads are usually with low capacity to accommodate traffic flows, particularly in historic centers. Motorization rates are below the national average with traffic congestion in roads that give access to the city center. Public transport is privately provided. Public transport presents different ranges in quality of service. While in cities such as Veracruz (Veracruz) and Oaxaca (Oaxaca) service is provided using buses with medium capacity, in cities such Tuxtla Gutiérrez (Chiapas) and in other cities located in Oaxaca, Veracruz and Tabasco service is provided in low capacity units and the service is highly atomized. In some cities, there is a high presence of informal service. Fares levels are above the national average.

State authorities have made important efforts to improve public transport provision in cities such as Villahermosa (Tabasco) and Tuxtla Gutierrez (Chiapas). In these cities, authorities have addressed the problem of having a large number of private bus operators and oversupply through the formation of transport companies. Notably, in Villahermosa, improvements in public transport cover 70 percent of the urban area.

2.2.6 Tourist Cities

Tourist cities are urban centers that exhibit a linear pattern along the coast. The characteristics of the urban development include medium densities and this development depends on topographic conditions. Road infrastructure is based on a main road – usually with high capacity to accommodate traffic volumes – that runs along the coast. Motorization rates are above the national average and traffic congestion problems are due to limited parking. Public transport is privately provided with an acceptable quality of service. Cities observed a high presence of informal service and low capacity vehicles for transit, particularly in the city of Acapulco (Guerrero). Fares are above the national average. Recently, mass transit improvements are in the phase of construction in the city of Acapulco. Other recent improvements include the organization of private bus operators in bus companies in the

city of Cancun (Quintana Roo). In this city, vehicles for public transport include low-floor technology.

2.2.7 Some Observations

Some of the main observations included in the classification of cities are also illustrated in Figure 2. Figures 2 shows that cities with low population density, such as Tijuana, Mexicali and Chihuahua, have high rates of motorization. Denser cities such as the metropolitan areas of Guadalajara, Puebla-Tlaxcala and Mexico City have lower rates of motorization. This evidence provides strong support to the densification of cities and the arrest of its expansion. This graph also support that public transport used is not only determined by low-income levels; high participation of public transport in modal share is also the result of higher densities.

Figure 2 – Automobile vs Density in Mexican Cities

MA (Metropolitan Area) *Source: ITDP, 2012*

2.3 Public Transport in Numbers

In this section, basic information about public transport and its use in Mexico is presented.

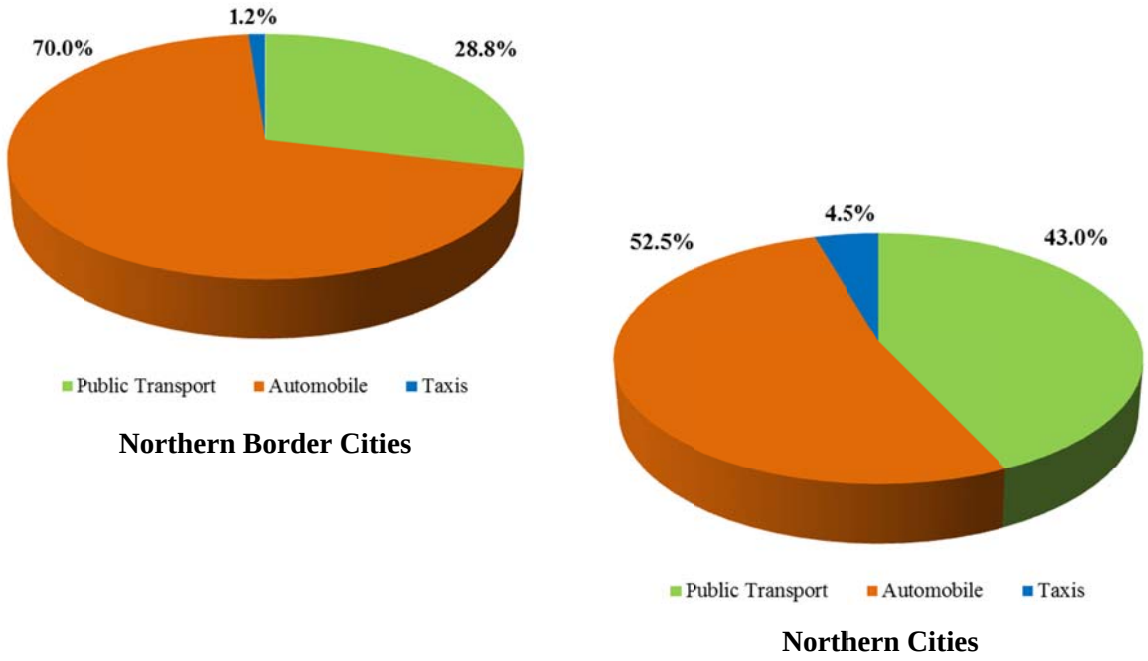
2.3.1 Modal Share

The modal share observed in the country depends on the urban structure and the quality and type of transport alternatives. However, reports on modal share show that, on average, approximately 60

percent of total population uses public transport – in any of its various modes – for daily activities. In contrast, approximately 35 percent of total trips are made by private cars. The remaining 5 percent is for trips made by taxi. It is important to mention that in many urban areas, trips are also made by foot. The lack of information on this regard impedes estimating values for this type of trips.

Northern and Northern border cities observe high motorization rates. Compared to national average and to other regions, the majority of trips in these cities are made by car. This motorization is highly influenced by its proximity to the United States and by the absence of import barriers for used cars. In cities like Tijuana and Mexicali (Baja California), Monterrey (Nuevo León), Reynosa (Tamaulipas) and Chihuahua (Chihuahua) over a third of trips are made by car: Tijuana (34%); Mexicali, (94%); Monterrey (42%), Reynosa (48%); and Chihuahua (61%).

Figure 3 – Average Modal Share in Northern Border Cities and Northern Cities



Northern Border Cities

Northern Cities

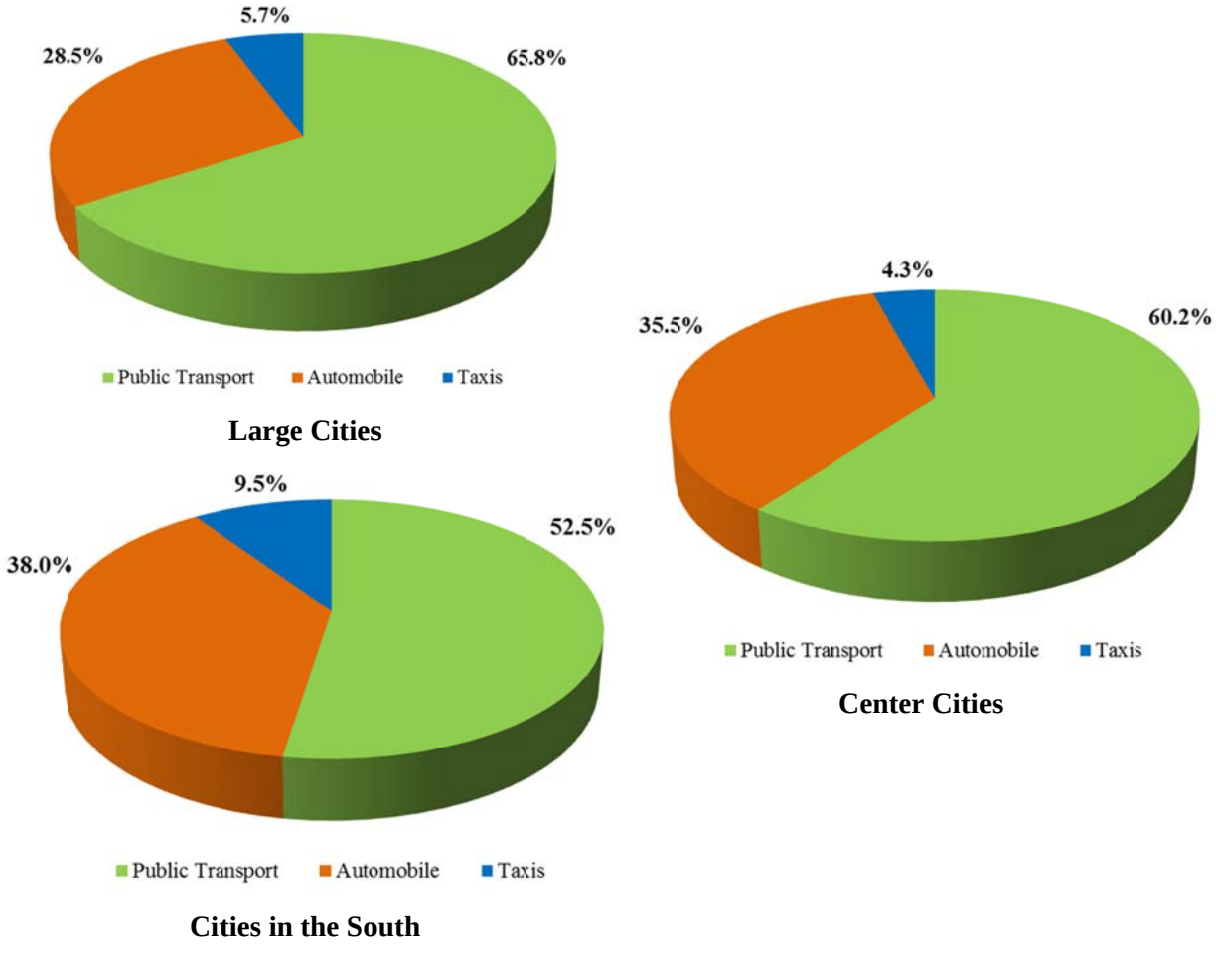
In cities located in the southern part of Mexico, in contrast, figures reveal a high level of dependency on public transport for daily trips, especially for the lower-income population. Cities like Villahermosa (Tabasco), Tuxtla Gutierrez (Chiapas), Ciudad del Carmen (Campeche) and Oaxaca (Oaxaca), for instance, have observed a public transport participation in modal shares exceeding 40 percent.

Noteworthy also is the elevated use of public transport for daily trips in large cities and cities located in the center part of Mexico such as Mexico City, Puebla, Monterrey, Toluca, Querétaro, León and Cuernavaca. These cities' modal shares are above 50 percent (ITDP, 2012a; CTSEMBARQ-México, 2012; Secretariat of Communication and Transport in the State of Tabasco and Chiapas, personal communication).

Automobile use in these three areas is lower compared to the figures observed in Northern cities. Incentives for purchasing and using automobiles in these cities are fewer than those found in cities in the Northern part of the country.

Figure 4 shows average modal share in these three groups of cities.

Figure 4 - Modal Share in Large Cities, Center Cities and Cities in the South



Interestingly, figures for tourist cities show a high participation of taxis in the modal share. These cities have large fleet of taxis that provide service for visitors. In these cities, trips are made also made by private bus transport. This mode of transport is usually provided by hotels to their employees. In the city of Acapulco, it is estimated that approximately 1 percent of the total trips are made by this mode of transportation. Figure 5 shows figures for touristic cities.

Figure 5 - Modal share in Touristic Cities

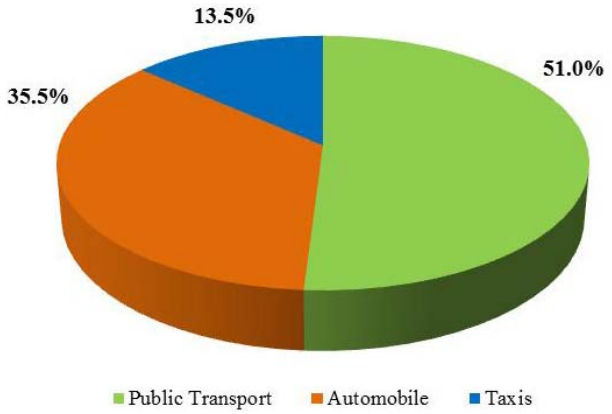


Table 2 shows modal share for some cities in Mexico.

Table 2 – Modal Share in Selected Cities in Mexico

City	Individual motorized transport (%)	Public transport (%)	Non-motorized transport (%)
Tijuana	43	32	25
Mexicali	94	4	2
Chihuahua	61	17	22
Mexico City	23	52	25
Acapulco	20	60	20
Guadalajara	32	28	40
Monterrey	42	47	11
Puebla	17	47	36
Cancun	43	35	22
Tampico	31	42	25
Leon	28	32	40

CTSEMBARQ-México 2012; CAF, 2010

2.3.2 Public Transport Systems

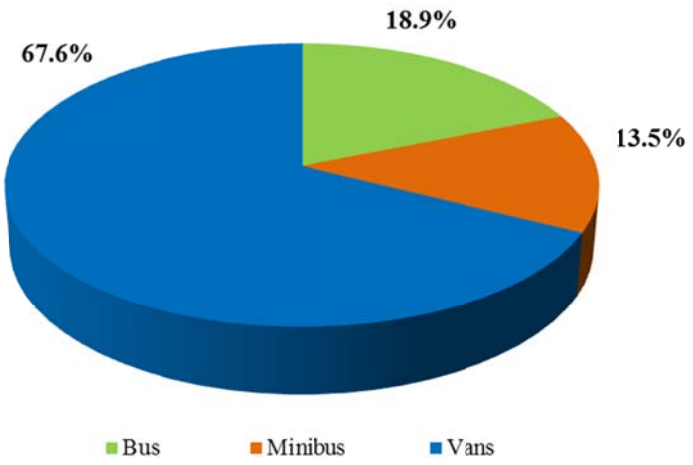
Public transport technology in Mexican cities is correlated with population size and urban development. The vast majority of cities with over 100,000 inhabitants have privately operated bus systems. Only large metropolitan areas – Mexico City, Guadalajara and Monterrey – have government participation in the provision of service. Government involvement is in mass transit services, particularly in rail systems.

Public and private participation in the provision of service also exist in these cities. In the last eight years Mexico City and Guadalajara have introduced mass transit systems in the form of Bus Rapid Transit (BRT) systems. These systems are operated by private providers; the provision of the infrastructure and the planning of routes are conducted by government authorities. In the city of Monterrey, a BRT system is under construction and is expected to operate during 2013.

The case of Mexico City deserves special mention for its size and complexity. Mexico City has a network of 11 subway lines (publicly operated); a commuter train that connects service to the State of Mexico (operated through Public Private Partnership); four lines of BRT with approximately 100 km of dedicated lanes (operated through PPP); an electric trolley system (publicly operated); an electric trolleybus network (publicly operated); and a network of buses operated by the city government. In addition, the city has a privately operated bus system (particularly low capacity units) provided by more than 30,000 bus operators.

Although no official figures exist on vehicle fleet dedicated to urban public transport in Mexico, the estimated vehicle fleet exceeds 370,000 units. Figures obtained for 71 urban areas in the country also show that the supply for urban public transport includes units with different characteristics: high capacity buses (articulated and bi-articulated), buses, minibuses and vans (CTSEMBARQ-Mexico, 2012). Most of these vehicles are vans with capacity ranging from 9 to 16 passengers. These vans account for over 65 percent of the entire vehicle fleet dedicated to public transportation. Figure 6 shows the fleet composition.

Figure 6 - Road-Based Urban Transport Fleet



Noteworthy, however, is the predominance of low capacity units particularly in cities located in the center and in the south of the country. Most transit units are found in Mexico City and in the municipalities of the State of Mexico. Total vehicle fleet in these two areas accounts for approximately 300,000 units. This figure represents approximately 80 percent of the total fleet in the country. The lack of official information and the growth of the informal service limit the accuracy of the estimated total vehicle fleet in Mexico.´

Fleet figures reveal, however, a problem of oversupply. Transport experts indicate that compared to international levels current vehicle occupancy levels in Mexico are relatively low. On average, vehicle occupancy levels per unit – buses – are estimated in approximately 230 passengers (pass/day/bus). These numbers are very similar to those found in some cities in developing countries – particularly Latin American countries – such as Colombia. International standards indicate that vehicle occupancy levels per unit per day ought to reach approximately 500 passengers per unit per day, depending on the characteristics of the city. Reports on transport indicators for some cities in Mexico estimate an oversupply of approximately 30 percent (Camara de Comercio de Bogota, 2008; Quintin, 2011; A. Molinero, personal communications, June, 2012). Figure 7 shows the problem of oversupply in selected cities in Mexico.

Figure 7 - The Problem of Oversupply

City of Morelia

Greater Mexico City

City of Tuxtla Gutierrez

2.3.3 Public Transport Ownership and Operation

The traditional and still prevailing model of operation and management of public transport service is known as "man-and-his-bus". In most cities, public transport is provided by individual owner-operators of small buses that compete for customers within the market, and their day's pay depends upon passengers carried. While public transport is also offered by bus companies – legally constituted – (e.g. Guadalajara with 17 companies; Puebla with 3% constituted as companies; Querétaro with 8t companies and Nuevo Laredo with 1 company) these companies operate under the

man-and-his-bus scheme or under what I call *"companies-and-their-buses"* scheme. The characteristics of ownership models are explained in detail in Chapter 4 of this thesis.

The organization of public transport in the cities of León and Villahermosa are also special cases. In these two cities two of three trips made by public transport are provided by fully organized transport companies. These companies have fare collection systems and maintenance and operation plans (CTSEMBARQ-Mexico, 2012; SCT-Tabasco, personal communication). Other cities with fare collection systems and organized transport companies – operating in selected corridors – include the city of Tuxtla Gutierrez and Tapachula in the state of Chiapas.

2.4 Public Transport Performance in Mexico

The effects of economic growth on the poor quality of urban mobility – particularly that related to public transport – can be estimated by analyzing relevant indicators that illustrate the performance of transport systems in Mexican cities. Below are various features and indicators that show the difficulties faced by Mexican cities on urban mobility.

2.4.1 Decreasing Travel Speeds and Increasing Travel Times

In most Mexican cities, average speed has dropped dramatically over the past 20 years. Figures from Mexico City show, for instance, that the city is losing 3.3 million man-hours a day, which accounts to $2.5B a year. Moreover, average speed in Mexico has dropped from 38.5 km/hour registered in 1990 to 17 km/hour registered in 2007. In 2012, a report on traffic congestion estimates that annual losses due to traffic congestion in the country total $15B (ITDP, 2012).

Regarding public transport users, it is estimated that, on average, a person in Mexico City losses above one thousand dollars a year due to public transport inefficiencies (Mejia, 2012; Santillan, 2012). While in 2007 average length of a trip was estimated in 53 minutes, in 2009 average length of a trip reached 81 minutes (Tarriba and Alarcon, 2012). Average speed in public transport in Mexico City has also decreased in the last 20 years. Whereas in 1990 average speed was 28 km/hr. in public transport, in 2012, average speed in some corridors reached between 12 to 15 km/hr (SMA, 2009; Santillan, 2012).

Figures on average speed in public transport in other cities show similar results to that found in Mexico City (see Table 3). However, average operational speed in these cities is expected to be

improved; recent public transport initiatives include dedicated lanes for buses with designated stops along the corridors.

Table 3 - Average Operation Speed in Selected Cities

City	Current Operational Speed	Expected Operational Speed
Chihuahua	19 km / hr	20 km / hr
Monterrey	18 km / hr	25 km / hr
Puebla	18 km / hr	25 km / hr
Municipalities in the State of Mexico	12 – 15 km / hr	25 - 30 km / hr

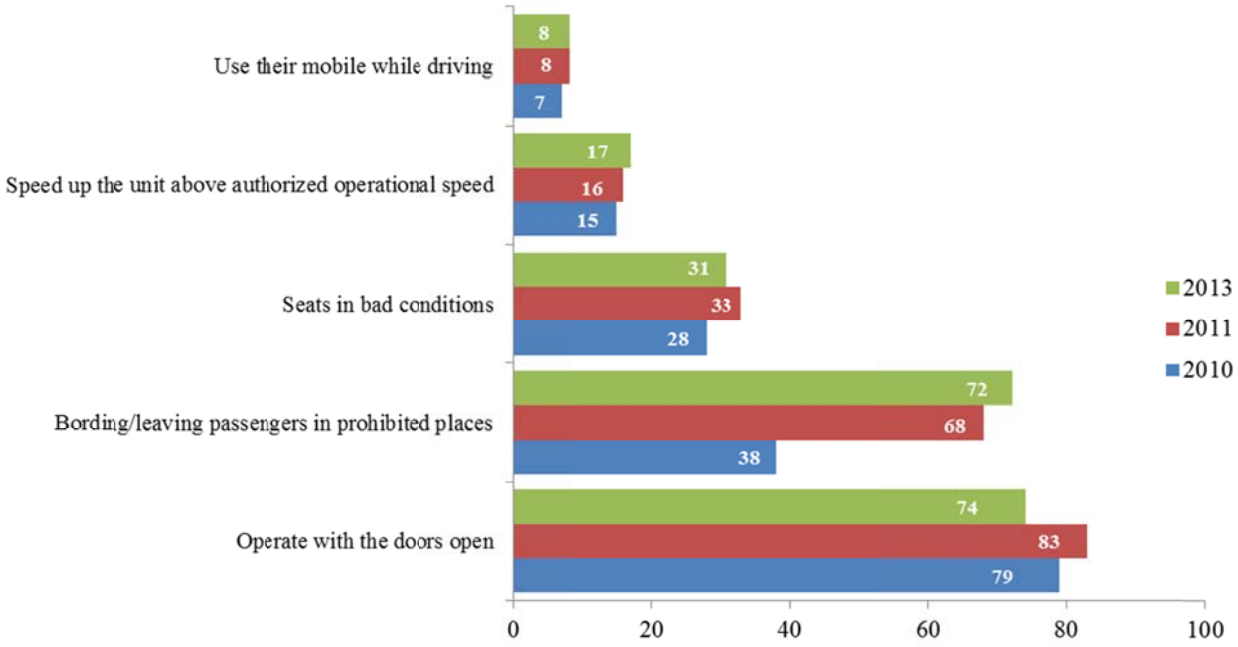
CTSEMBARQ-México 2012

2.4.2 Low Levels of Comfort in Alternatives Modes to the Automobile

In most of the country, service quality of public transport is generally low, particularly in areas of safety, system integration and passenger comfort. Although coverage and frequency are generally acceptable during the day, these two service indicators fall sharply during the night time and on lower order roads. In most cities, the current form of operation complicates setting up system information; there are no designated bus stops and frequencies vary throughout the day. In some cities, accurate information about the whole public transport system – number of routes, infrastructure dedicated to transport characteristics of vehicle fleet, number of concessionaries and their characteristics – is unknown by the transport authorities.

Regarding safety issues, in many places, transit units usually lack insurance for protection of users. Moreover, system operation is performed without safety driving measures. A report on safety elements in road-based urban transport in Mexico City shows that 7 of 10 minibuses operate with the doors open. Similarly, boarding/leaving passengers in most cases occurs in prohibited places. The report also shows growing trends in the use of mobiles by drivers while driving and in speeding up the unit above authorized operational speed (Reforma, 2013a). These problems are not unique to the Mexico City; these problems are very common in other parts of the country. Figure 8 shows results found by Reforma newspaper. The problem of boarding/leaving passengers in prohibit places is shown in Figure 9.

Figure 8- Issues with Safety Driving



Source: Reforma (2013)

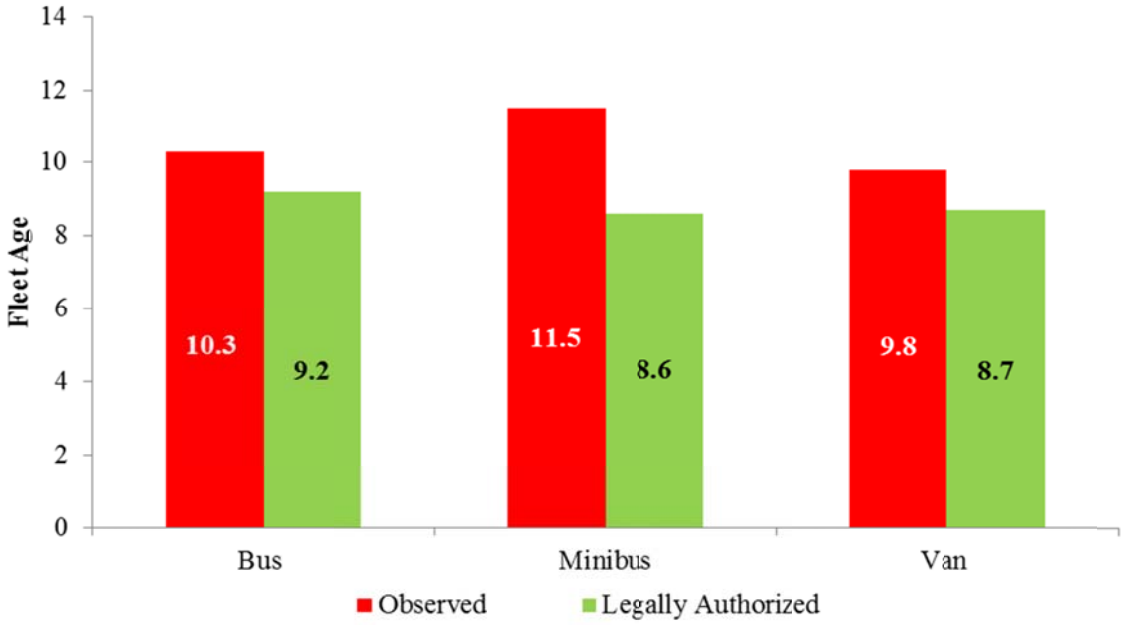
Figure 9- Safety Issues in Public Transport

Bus operating with doors open

Boarding/leaving in prohibited places

In terms of average age of the vehicle fleet, Figure 10 shows this average for 38 urban areas in Mexico by mode of transport. Figure 10 also shows the legally authorized age by mode of transport, as it is indicated in each city Transport Law. As it can be seen, average age of the vehicle fleet for buses is 11.3 percent higher than that stated in Transport Law. As for the case of minibuses, average age of the vehicle feel is 33.7 percent higher than that stated in Transport Laws. This evidence gives sights of the limited institutional capacity to enforce this law. These results also provide evidence of the highly politicized of the transport sector. Figure 11 show some of the problem facing passengers when using public transport in Mexico.

Figure 10 - Average Fleet Age vs Legally Authorized Age



Reports also highlight the case of Mexico City and cities located in the northern border with fleet ages that exceed approximately 20 years. In Mexico City, where the majority of service is provided by minibuses, average fleet age of this type of units exceeds 25 years (CTSEMBARQ-Mexico, 2012; Montes and Robles, 2012). It should be noted that the average age of the fleet for countries such as Canada – to maintain a sustainable and acceptable comfort level – is estimated at eight years. In the United States the average age of the fleet is 12 years (CUTA-ACTU, 2010).

Figure 11 - Travel Experience - Issues in Public Transport

The infrastructure dedicated to public transport is, in most cases, in poor condition. This infrastructure is limited to shelters and bus signs that are usually in bad condition. Sadly, in places where bus signs exist, these signs are sometimes not respected by any actor. Figure 12 shows an example of this situation. Similarly, shelters are sometimes built without considerations to improve users' travel experience. Figure 13 shows how publicity and gardening – legally regulated – impedes shelters to fulfill their functions. Users have to stand up near the road to see if buses are coming or not.

Figure 12 - Bus Signs in the City of Morelia

Figure 13 - Bus Shelters in Mexico City

Ciudad Pedestre (2011; 2012)

Infrastructure and vehicles adapted to provide service to users with disabilities are non-existent. Finally, pedestrian access to bus routes is also in poor conditions, mainly in the outskirt of cities. In Northern border cities, poor pedestrian access to public transport and limited area coverage of public transport during night time has raised issues associated with safety, particularly for women, the director of a NGO in urban mobility in Mexico indicates **(**A. Lobo, personal communications, January, 2013).

2.4.3 Fares on Public Transport

A problem associated with the quality of service offered by public transport is that related to fare levels. Fare levels are usually politically determined; only in very few cases, are fares determined through technical studies that indicate the "correct" cost of the public transport provision.

Transport specialists and legal consultants indicate that in the majority of the States there is no adequate pricing policy that ensures the quality of service. Legal frameworks are unclear in how fare levels should be established. On the one hand, it is stated that fare levels should guarantee mobility of the urban poor. On the other hand, the legal framework also states that fares should be annually re-calculated and should consider increases in operating costs (e.g. fuel, tires, etc). The lack of legal clarity in determining fare levels leaves private bus operators – and the public transport system as a whole – in a vulnerable situation. Fares usually do not cover the total operating costs for providing service. Fares do not also consider maintenance of units and depreciation costs (B. Almorejo and A. Molinero, personal communication, April 2010).

Several consultants and transport experts indicate – ironically – that the service is, in effect, a subsidized service, but this subsidy comes from the private bus operators and not from government bodies. Private bus operators subsidize bus service in two main aspects: they limit areas of maintenance – which reduce operating costs but increases depreciation factors associated with transit units – and have long working hours without increased wages. Likewise, subsidy for students – 50 percent of the cost of transport – is usually absorbed by private bus operators. In a very limited number of cities, governments cover the cost of this subsidy via financial transfers to acquire bus supplies such as tires (A. Molinero and R. Juarez, personal communication, September, 2012).

Mexico, in fact, has one of the cheapest fares in the world. The average cost of one-way ticket on public transport is approximately US$ 0.45: Mexico City has lowest fare of US$ 0.23 and the state of Chiapas the most expensive fare of US$ 0.76. On average, fares in Mexico are 20 times cheaper than those found in cities such as Tokyo and London. Fares in Mexico are 1.5 cheaper than those found in cities in Colombia, Chile and Brazil (Metrobus, 2011).

2.5 Multiple Causes of the Current Situation

Several causes have contributed to current public transportation problems in Mexico. The most important causes are discussed here.

2.5.1 Inefficiencies in the Allocation of Road Space

Several cities in Mexico are facing the problem of allocation of road space. In most cities, private vehicles and public transit share right-of-way. While the latter are slowed down by the volume of congestion generated by cars (which carry few passenger-trips but use a great street space), the former are slowed down by the frequent stops made by buses. Low-income groups, who depend on public transport, are most affected by these inefficiencies; these groups experience long commutes.

2.5.2 Limited Interjurisdictional Collaboration

In Mexico, the three levels of government – federal, state and municipal – have a say in urban transport; however, their influence are intersected and the legislation does not promote their confluence. Moreover, the dynamics of urban development have resulted in conurbation of several municipalities, resulting in an increase in the number of actors involved in decision-making processes. Metropolitan commissions may be instituted to facilitate inter-jurisdictional coordination yet are poorly developed. For example, the importance of the Metropolitan Transportation Commission for Greater Mexico City – which includes Mexico City and municipalities in the State of Mexico – reached a peak during the 1990s. Several studies associated with legal aspects, technical standards, operation, fees and financial aspects, supervision, infrastructure, mass transit, energy consumption and accident prevention were developed during the first years of operation. However, political differences between authorities in the State of Mexico and Mexico City disrupted the continuity of work (Angel Molinero, personal communication, October 2010).

2.5.3 Weak Institutional Capacity to Plan, Build and Regulate Public Transport

With some exceptions, the institutional capacity to organize public transport operation and regulation is generally very weak. Governments lack (among other things) trained personnel, organization and maintenance of databases and adequate facilities. Even in the case of large cities such as Mexico City – where staff turnover is moderated and the institution in charge of the regulation of public transport service has well-defined structure with a moderate capacity in terms of staffing – the capacity to plan and execute solutions is overwhelmed by daily activities. In addition, in most cities, planning is

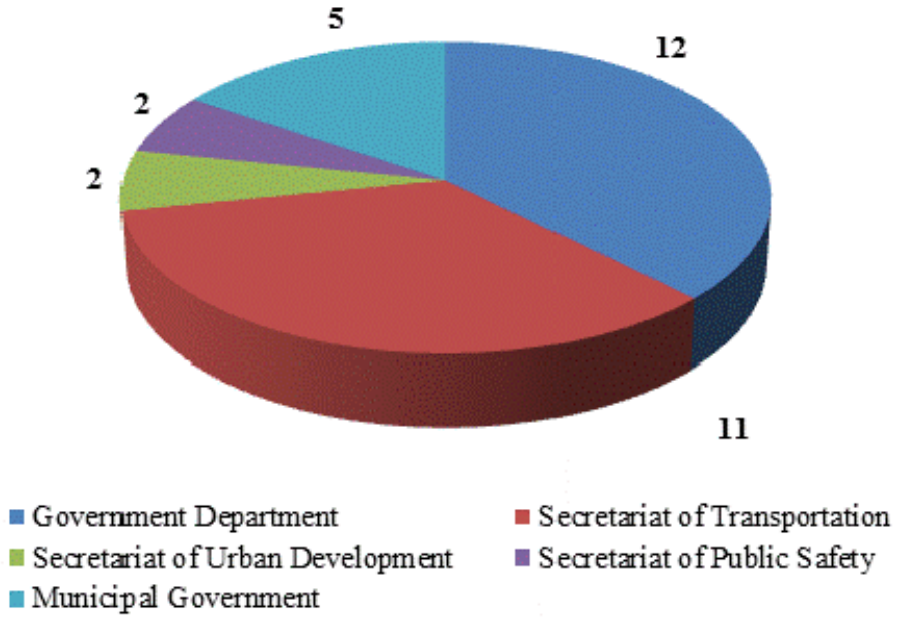
usually a short-term activity and it is limited by the time of political appointments. Very little continuity in the planning of programs can be found in most cities. Continuity is practically non-existent in cities that experience changes in political parties.

In addition, most cities require improved institutional capacity in the form of stronger planning units and by establishing transport management entities to manage transport demand. Although some cities – e.g. Leon, Monterrey and Guadalajara – have dedicated considerable resources to training and institution building and have managed to maintain experienced staff, the majority of cities in Mexico lack institutional capacity and satisfactory human resources with transport expertise or background. In recent years, however, several transport initiatives are working on areas that improve institutional capacity. Under a project called "Medium Cities Project", partly financed by the World Bank, for example, it is mandatory that cities develop Integral Transport Plans to access financing for transport improvements. This project can serve as a basis for moving forward in improving institutional capacity, a transport and financial specialist at the Federal Government indicates (Francisco Quiñones, personal communication, June 2011).

The weak institutional capacity is certainly influenced by how public transport areas are legally organized or located within the government structure. In several cases, public transportation regulation and planning is the responsibility of areas that – legally speaking – are not necessarily entitled to perform public transport activities, in a broader sense. As it is shown in Figure 14, in 14 of 32 states in Mexico, public transport is the responsibility of Government and Public Safety Departments. The main function of these departments, however, is to preserve public order. These functions differ from those required for optimal operation of public transport.

However, the latter does not mean that public transportation is more advance in states where public transport planning and regulation is the responsibility of transport authorities. The argument about responsible areas is that – legally speaking – states with "transit-oriented" departments have greater possibilities to address the problem of public transport more effectively.

Figure 14 - Institutions in Charge of Public Transport Planning and Regulation



2.5.4 Low Level of Fares and Weak Ownership Models in Public Transport

The low levels of fares - observed in the majority of cities – have also impeded the modernization of the fleet and the generation of surpluses that allow the growth of the sector. Fare structure in most systems does not include the cost and use of capital, leading to a state in which vehicles are outdated, unsafe and polluting. The problem of low fares is evident in cities such as Mexico City. Mexico City' public transport fares have remained the lowest in the country for several years. Despite constant increases in operating and maintenance costs, government authorities have kept fares unchanged for several periods.

The problem of low fares in Mexico City raises issues mainly in bus operations and management. Mass transit systems – Metro, trolley and light rail – are highly subsidized. However, road-based transport systems, which provide service to the majority of the urban population, become increasingly inefficient because of low fares. Official figures in Mexico City show that most buses – particularly minibuses – are in poor condition and 95 percent of them have reached the end of their operating lifecycle. The problem of low fares in this area has also led private bus operators to seek alternative methods to reduce operating costs. Private bus operators usually rely on informal markets for repairing and purchasing transport supplies.

Informality also extends to non-traditional areas. Illegal purchase of fuel has been recently revealed by a national newspaper. This newspaper's report shows how illegal fuel is distributed to private bus operators in bus departure areas. Savings from illegal fuel purchase is estimated in US$3 a day, an 8 percent savings compared to the cost of fuel purchased legally. It should be highlighted that the distribution and purchase of illegal fuel is sanctioned not only by local laws but also by federal laws (Reforma, 2013b). Figure 15 shows illegal purchase of fuel in Mexico City.

Figure 15 - Illegal Purchase of Fuel

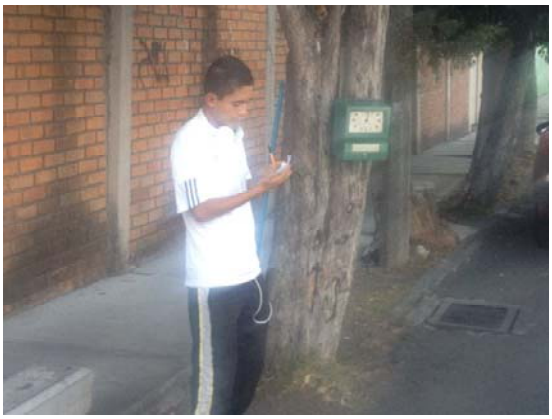
Source: Reforma (2013a)

Public transport' business structures also include characteristics of informality with no responsibility to user service. Drivers of transit units have no social security and work more than 10 hours a day. Maintenance of vehicles is very limited with virtually no government control on the fleet and service standards. The daily operation is virtually self-regulated, with minimal controls and without penalties. Key activities for the optimal operation of the service, such as dispatching, are also performed by people with limited training. Fieldwork confirms that this important activity is even performed by minors. Some of these issues are shown in Figure 16.

Figure 16 - Current Business Operation and Management

Man taking care of units

Dispatcher Man



Dispatcher Kid

Moreover, the business structure of the public transport provision does not encourage investment, modernization of the sector or specialization. In practice it is observed that each private bus operator maximizes their utility functions individually. As such private bus operators have not had a real incentive to generate a competitive and effective business structure. Poor business organization contributes not only to the decline of the transport business but also to the already deteriorated transport facilities; poor transport facilities exist not only for users but also for private bus operators themselves. Figure 17 shows an example of current transport facilities dedicated for private bus operators.

Figure 17 - Poor Transport Facilities for Bus Operators

Infrastructure in Bus Departure Areas

A conclusion reached by several transport experts is that in the absence of government involvement in regulating service provision, providing the required infrastructure and developing a fare structure that cover all costs, irregularity is, in fact, a more desired state than actual business formalization.

2.5.5 The influence of Private Bus Operators in Planning Transport Improvements

Another problem associated with the current situation of public transport systems in Mexico is the opposition of bus operators to formalize business and to follow some sort of service standards. The opposition of private bus operators to governmental attempts to control public transport has been documented for years. One of the first instances of these operators' political power operators against organizational policies from the government emerged during the early 1990s in Mexico City. Authorities at the government of Mexico City indicate that during this period, government authorities attempted to introduce several policies with the aim to regularize the bus provision system: the vehicle registration plate and the creation of bus companies. The vehicle registration plate, which was required to provide service, was subject to the replacement of low-capacity units for higher capacity units (two low-capacity units for one unit with higher capacity). This policy also implied the creation of bus companies.

Box 1 - Privatization of bus service and the role of private bus operators: The case of Mexico City

During the 1980s, Mexico City was facing economic difficulties and labour conflicts in the public bus company. Financial constraints affected the long-term implementation of the Transportation Master Plan for extending the Metro system introduced in the late 1970s (Legorreta & Flores, 1995; Wirth, 1997; STC, 2010). The city was also facing growing political conflicts with bus-drivers' unions which resulted in workforce and budgetary cuts and subsequently in the demise of the public bus company "Ruta-100" (Wirth, 1997, Islas, 2000).

The result of these events gave rise to the growth of the informal – or non-regulated – bus service. The popularity of this mode had grown amongst the urban population due to its versatility to adapt to the needs of the population. Privatization of bus service led to improved access to markets and jobs, given ubiquity of service and service expansion. Moreover, privatization produced greater employment opportunities for low- to moderate - skilled workers who found in public transportation a means to make a livelihood (Legorreta & Puente, 1998; Cervero, 1997; Figueroa, 2005). Tolerated by government authorities, these workers – or bus operators – lacked minimum skills to drive transit units. Local authorities deliberately relaxed entry and operation requirements to accomplish national and local policies promoting employment (Gakenheimer et al., 2002).

The growth of the informal or non-regulated service – with the use of low capacity vehicles – was also influenced by recommendations of international organizations. During the late 1980s, the World Bank promoted the politics of deregulation in the transport sector and the use of small vehicles for transit given low labour costs. Policies were created that advocated for avoiding the use of regulations or franchises that could create private monopolies, encouraging the atomization of road-based public transport. The benefits of frequency of service and area coverage that would result from giving private unrestricted opportunity to enter the market (World Bank, 1986) were also emphasized.

The problems facing the city in terms of bus provision is thus, in part, the result of policies promoted by government bodies; these problems should not be attributable only to private bus operators. The above describing policies have contributed to the current situation of private bus provision which stress the limited professionalization of the sector: 49 percent of drivers completed junior high school and 30 percent completed elementary school (ciudadanosenred.com.mx, 2012).

Today, the professionalization of the sector through the introduction of mass modes of urban transportation raises some difficulties during the implementation process. Incorporating bus operators into BRT systems implies mayor changes not only in these operators' business and routines but also in terms of these operators' understanding of new management and operational practices. These operating conditions are not even entirely understood by government bodies nor are explained to private bus operators through training programs.

These policies resulted in the opposition of private bus operators to accomplish government regulations; private bus operators wanted to demonstrate their political power to the authorities and to continue operating under a weak regulation framework. Private bus operators threatened government bodies to interrupt bus provisions – for an unlimited period of time – and to block the main avenues of the city. This threat was taken as valid by the government authorities. Private bus operators continued to operate as they had done. Chapter 3, 4 and 5 formalize and examine the influence of private bus operators in the planning of bus improvements.

2.5.6 Insufficient Funding to Public Transport

In Mexico, federal resources are fundamental for improving the urban infrastructure in the majority of cities; federal resources account for up to 80% of infrastructure funding. Recent reports show that of the total resources earmarked for infrastructure investments, those resources committed to urban mobility are the highest priority in some cities: Puebla (51%), Veracruz (33%), Querétaro (32%), Guadalajara (32%) and Mexico City (26%). However, resources committed to urban mobility have mainly been focused on infrastructure projects dedicated to automobile use. For example, in 2011, car-oriented projects accounted for 80 percent of the total resources dedicated to urban mobility; only 11 percent was directed to improve public transport systems (ITDP, 2012b). The allocation policy followed by most Mexican cities is certainly questionable in terms of equity and of promoting the competitiveness of cities. As it is shown in section 2.3 of this document, car accounts for only 30-40 percent – national average – of the total trips in cities; cars are responsible for the high energy consumption and various negative externalities associated with their use.

The conclusion reached by several consultants is that government authorities prefer to improve automobile mobility rather than public transport for three main reasons. First, government authorities rarely choose public transport as the main mode of urban transportation; government authorities usually rely on automobiles for their daily activities. This situation leads to a second point. Given that government authorities use the car for their daily activities, they only see the problems faced by automobile users. Third, given the time of political appointments and the complexity associated with improving public transport, the preferred solution to urban mobility is usually the one with results in the very short-term. These decisions are usually associated with widening roads, building bridges, etc. (A. Lobo; L.E. Moreno; A. Molinero personal communication, June 2011).

2.6 Undesired Impacts Associated with the Current Situation Prevailing in Public Transport Systems

This section shows some of the most relevant undesired effects faced by Mexican cities due to problems associated with public transport:

2.6.1 Deaths and Injuries because of the Low Performance of Public Transport Systems

In Mexico, it is estimated that approximately 17,000 people die and more than one million children, youth and adults suffer disability or injuries because of motorization. The main victims in traffic accidents are pedestrians and cyclists (Lobo, 2012). Mexico is, in fact, one of the riskiest countries in Latin America and the riskiest of the OECD member countries. The estimated mortality from traffic accidents per 100 000 inhabitants (20.7) is almost two times higher than countries like the U.S., Spain and Canada, and four times higher than in countries such as Sweden, Switzerland and Japan. The national average is 16 accidents per 1,000 vehicles, with a mortality of 16 people per 100,000 citizens. The problem of deaths and injuries from high levels of motorization ranks second as the leading cause of disability (WHO, 2007).

Although several causes can be identified as contributors to mortality rates –speeding; a lack of adequate urban infrastructure; limited infrastructure for non-motorized modes; and limited education of both the driver and the pedestrian – the low performance prevailing in the majority of public transport systems greatly contributes to these rates. Information from the Department of Forensic Medicine in Mexico City reveals that in the city about 900 people die each year in traffic accidents. Of this total, 60 percent are attributable to public transport occurrences. In the city of Guadalajara, 283 people have died as a result of an accident associated with public transport. In the state of Veracruz, reports indicate that eight people die, on average, because of occurrences in the public transport system (Informador, 2012; Ruiz, 2010; Delgado, 2012).

2.6.2 Air Pollution, Health and the Environment

Motor vehicle emissions is one of the primary sources of air pollution that contribute to the current environmental problems facing in Mexico. In fact, reports on global warming show that the metropolitan areas of Mexico City, Monterrey and Mexicali are, amongst major global cities, some of places with the highest levels of motor vehicle emissions. Recent emissions inventories in these metropolitan also highlight the high levels of particulate matter (PM2.5): Mexico City, Monterrey and

Mexicali are among the 20 cities – of a total of 565 cities – with the highest concentration of PM2.5 (WHO, 2009). The effects of PM2.5 on health are considerable. PM2.5 emissions have high morbidity as they directly affect lungs. The transport sector is also the largest generator of methane (CH4) and volatile organic compounds (VOCs).

The environmental problem in Mexico has certainly been exacerbated by the recent boom in sales of used vehicles from the United States. However, in the last years, the problem of having outdated buses has greatly contributed to environmental concerns. In greater Mexico City, for example, circulates approximately 32,000 minibuses, of which 23,000 are registered with the Federal District (DF) and 9,000 in the State of Mexico. These units travel an average of 200 miles per day and generate more than 246,000 tons of pollutants, which represent 11.7 percent of total emissions generated by mobile sources for the base year. Additionally over 90 percent of these minibuses are pre-1993 model. These transit units have no emission control equipment and operate in very poor mechanical condition (SMA, 2003).

2.7 Conclusions

This chapter shows that public transport systems shows signs of inefficiencies in most cities in Mexico. The main problems presented by weak public transport systems are high travel times and low quality of services. Other related problems are the sheer magnitude of the unwanted impacts on public health and air pollution. To raise the competitiveness of cities requires professionalism and effectiveness from local governments to deliver results and work together with other authorities. Competitiveness also requires ensuring institutional and legal innovation. Specifically, cities must have professional institutions of metropolitan character with sufficient powers, resources and incentives to deliver results.

Finally, and more important to this research, is the work that has to be done in terms of formalizing and improving the public transport systems. As noted in this chapter, the sector is still dominated by a large number of private providers that work under concessionary schemes to provide service. The limited organization of the sector has led to several problems including reckless driving behaviour, traffic congestion and injuries. The current business structure of public transport also limits the modernization of vehicles and the generation of surpluses for the progress of the sector. In the following sections introduce the influence of private bus operators in the planning process of transport improvements and examines strategies to minimize these operators' influence.

Chapter 3
Bus Operators' Objectives in the Evaluation for Transit Investments in Developing Countries: A Conceptual Framework

Overview

This chapter discusses the appropriate evaluation techniques to assess transit proposals in developing countries. With the shift of ownership models in past decades - from fully public, to fully private, and eventually to consolidated, franchising models – this chapter argues that successful transit projects require analysis of several indirect costs associated with changing ownership. The chapter define these indirect costs to include: (1) the potential loss of personal income for local bus operators if the new investment precludes their continued operation; (2) negative personal impacts in terms of self-worth and changing business dynamics; and (3) long-term impacts on government ability to implement future projects as a result of the obstacles that may result from costs (1) and (2). The chapter proposes a methodology in which these costs are explicitly considered in the evaluation process. The chapter presents an assessment on how various ownership models currently being utilized influence - either positively or negatively - these indirect costs. In this chapter it is concluded that full involvement of local bus operators typically minimizes these indirect costs but may be difficult to achieve depending on the number and characteristics of the operators in the corridor for which the development is proposed. Finally, the chapter presents a detailed assessment of the conditions under which full involvement is possible; it is also suggested alternative techniques to advance the idea of local operator involvement.

3.1 Introduction

In recent decades, state authorities in Mexico have increasingly engaged private transportation providers to replace government operated transit systems. This privatization model, when compared to transit provided exclusively by government, produce higher frequency of service over expanded areas and create positive economic opportunities for low- to moderately-skilled workers. Moreover, engaging the private sector in transit operation has increased private capital investment in transit infrastructure which is especially important in developing countries where the competition for public resources - or opportunity costs - are very high (Cervero, 2000).

However, privatization, often without strong regulation, generates an over-supply of service which results in excessive competition. When this occurs, increased congestion, higher accident rates, reduced vehicular safety and overall lower quality of service may arise (World Bank, 2002; Cervero and Golub, 2007).

In response to these shortcomings, governments in developing countries have begun to explore alternative ownership models that maintain the benefits of privatization but improve upon the weaknesses. One such ownership model is franchising in which private sector suppliers are organized to form consolidated transit providers which operate under public sector regulation and monitoring. Consolidated, franchise systems share revenues and costs which in turn eliminate competition for passenger volumes, improve economies of scale, and advance the integration of the transit system (Gwilliam, 2003; Ardila, 2008).

Franchise systems also have secondary benefits in terms of the operators' personal well-being. These systems often include the existing (local) transit suppliers to various extents in the newly-formed companies. In other cases, the right to private operations may be opened to any group of operators (local or foreign) who wish to own the service rights, with local operators receiving various advantages in the bidding process (EMBARQ, 2006; Hidalgo and Graftieaux, 2008).

Franchising can be contentious and may not be easily implemented because of several indirect costs associated with the implementation process. Current private operators may be reluctant either to give up operations or to enter into franchising agreements, for a variety of reasons including mistrust of government, limited understanding of the economic benefits of such agreement and strong emotional ties to their existing business. Private operators' commitment to the status quo presents

major challenges in transitioning to new ownership models. Failure to fully and successfully convey the benefits of transition to local operators has led to protests, disruption and delaying of projects (EMBARQ, 2006; Alcaraz and Robles, 2005; Hidalgo and Graftieaux, 2008; Nava and Ramírez, 2008). In addition, the impacts of alienating local providers may also exacerbate the mistrust between these operators and government which may, in turn, further complicate negotiations in other areas. Finally, in developing countries, there exist political and economic limitations to undertake plans over an extended period of time. Transit projects can be either delayed or not completed because other policy priorities arise or because the impetus for the project is lost due to natural political cycles (Ardila, 2002; Mitric, 2008).

In this chapter, it is demonstrated that full involvement of local operators for franchising systems is in most cases the best method to minimize the indirect cost described above. What it is analyzed here are the conditions – in terms of the characteristics of the private operators, the areas in which an improvement is proposed, and the relationship between government and operators – under which full involvement poses the greatest challenges. It is suggested that there are cases in which full involvement may be extremely complicated. In these cases, longer negotiation times may delay a project through a political cycle after which the public support for and political capacity to implement the project has expired. Under these circumstances, the chapter suggests that the negotiation costs may warrant different strategies (ownership or location) for the investment.

In the remaining sections, it is analyzed these indirect costs more thoroughly and demonstrate how they should be included in the planning process. It is then identified the critical system components that have the greatest influence on indirect costs including the characteristics of bus operators as well as the features of the network structure where investments are proposed. Finally, the chapter suggests the methods by which private operators may work "bottom up" with governments support to facilitate their inclusion in successful transportation investments.

3.2 Indirect Costs of Major Transit Investments in Developing Countries

World-wide examples are used to support the motivation for a stronger emphasis on analyzing the competing interests and project costs perceived by stakeholders in developing countries. Rarely formalized in the literature of transportation planning for developing countries, these costs include the impacts on existing operators; the potential for disruption; the opportunity costs of both investments and prolonged negotiations; and changes in the political agenda.

Box 2 The term *developing*

The term *developing countries* is commonly used in the academic world to denote countries located in the Southern Hemisphere – Africa, Asia and Latin America – that are at a relatively early stage of their economic development. *Developing countries* are also characterized by problems of unemployment, high inflation, financial debts and lack of social development, including health, crime and access to jobs and to the amenities of life. Moreover, the literature refers to *developing countries* as those in need of technological and financial assistance to ensure development. Additionally, authors refer to *developing countries* as places with ineffective institutional structures, significant levels of corruption, economic stagnation, growing informality and poor fiscal controls that result in limited human and financial resources to improve the welfare of society (Dimitriou and Banjo, 1990; Esteva, 1992; World Bank, 1997; Easterly, 2002).

However, the term *developing* in the academic literature is sometimes misleading, and its use can be exposed to criticism, requiring the explanation of some of the most cited misconceptions about the term. For instance, Roth (1987) indicates that one of the problems with the term *developing* is that it implies that any country outside certain "conventional" socio-economic standards is no longer "developing". Thus, the counterpart of the term *developing* – developed – can erroneously assume that no drastic changes are further required for countries that have escaped from that "undignified" condition of development. Similarly, for Esteva (1992) the problem associated with this term is that the specifications about the term *developing/developed* have been based either on a Western or on an intellectual perception, so people of different cultures do not have the opportunity to define the forms of their social life. Esteva (1992) and Escobar (1992) argue that the term is misleading in that it implies that *developed* or *advance* economies are doing well, and so they are in a position to dictate the course of action to converge to a "desirable state".

In addition, although the term is widely employed in many different areas of study, including Geography, the wide acceptance of the concept without any form of clarification can be inadequate as it hides geographical aspects associated with the division of continents (Williams et al., 2009). For example, Mexico and former Soviet Union countries, such as Tajikistan, Uzbekistan or Kyrgyz Republic, are located in the Northern Hemisphere. However, it is widely acknowledged that these countries share many characteristics with other *developing countries*, including the prevalence of a relatively high proportion of a low- and middle-income population, urban informal settlements and large financial assistance from external sources to improve development. Similarly, geographically Southern nations, previously considered as *developing*, e.g., Turkey and the East Asian Tigers – Singapore, Hong Kong, South Korea, and Taiwan – have joined the modern "First World". The socio-economic conditions of the East Asian Tigers are related to those found in economically advanced countries.

3.2.1 Impacts on Existing Operators

Transit provision in developing countries provides employment for many unskilled persons and is a generator of wealth. Employment opportunities are not only limited to the direct operation of buses. Rather, the economics of privately provided transit systems include multiple drivers and "in-bus assistants." Intermediate goods and services such as vehicle maintenance, local vehicle production, and parts retailing are also economic sectors that benefit from current bus operations. Other indirect jobs include the field attendants who perform informal dispatching of buses at busy terminals. Some have extended the analysis of economic generators associated with private bus provisions to performers (typically clowns and musicians) and vendors who make their livelihood from bus passengers *(*Cervero, 2002; Islas, 2000; world Bank, 2002a; Ramírez, 2006*)*.

Beyond economic costs, scholars have identified costs that may arise due to changing routines and habits associated with a privatized transit service. Often, private operators feel very strong attachments - in terms of their personal well-being and social status - having created and operated their businesses for extended periods of time (EMBARQ,2006; Ramírez,2006; Roschlau, 1981;López, 1997; Dimitriou, 1990). Bus owners not only drive their vehicles, but are also responsible for repairing and cleaning the units. A common concern amongst private operators is the loss of personal well-being associated with relinquishing direct control of their current business (Nava and Ramírez, 2008); the greater the economic activities and psychological attachment associated with transit provision, the more sensitive this sector may be to attempts to modify business routines.

3.2.2 Public Disruption and Greater Transferability Impacts

Replacing the owner-operator model represents a major disruption for many operators' daily routines and may produce a potential net welfare loss because of the changing personal (social and economic) dynamics. Consequently, government attempts to improve transit service can increase the likelihood of social unrest. For example, in many cities (Bogota, Colombia; Sao Paulo, Brazil; Johannesburg, South Africa; and Mexico City, Mexico) local authorities have frequently been confronted by bus owners that oppose giving up operations, being relocated (operating in other areas) or changes to the organizational structure of their current operations (Alcaraz and Robles, 2005; Hidalgo, 2009; Quintero and Bolaños, 2008; Pantoja, 2009; Pantoja, 2009a; El Tiempo, 2010; News 24.com, 2010).

It is also important to recognize that the relationship between government and bus operators on one project can directly influence the willingness of operators in other areas to enter into agreements with

governments on similar projects. The impacts of a project's failed (or incomplete) negotiations on other projects are thus defined to as a transferability factor – either as a benefit where trust is established or as a cost where trust and willingness to participate is lost.

In the worst case, failed negotiations may not only lead to higher transferability costs, but may also lead to greater economic costs as well as direct efforts to delay the current project through disruptive actions or social unrest. Adversarial negotiations between government and bus operators in Bogota resulted in a four-day public transit strike. The former mayor of Bogota, Enrique Peñalosa has stated that this disruption increased the cost of revoking bus concessions well beyond government estimates (Rueda, 2010).

3.2.3 Multiple Representations of Opportunity costs

One of the primary concerns about transit improvements in developing countries is the associated opportunity cost. It is not that developing countries do not have the resources to invest in higher-cost technologies; it is that countries with significant socio-economic problems affecting well-being – unemployment, low-quality housing or education – face significant opportunity costs when allocating resources to certain transit technologies (World Bank, 2002; World Bank, 2002a; Armstrong- Wight and Thiriez, 1987; Jenks and Burgess, 2000; Morga- Martínez, 2005). Darido (2003), and Cervero and Golub (2007), for example, indicate that in cities with pressing problems related to poverty and crime, problems associated with public transportation failures can be a lower priority under such conditions.

High-cost transit technologies can also be perceived as inconsistent with official attempts to promote more spatially balanced opportunities for economic growth amongst cities and regions. Likewise, another problem associated with this cost is that it can affect the long-term implementation of projects in countries with economic vulnerability. Transit projects can be delayed if other policy priorities arise or if the project depends mainly on an imported technology. Given the economic fluctuations and risk of national currency depreciation faced by several developing countries, project costs are expected to be volatile because contracts are usually set in foreign currencies (Davis, 1994). Developing countries' limited technological expertise results in reliance on foreign professionals (Simon, 1996; Dimitriou & Banjo 1990).

There is also a second, more subtle opportunity cost associated with the process of evaluating transit investments. Excessively long planning processes prevent the implementation of necessary

transportation improvements which, while not always optimal, may address many mobility constraints that reduce the efficient functioning and livability of cities. For this reason, whatever course of action is taken for a transit investment, it is necessary to pursue a strategy that balances the long-term objective of planning the optimal project (including an evaluation of indirect costs) versus mitigating the short term opportunity cost of delayed investments.

3.2.4 Other Costs: Changes in the Political Agenda

The influence of political cycles (and therefore political willingness) on transport investments has been the subject of recent research. Ardila (2002) argues that in addition to financial constraints there exist political and institutional barriers for the completion of transit projects. Planning major transit investments, which consider time and institutional resources for both the physical construction of the project and for the negotiation process, requires being realistic in political terms. Hidalgo and Graftieaux (2008) point out the political restriction and suggest that politicians choose transit projects that can be completed during their tenure.

Projects with a potentially long duration between conception and implementation (due to complex planning, negotiations, or construction for example) are less likely to be funded and built because the completion of the project may occur after an electoral cycle. These considerations support the findings of some planners that question the feasibility of the long-term or ambitious implementations for environments with limited political and economic stability (Thomson, 1983; Dimitriou, 1990a; Heraty, 1991; Gaurav & Khisty, 1998).

In the city of Puebla, Mexico, for example, despite creating a detailed transportation master plan in 1997, local authorities have been unable to complete the legal conversion from a “man and his bus” model to company-provided operator model. Along with the lack of institutional support, reports refer to the limited period of time to carry out the proposed plan (EMBARQ, 2006; Bayliss, 2002). In the Mexican city of Veracruz, a US$200 million dollar light rail proposal has not yet been initiated for political reasons. Several consultants and scholars recognize that changes in the political agenda due to political cycles have impeded continuity in the planning process and technical evaluations of the project (A. Lobo; A. Molinero; D. Vazquez, personal communication, April 2010).

3.3 Modified Planning Process Including Indirect Costs

Based on an analysis of the indirect costs associated with transit investments in developing countries, in Figure 18 it is presented a planning process that explicitly considers the indirect costs. As

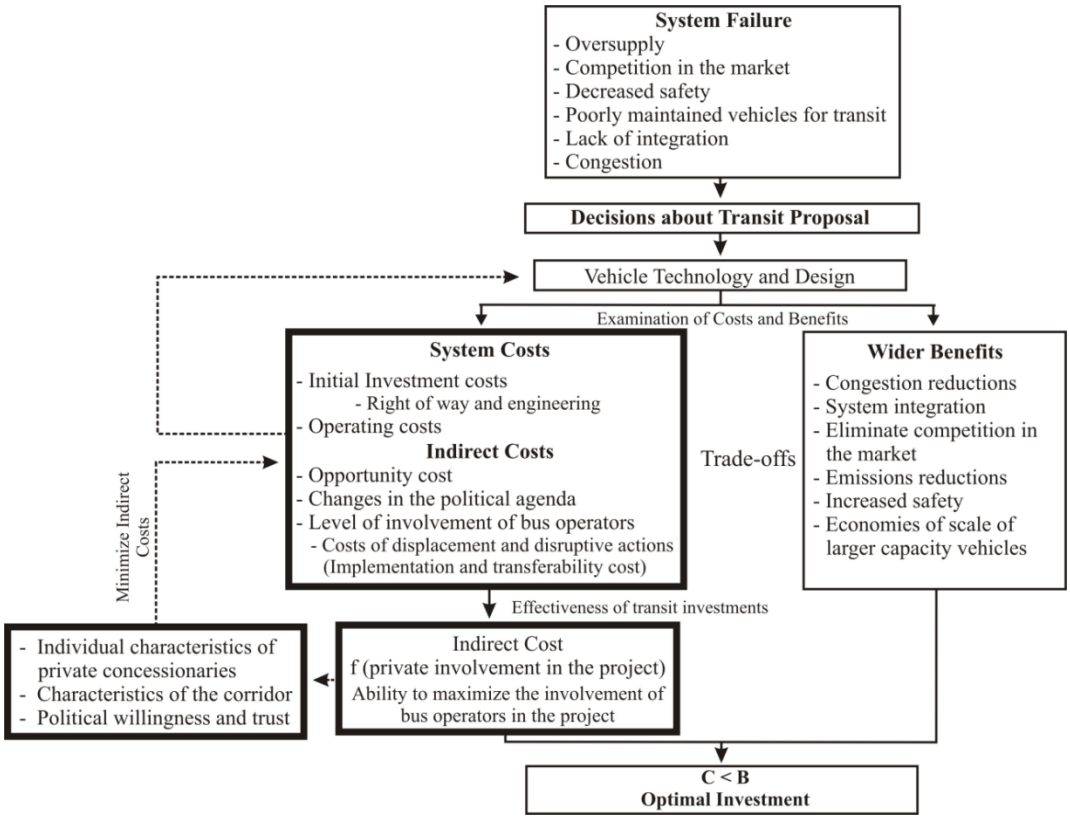
illustrated, the motivation to change ownership models is driven by system failures associated with widespread privatization. The fact that conventional elements needed to predict traffic volumes and potential modal split are not shown in this version, does not imply that they should not be included, rather it emphasizes the importance of the indirect costs.

Thus, the appropriate transit solution involves selecting the system technology, design, and ownership model. There is an interdependency amongst:

(1) total costs - tangible costs plus the indirect costs;
(2) perceived system benefits - congestion reduction, increased system integration, etc., and;
(3) the period of time for which the system is being designed.

While in conventional planning approaches much attention is paid to estimating tangible costs, less work has been done in understanding the indirect cost and the relationships between the considerations presented above.

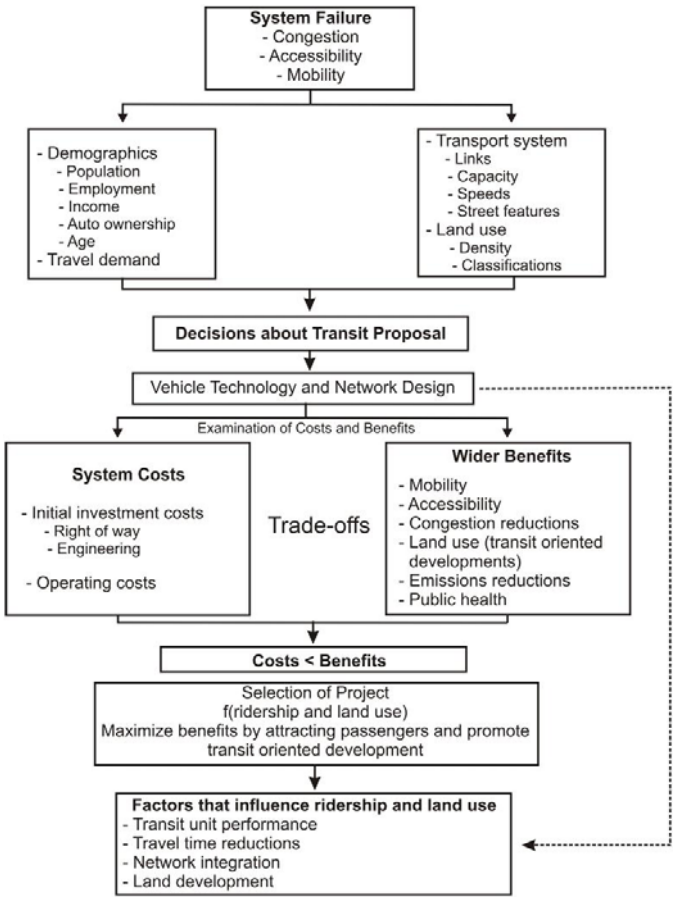
Figure 18 - A Modified Planning Process for the Context of Privatization



Box 3: The Conventional Planning Process for Major Transit Investments

The evaluation of transit investments are based on the classic deductive approach. The process is usually complex as it involves estimating economic, social and environmental returns. The process begins with an identification of system failures, manifested as mobility limitations. To design system interventions, the process analyzes demographics, land use and the transport system. The greatest emphasis is on the estimation of total travel demand to calculate traffic volumes, potential modal split, and system performance under future demand scenarios. From these assessments, network configurations, technologies and vehicle sizes become feasible for the proposed project. Decisions amongst candidate proposals are based on a trade-off amongst total costs and expected benefits. However, the ability of a transit project to cover its operating costs – farebox recovery ratio – remains a critical evaluation criterion. Figure 19 shows that passenger attraction is a function of the transit unit performance, travel time reductions, network integration, and land development. Thus, the magnitude of initial investment – largely driven by the choice of technology – can directly influence system performance and the ability to attract riders and produce wider benefits.

Figure 19 - The Conventional Planning Process for Major Transit Investments



(Banister, 2002; Johnston, 2004; Vuchic, 2005; Sinha & Labi, 2007; Vasconcellos, 2012)

The following section presents an analysis of ownership models that are currently being used to address the shortcomings of privatization. It is demonstrated that full involvement minimizes the indirect costs associated with transit investments.

3.4 Minimizing Indirect Costs through Various Ownership Models

Several strategies have been adopted to overcome the indirect costs of major transit investments while still improving public transportation in areas of operational safety and system integration. Today, transportation planning promotes addressing the negative externalities caused by privatization and deregulation with the introduction of franchise systems. By following strict institutional arrangements and regulation schemes, these contracts help eliminate the economic incentive that motivates fleet owners and bus drivers to compete for passenger volumes.

The government entity emerges primarily as the organizer and provider of the urban infrastructure needed for the operation of major transit investments. Because the government entity retains ownership and overall control, fares and service parameters can also be set down and monitored by authorities to guarantee the overall performance of the franchisee (Hidalgo, 2005). In busy corridors, franchised contracts can also increase the economies of scale associated with larger capacity vehicles, improve travel time, and enhance the overall integration of the transportation system (Gwilliam, 2003; Ardila, 2008; Connelly, 1999). The types and impacts of various franchising models are explored here.

3.4.1 Ownership Models that Extend Private Operator Involvement

Two classes of franchising ownership models are used in developing countries. The first class of models involves *negotiations with local bus operators* to operate the system. The second class opens the opportunity to own and operate a system to any private operator. This is known as *bidding out of project operations.* From these two classes, four distinct operational models arise. They are:

(1) *all current bus operators* operate the system;
(2) *only a subset of existing bus operators* operates the system;
(3) *competitive bidding* for project operations in which local bus operators receive *privileges* or advantages in competing with non-local operators; and
(4) *competitive bidding* for project operations *with no privileges* to existing bus operators in the bidding process.

Models (2), (3) and (4) often include provisions for those existing bus operators that do not become part of the franchised system; they are either relocated into other corridors – defined as a *relocation strategy* – or compensated for the privileges of their bus concessions – *revocation strategy*.

The direct and indirect costs of these different forms of franchising models are presented in Table 4 and contrasted with a purely public (government) ownership and operations approach. These costs are analyzed according to the following elements:

(1) public or private sector financing of projects and the commensurate public sector opportunity costs;
(2) the well-being, both financially and psychologically of existing, local operators;
(3) the transferability cost of the process;
(4) the potential for disruption;

The analysis also considers the expected system performance under each ownership model.

Table 4- Ownership Models, Costs and System Performance

Costs and Performance	Government	Franchising Systems			
		Negotiation with Existing Operators		Bid Out Project Operations	
		Model (1)	Model (2)	Model (3)	Model (4)
Financial and opportunity cost	High	Low	Low-Moderate	Low-Moderate	Low-Moderate
Well-being cost	Moderate-High	Low	Low-Moderate	Low-Moderate	Moderate-High
Transferability cost	High	Low	Low-Moderate	Moderate-High	High
Potential for disruption	High	Low	Low-Moderate	Moderate-High	High
System performance	Varies	Varies	Varies	Moderate-High	High

(1) All current bus operators operate the system
(2) Only a subset of current bus operators operates the system
(3) Competitive bidding for project operations: current bus operators receive privileges in the process and compete with externals
(4) Competitive bidding for project operations with no privileges to current bus operators

3.4.2 Centralized (Government) Transit Provision

A single organization presents some benefits for operations. Centralized governmental transit provision is perhaps more conducive to the provision of an integrated, safe and comprehensive bus service with the aim of maximizing social benefit, as it is in most developed countries (Connelly, 1999). The benefits of public centralized provision may also include the ability to achieve longer-term objectives. But the possibility of accomplishing these objectives even with public ownership

can sometimes be constrained by political and macroeconomic influences as was the case during the late 1970s and 1980s in Mexico City (Islas, 2000; Sandoval and Hidalgo, 2002).

System performance may depend on whether the government has the capacity to operate and manage the transit systems in a more efficient manner and whether the operation of the system can be isolated from economic and political cycles. Centralized provision can result in poor service and high operational costs as it is more vulnerable to excessive labour costs and lacks entrepreneurial dynamism. In most cases, the financial and opportunity costs are expected to be high as the government will have to buy back bus concessions, build the system, and operate it. Because bus operators will not receive the opportunity to participate in the system, high cost are expected with regard to both operators' well-being and transferability as private operators will experience a potentially significant loss of income. They may also create opposition during the implementation of the project and influence the government's ability to undertake future transit projects.

3.4.3 Engaging Existing Private Operators

Engaging all private operators in the operation of the system is more likely to minimize direct and indirect cost than having fully centralized provision. Although full involvement can increase the time devoted to negotiations (Hidalgo and Graftieaux, 2008), full involvement in operations may reduce the need for public funds and, thus, the opportunity cost that results from allocating fiscal resources to transit instead of other government priorities. Land acquisitions, technical studies, and stations and facilities for the first phase of the BRT in Mexico City were supplied through government intervention; the purchase of new vehicles was done by bus operators and by Red de Transportes de Pasajeros (RTP), an independent public company (EMBARQ, 2006; Nava and Ramírez, 2008).

In addition, this model results in not having to dedicate funds or institutional resources either to compensate private operators for operating rights or to relocate them in other areas. Negotiations for the first phase of the BRT in Mexico City resulted in the substitution of all individual concessions for a single group concession (Nava and Ramírez, 2008). Therefore, a low transferability cost is expected, as private operators in remaining corridors will not fear being displaced by official attempts to improve transit. Hidalgo and Graftieaux (2008), indicate that a full involvement of bus operators in system operations has been used in several cities in developing countries to reduce the likelihood of disruptive actions.

A full involvement strategy has the potential to minimize the loss of personal income and status quo attached to bus provision. Although, several jobs may be lost from the substitution of small vehicles for transit to higher capacity vehicles and from other activities attached to traditional bus service, transit improvement also has the potential to create better-paid and formal jobs associated with transit provision. For example, jobs that deal with the operation and maintenance of the system were created with BRT implementation in Mexico City.

In terms of system performance, a question that also arises is whether such performance is maximized by having directly negotiated legal settings with all the existing operators. Hidalgo and Graftieaux (2008) also suggest that the full involvement strategy in Mexico City resulted in soft contractual conditions for operation, as terms and conditions were negotiated prior to the official announcement of the system.

3.4.4 Bid Out Project Operations

Bidding out project system operations can also result in fewer financial and opportunity costs compared to government attempts to wholly operate the system. Bogota's BRT, perhaps the most well-known example of bid out project operations, required tax payers' money only for the technical preparation of the project, land acquisitions and the construction of stations, terminals and other system facilities. All service provision was competitively bid (Ardila, 2004; Aroche, 2008).

The transferability cost, well-being costs, and the potential for disruption are expected to be influenced by the bidding process specifications that may, or may not, allow the participation of current private operators in the process. During the first phase of the BRT system in Bogota, traditional bus operators were granted additional points for their local operating knowledge. This competitive advantage minimized the potential for disruption (Ardila, 2004; Aroche, 2008). In contrast, an open bidding process for bus operations with no bidding priority treatment for the existing bus companies launched in Santiago, Chile resulted in several disruptive actions. These actions were partially solved with the inclusion of project involvement incentives. Bus operators had some advantages over other participants as they were allowed to use their existing transit units in the new concessions (Hidalgo and Graftieaux, 2008; Hidalgo and Graftieaux, 2008a).

System performance may depend on the contractual conditions established in the bid. However, a better system performance is expected as the government can set the technical specifications of the

system prior to the official announcement of the terms and conditions of the bid (Hidalgo and Graftieaux, 2008).

3.4.5 Potential Problems

Certainly, partial involvement (models 2 through 4) in the operation of the project combined with a *relocation strategy* of the remaining bus operators into other corridors or with *revocation* of bus concessions can be perceived as a win-win solution. While partial involvement may result in low to moderate direct costs, *relocation* can minimize the potential social and economic costs for bus operators of unemployment and of changing habits and routines while increasing mobility and accessibility in other areas. Moreover, relocation can reduce the likelihood of disruptive actions if this is not perceived as a potential loss of personal income by bus operators. Likewise, this strategy can influence the relationship between bus operators and present positive results in terms of the government's ability to plan, design and implement future projects.

However, if non-participant operators are relocated in corridors parallel to future transit implementations, the performance of these implementations can be undermined, as the relocated bus operators would then compete in price and quality of service. Likewise, although *revocation* of concessions have the potential to ease well-being costs as private operators are financially compensated for the loss of rights, I argue that the success of this implementation depends on whether operators are satisfactorily compensated for the social and cultural aspects attached to their previous operations.

3.5 Conditions which Influence the Likelihood of Successful Full Involvement

This section reviews the factors that may influence the likelihood to reach full participation of private operators in transit improvements and to identify the conditions under which alternative strategies should be pursued. Recent transit implementations are used to support the assessment of these factors.

3.5.1 Characteristics of The Private Operators

Several characteristics of private operators have been associated with these actors' willingness to participate in transit improvements. For instance, Ardila (2004) notes that the planning team for the implementation of the first phase of the BRT in Bogota devoted initial efforts to understanding the interests of critical stakeholders. He describes mechanisms that helped to persuade private operators

to participate in the competitive process for the introduction of this system. In particular, Ardila indicates that authorities in Bogota observed a positive correlation between education levels of the bus operators and their willingness to support the project. According to the author, better-educated operators could better understand the need for change. Along the same lines, Nava and Ramirez (2008) suggest that the lack of entrepreneurial motivations amongst local operators delayed negotiations for the first BRT in Mexico City.

Similar to Bogota, in Mexico City, evidence indicates that bus operators with more power in terms of fleet size and with better management practices were more comfortable in participating in the execution of solutions (Nava and Ramírez, 2008; Aroche, 2008). Similar results were described for the planning scheme for a BRT in the city of Guadalajara, Mexico by the General Director of the BRT in this city (D. Monraz, personal communication, January 2010). Moreover, the likelihood of success in attempts to modernize urban transport depends on the sophistication of the bus operators' organization. Bus operators are usually grouped in associations to organize their operations, but management practices differ considerably amongst them. It may thus be expected that better managed associations increase the likelihood of reaching general consensus.

Other considerations include the understanding of sociological aspects related to leadership. Several bus operators are reluctant to give up their role as leader in their organizations. Usually these leaders convey the concern of other bus operators to politicians or civil servants, resulting in political or personal gains. Thus, the greater the leadership attached to old practices the lesser the possibility to achieve improvements.

However, leadership can also be used to have an influence on the likelihood to execute transit solutions. As for the case of Bogota, leadership facilitated the communication channels with other private bus operators and sped the implementation process (Ardila, 2004). Leadership has also played an influential role in the implementation of BRTs in Mexico City. While an elderly leader was unwilling to change business operations and management on the route where the first BRT operates, a younger leader encouraged private operators to transform the business management and system operation (personal communication, 2010, name withheld).

In an interview conducted by a local newspaper, professor and city planning expert Francisco Valverde identifies a window of opportunity for transit improvements in the city of Puebla. Valverde observed that, in the case of older operators, their sons are most likely in charge of the operation and management of bus concessions. This younger generation often sees beyond the emotional attachment

to the status quo and appreciates new business opportunities. The younger generation is also likely to be more educated and, as a result, have stronger entrepreneurial vision compared to former generations (Fletcher, 1998). In informal meetings with private operators during the XVII Annual Meeting of Private Bus Operators (CONTURMEX), I observed a better understanding of the need to transform current business and operational practices in younger operators than those from older generations.

It has also been suggested that private operators linked to political practices or that have taken political seats are less likely to participate in transit improvements, as they associated these gains to habitual practices (F. Valverde, personal communication, June 2010). Fletcher (1998) also described how the strength of the relationship between private operators and politicians influence the implementation of projects. Private operators turn to politicians when they perceive that government attempts to modify operations can result in a potential loss of personal well-being.

3.5.2 Ownership and Business Model

Other elements associated with private bus operators' willingness to participate in transit improvements include the ownership model, also referred to as business relationship. The concept of business model refers to operational and managerial characteristics of the transport provision. The concept is also used to identify the basic arrangements between the owners of the concession and drivers of vehicles – if the driver and concession holder are different persons –, and occasionally others involved in the provision of bus service. Two types of ownership or business models dominate the public transport provision: a man and his bus model and concession lease model. A third type was identified during field work conducted in Mexico in the city of Villahermosa, Tabasco. This ownership model was also identified by state authorities in the major cities in the state of Tamaulipas, Mexico. These models and their characteristics are:

a) *Man and his bus model*: In some cases, the owner of the concession performs the driving and management of the business.
b) *Concession lease model*: In other cases, the concession holder and a driver enter into a verbal agreement that defines operating rules, revenue sharing, and maintenance requirements.
c) *Concession only lease model*: In some cities, the concession holder rents only the right to operate for a predetermined monthly lease amount. In this case, the driver is responsible for acquiring, operating and maintaining a transit unit.

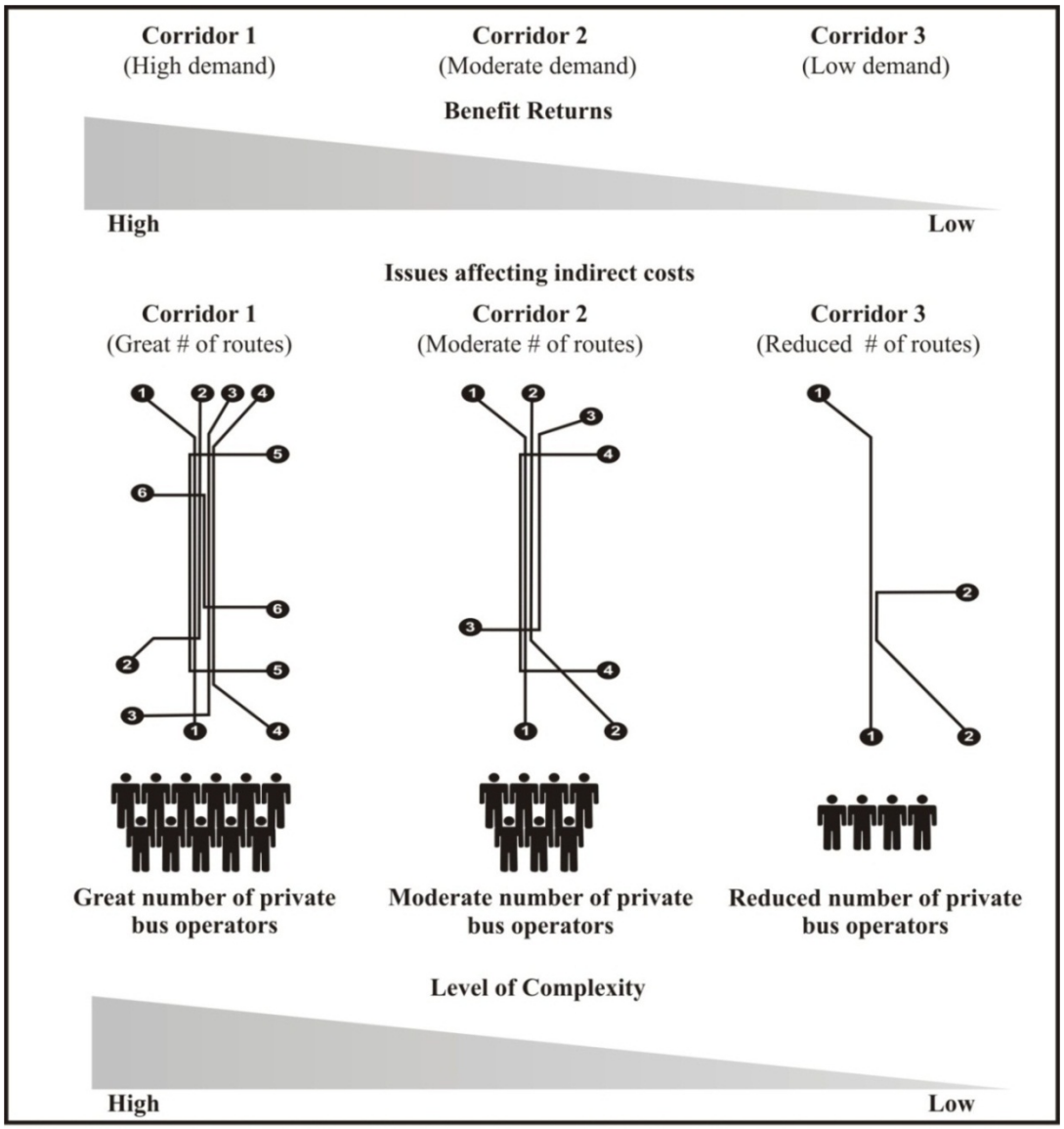
As it is explained in Chapter 4 of this thesis, because of the greater economic and personal investments felt by concession holders operating under the man and his bus model, these concession holders are typically least willing to participate in enhanced transit systems. In the man and his bus model, for example, owners spend more time in business, have greater control over decision making, manage finances more directly and do not experience "money leakage" from having drivers; these owners also tend to be least educated and least business savvy. All of these factors tend to decrease their willingness to participate in transit enhancements relative to the other models. Therefore, if the area of improvement is dominated by the man and his bus model, negotiations with these concession holders may require the most government resources to have major enhancements implemented.

3.5.3 Network Characteristics and Number of Actors

Usually, transit operations in developing countries involve the movement of passengers from lower to higher order roads. This mode of operation results in several buses (or routes) sharing corridors, particularly avenues with great commercial development. Although these corridors may exhibit a great number of trips – and thus produce greater benefits if service is improved – I argue that these corridors may present several challenges for service improvement. Specifically, these corridors may include a great number of actors involved in the bus service provision. Thus, I contend that the number of actors is highly negatively correlated to the likelihood to reach consensus amongst bus operators to participate, financially and operationally, in a new project. Figure 20 illustrates the rationale of these assumptions.

Nava and Ramirez (2008) indicate that the number of stakeholders sharing a corridor influenced the planning process of BRTs in Mexico City. Unlike the first phase, in which only two routes were operating in the improved corridor, phase two of the BRT required negotiations with twelve associations, further complicating the implementation process. Similar problems were observed for a proposed BRT system that would connect the eastern and southern sections of the city in which 80 bus associations operate. The proposed BRT system was abandoned and instead authorities opted for the introduction of a Metro line given the elevated demand on this corridor. However, it is our perception that the decision was also influenced by the prospects of having to negotiate with bus associations. Ironically, bus associations do not oppose to Metro developments as they do not perceive them as direct competition.

Figure 20 - Characteristics of the Corridor: Trunk, Number of Feeders and Number of Actors



In the city of Puebla, Mexico no transit improvement has been implemented in the last few years because authorities have been unable to reach agreement with bus operators. The proposed areas for system improvements include a large number of routes sharing busy corridors, making this implementation politically difficult (Fletcher, 1998). Significant opposition from private operators to large-scale reorganization have been also seen in Kingston, Jamaica; Santiago, Chile; and Sao Paulo, Brazil (Hidalgo and Graftieaux, 2008, Hidalgo, 2009; Fletcher, 1998).

3.5.4 Political Willingness and the Importance of Trust

Indirect costs are also a function of whether projects enjoy political support. The likelihood to plan and implement projects extensively depends on the involvement of key decision makers. Transit improvements in Latin-American cities were the result of strong leadership and political will. In Bogota and in the Brazilian city of Curitiba, for example, leadership abilities were used to prepare and formulate policies and strategies to have plans adopted and implemented (Aroche, 2008).

Further, indirect costs of transit improvements are influenced by how communication channels and trust are developed between private operators and authorities. Some authors, for example, have identified conflicts associated with the fare collection method and planning process for the first phase of the BRT in Mexico City. Nava and Ramirez (2008) indicate that private operators were unwilling to delegate the control of the resources to a third party, making the fare collection method difficult to implement. Similarly, EMBARQ (2006) refers to private operators' scepticism about the benefits associated with integrating their operations into one company during the planning process. I contend that such reactions are the result of the nature of the implementation process, given that the implementation is primarily conducted through governmental channels.

Much more positive reactions to participating in transit improvements are observed when other private bus operators (rather than government officials) explain the benefits of changing from a "man and his bus" model to a company or shareholder model. For this reason, the planning for transit improvements should consider more consultative methods to build up the required trust that facilitate the implementation. Particularly, I advocate considerations for legal and financial mechanisms that allow private operators to generate their own proposals with the support of "capable planners" outside governmental spheres. Ignoring the issues that may influence the confidence of private operators in the project such as the lack of entrepreneurial understanding or social and cultural emotions attached to current transit provision would then increase the time devoted to negotiations.

3.6 Conclusion and Recommendations

Planning for transit investments in developing countries requires a much stronger emphasis on analyzing costs particularly those concerning private operators' objectives in the planning process. The chapter advocates for ownership models that encourage full involvement of current private operators in proposed transit innovations. The chapter strongly suggests that maintaining economic opportunities for bus operators minimizes potential welfare loss, reduces the opportunity costs of the

use of public funds dedicated to transit, and mitigates the possibility of disruptive actions by bus operators during and after the introduction of new schemes or innovations.

This chapter also recognizes that achieving full involvement will not always be possible or desirable. It is necessary to examine characteristics - including the number of routes and bus operators - in areas in which improvements will take place. More importantly, the chapter shows that the potential for successful full involvement requires a thorough understanding of the individual characteristics associated with bus operators such as their level of education, age and business practices, as well as sociological issues associated with leadership and political ties. This chapter also highlights the importance of trust between private operators and authorities and advocates for more consultative approaches that may facilitate the achievement of full involvement in a more timely way, lower cost way.

Chapter 4
The Influence of Ownership and Business Models on Achieving Transit Improvements

Overview

Ownerships and business models in road-based urban transport – understood as the framework for basic arrangements between the owners and operators of vehicles to provide service – are examined to determine their influence on delivering transit improvements. In particular, the chapter assesses three ownership models' impacts on private bus operators' willingness to participate in bus improvements. The models are: [1] a man-and-his bus, in which the owner of the concession operates and manages a single unit; [2] a concession and vehicle lease, in which a driver leases the vehicle from and pays a service fee to the concession holder for the right to operate the unit; and [3] a concession-only lease, in which the driver pays a monthly set amount for the right to operate. From this assessment, it is concluded that greater opportunities exist to engage private bus operators in a desired public transport initiative in places where models [2] and [3] exist rather than model [1]. Converting from model [1] to centralized operations represents a loss of social status which is not felt to the same extent when converting from models [2] or [3]. Finally, in the chapter it is noted that many areas in Mexico are served by illegal but tolerated private operations. These cases present opportunities to introduce an improved service because governments may persuade those operating illegally to participate in legal franchise systems.

4.1 Introduction

In Mexico, non-regulated transit service – usually buses, minibuses and vans – is the primary mode of urban transportation. Over the last decades, in some cities, this transit provision has either complemented or replaced state-controlled monopolies. Non-regulated transit service has improved access to markets and provided greater quantity of service. However, limited mechanisms to regulate the entry and operation of this transit provision have led to oversupply and to low quality of service particularly in areas of passenger safety, comfort and system integration (Islas, 2000; Molinero, 2000; Darido, 2003; Cervero and Golub, 2007).

To reverse these problems, contemporary public transport initiatives attempt to enhance bus operation and management by strengthening public sector regulation and monitoring. However, modifications to current bus provision may be time-consuming and costly. Private bus operators experience either positive or negative reactions when government officials suggest transit improvements. These suppliers may be reluctant to enter into new operational and managerial agreements for variety of reasons including mistrust of government and perceived disruptions as a result of changing ownership, administration and operations (Ardila, 2004; Aroche, 2008; Lopez et al., 2011).

Dodero et al. (2011) suggest that it is necessary to evaluate the concerns of private bus operators (later refer to as concession holder) in the decision-making process when selecting areas for transit enhancements. It is argued that these operators' *willingness to participate* in more centrally regulated transit varies as a function of their financial and social reliance on their current operations. For many operators, bus activity represents their primary source of income. For some bus operators, providing transit has been the means through which they have achieved their livelihood and well-being; as such, these operators tend to have a much stronger emotional attachment to the status quo. These variables are further affected by operators' ages, levels of education and current business practices.

Based on a qualitative research approach, this chapter analyzes how private bus operators' willingness to participate in transit improvements are influenced by the different types of service provision, including the basic arrangements that exist between the concession holder and the drivers. Field research was conducted – primarily interviews with private bus operators (concession holders and drivers) – to understand how the provision of public transportation is conducted and how ownership models influence perceptions of proposed government investments in upgraded transit.

In the following sections the chapter presents an analysis of the elements that constitute a transit improvement in Mexico which, as it is argued, may be representative for other countries in various stages of development. The chapter also examines the critical elements that have the greatest influence on private bus operators' willingness to participate in transit improvements and analyzes ownership and business models. For each ownership model, an evaluation of the negative and positive reactions that private bus operators experience for different types of transit improvements is developed. Finally, the chapter suggests incorporating the characteristics of the service provision into the decision making process for transit improvements.

4.2 Changes Associated with Transit Improvements

In this section it is defined both the organizational changes and revised delivery mechanisms that are typically components of improvements to road-based urban transportation in Mexico. The recognition of the need for these adaptations was derived from fieldwork in various cities – particularly Mexico City, Queretaro, Tuxtla Gutierrez and Villahermosa – where state governments are working with bus transit owners and operators to upgrade operational safety, system integration and business management. Such mechanisms involve advances not only in physical infrastructure for service delivery but in "soft elements" such as intangible factors that are essential for service improvements.[3] Soft elements in public transport improvements usually include modifications in the concessionary agreements with bus transit providers and the institutional reforms for regulation and monitoring. Generally, changing from purely private provision of transit to more centralized, franchised (company based) systems requires:

(i) *New legal entity*: Legal modifications include a redefinition and detailed specifications of the service to be provided and duration of the concession rights. More specifically, franchise systems require the creation of rules and regulations to determine the operating, technical, financial and institutional obligations for the system's implementation and operation. Legal mechanisms to allow service improvement and modifications to future needs must also be generated or enriched. The creation of a new legal entity involves the definition of each party's responsibilities and penalties for failing to meet them (EMBARQ, 2006).

[3] Soft variables are refer to those that cannot be measured. In planning soft variables include culture, social structure and city administration (Kresl, 2007).

(ii) *New administrative entity for management and operations:* Administrative changes for business and operations are introduced to enhance the company image, dispatching, integration and safety, and cost controls. These changes also involve the introduction of human resource management philosophies, the establishment of a secure and formally registered labor force, and the modernization of transit facilities such as fleet depots and areas for maintenance. The introduction of a new administrative entity might require revisions to current fares or considerations of subsidies to offset the administrative expenses.

(iii) *Fare collection system:* Transit systems' improvements also aim to address the so-called "penny-war" or over-competition in the market. A second issue is so-called "money-leakage" where revenues collected by drivers are not shared with concessionaires as legally agreed. With a fare collection system, fares are centrally collected using technological advances such as smart cards and redistributed to service providers based on a predetermined arrangement. A fare collection system requires the establishment of a trust that is responsible for the management and distribution of cash flows. Fees for the management of the fare collection system vary amongst systems but are usually estimated between 4 and 8 percent of the total collection.

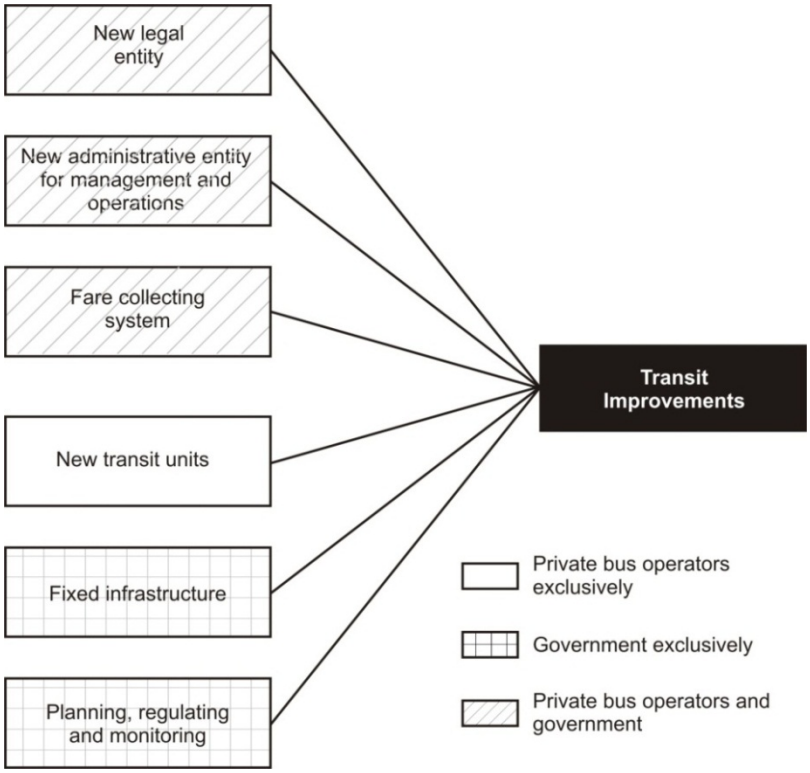
(iv) *New transit units:* In several cities, there is substantial evidence that existing fleets are aging and have decreasing safety performance (Molinero, 2000; EMBARQ 2006; World Bank, 2010). In cities such as Mexico City average fleet age exceeds 15 years (Montes and Robles, 2011). Transit improvements often involve the introduction of new units with greater performance and passenger comfort; these new units also provide greater capacity. With a more standardized bus fleet, owners are able to achieve economies of scale in maintenance and bus supplies. The introduction of new transit units usually involves scrapping the replaced units.

(v) *Fixed infrastructure:* In the majority of Mexican cities, transit infrastructure is poor or very limited. The absence of high quality shelters and information limits the attractiveness and ease of use for the existing system. Investments in new physical infrastructure are necessary to improve passenger comfort, riding experience, safety and travel speeds. Depending on the type of transit improvement, infrastructure usually includes stations, depots, terminals, system information, dedicated bus lanes, asphalt carpet, and other facilities.

(vi) *Regulation, planning and monitoring:* Typically, public transport staff is politically appointed often on the premise that managing transit requires little training. Transit improvements generally require more substantial technical regulation, planning and monitoring. To this end, achieving improved service may require the creation of an independent system authority with highly qualified staff. Experiences in public transport improvements in Mexico and in other developing countries acknowledge the importance of professionalizing the transit staff and of separating the planning, regulation and monitoring from operational functions (Wright, 2001; Deb, 2002; EMBARQ, 2006).

Figure 21 shows these six categories of change that may be required to achieve meaningful improvements in public transport systems. The Figure also differentiates the roles of individual actors in completing these changes. Typically, operators and governments share the responsibility of creating new legal and administrative entities to operate the system and to collect and redistribute fares. Private bus operators are exclusively or predominantly responsible for purchasing new transit units. Constructing new fixed infrastructure and enhancing regulations / monitoring are generally roles for the government.

Figure 21 - Transport Improvements to Existing Systems: Organizational



4.3 Private Bus Operators' Reactions to Transit Improvements

Private bus operators have shown various reactions – from reluctance to willingness to participate – in transit improvements proposed by government authorities. Figure 22 shows three main elements that are influencing these operators' reactions to improvements in public transport systems. The Figure also shows the sort of modifications or new features that make up these elements.
The reactions tend to vary as a function of the following three factors.

4.3.1 Legal and Fiscal Elements

During the interviews, it was observed a range of perceptions on the current legal arrangements that govern operating conditions. Most common situations are:

(i) *New fiscal responsibilities*: Our research suggests that some private bus operators simply do not pay taxes for the activities they perform; other suppliers, despite large profits, receive special consideration to be registered as reduced taxpayers. The potential involvement in a larger transit entity can result in new fiscal obligations (B. Almorejo and M. Hernandez, personal communication, June 2011). In several workshops, private bus operators indicate that informality is actually very attractive for current business. Private bus operators indicate that inefficiencies in transit business such as money leaks can be corrected by establishing mechanisms of controls or by removing the driver from his job and hiring a new one; however, once the business is formalized it is impossible to get rid of the tax authorities. New tax considerations for the urban transportation business - as a way to compensate the need for subsidies for operations - have been demanded by private bus operators in several meetings with authorities. Tax reductions for urban transport require, however reform modifications at the federal level, resulting in a complex task.

(ii) *Modification of current legal figures for service provision*: Interviews confirm that some private bus operators are under the impression that their concessions are valid "for life", and as such, were reluctant to enter into centralized agreements that are to be renewed periodically, perhaps every 20 years. In other cases, private bus operators lacked certainty about the legal arrangement that allows them to provide transit service. In several cities, service provision is provided with concessions that have already expired. In most of the cities, concessions can be legally revoked by government authorities because current service provision in these cities does not always meet the authorized service standards. In Mexico

City, the Minister of Transportation admits that 94 percent of the existing 25,000 concessions for bus service provisions are expired (Robles, 2001). Interviews with public transport consultants in Mexico confirm these occurrences for other cities (B. Almorejo and J. Quintin, personal communication, June 2011). Given these previous experiences, there exist limited incentives to embark upon a capital intensive project if there are no guarantees of ownership such that the return on investment may be realized.

(iii) *Introduction of strict monitoring and regulation*: Likewise, some suppliers are uncertain about the impacts of official monitoring and regulation. For many years, public transportation has not been regulated in the majority of cities in Mexico. Modifications for service improvement – route and fares modification – is usually the result of long negotiation with government authorities who, often, authorized these modifications in exchange of political support; these modifications are not necessarily recommendations that arise from technical studies. As such, government involvement in monitoring and regulation – understood as necessary for society and for strengthen the private bus operators' business – is perceived by some private bus operators as a new method to impose political support. Moreover, private bus operators associate government involvement with a potential displacement from their current business.

4.3.2 Economic Benefits Understanding Differs

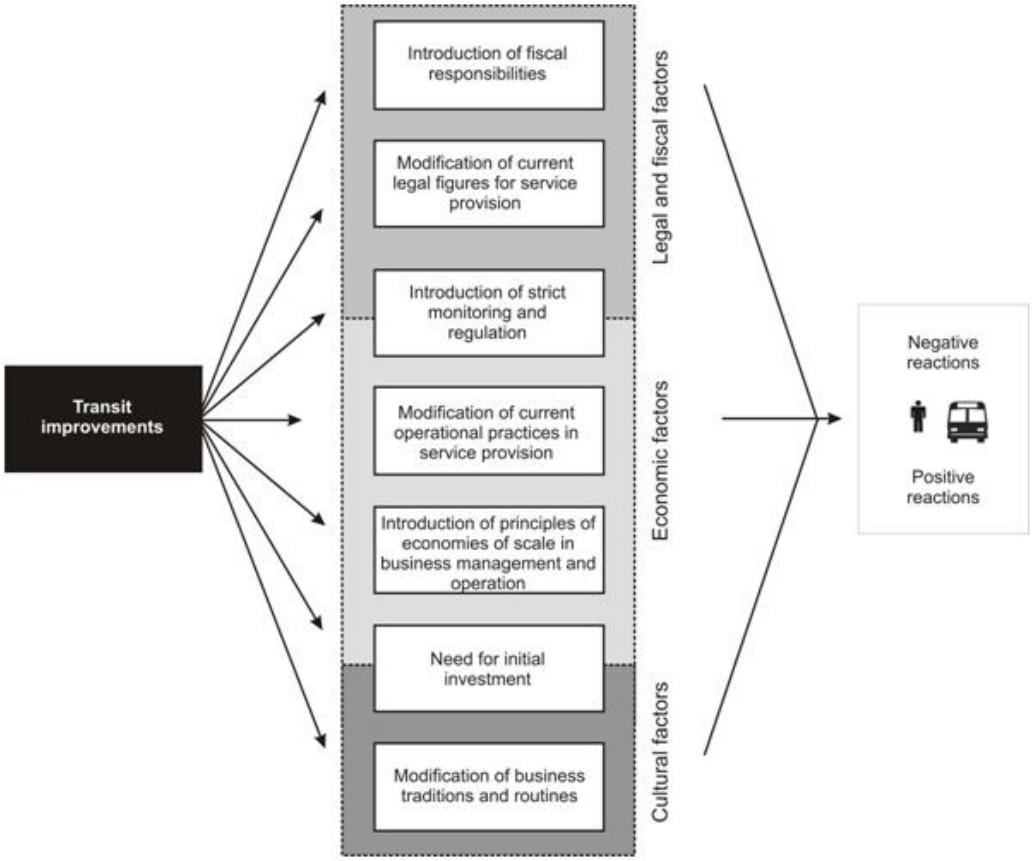
Reactions to proposed centralization also depend on private bus operators' levels of understanding of efficiency in transit delivery. A major issue in private provision is that some bus operators have limited sense of the long-term situation of their current business (Darido, 2003). Private bus operators often sacrifice the long-term performance of their vehicles because daily pay depends upon passengers carried; removal of a vehicle from service for maintenance equates to lost short-term revenues. Similar results are presented for different cities in Central and South America (Ardila, 2008).

Inefficiencies have manifested themselves in other ways. Failure to organize and centralize the purchasing of equipment, spare parts and other supplies results in high operating and maintenance costs. In addition, non-centralization of activities impedes access to soft credit loans for buses, which has an impact on investments returns. For some private bus operators, decentralized fare collection can result in reduced revenues; approximately 30 percent of the total passenger fares are not reported

by drivers to concession owners. This money is either retained by drivers or is used to pay "unconventional" operational fees for bus dispatching and "in-route" bus assistants, public transport specialists and officials indicate (A, Lobo, L. E. Moreno and M. Mejia, personal communication, June 2011).

Some private bus operators clearly understand the need to rationalize service for operation cost cuts to obtain benefits in the medium-to-long term; most suppliers perceive that an increase in profits only comes from rising passenger fares. The level of understanding is further affected by operators' ages, levels of education, fleet size, and current business practices for operation and management.

Figure 22 - Transport Improvements and Cultural, Economic and Legal Factors



4.3.3 Social and Cultural Elements

Several social and cultural elements influence operators' reactions to transit enhancements. In many cases, concession holders drive their vehicles – although some perform this activity only occasionally

– and are also responsible for repairing, maintaining, and cleaning the units. For some concession owners, buses are not only their livelihood. The vehicles and the businesses they support reflect owners' current social status and, for those who act as leaders of bus associations, the vehicles may reflect their political status (Lopez, 1997; EMBARQ, 2006; Ramirez, 2006; Lopez et al, 2011).

Moreover, bus operations create day to day interactions with other operators and people whose work is directly or indirectly associated with the bus activity. During fieldwork, it was observed bus operators often acting as if they were members of the same family. Drivers have, in essence, developed communities within their work. The stronger the social attachment to these activities, the more sensitive these suppliers may be to modifications in their business routines.

4.4 Ownership and Business Models for Transit Provision

In Mexico, road-based urban transportation is usually provided by various types of ownership and business models most often involving two primary actors: a concession holder (private bus operator), who has the legal right to operate, and a driver. In some cases, the owner of the concession operates the vehicle and manages the activities associated with business. I refer to this most basic model as a "pure" model from which other models have evolved. In other cases, the concession holder and a driver enter into a verbal agreement that defines various relationships including operating rules, revenue sharing, and maintenance requirements. A third type of business model exists in which the owner rents only the right to operate for a predetermined monthly lease amount. In this case, the driver is responsible for acquiring, operating and maintaining a vehicle. I also recognize that these relationships may exist even in the absence of legal operating concession. These arrangements are illegal, but are widely observed and tolerated.

Finally, I acknowledge that in some cities road-based urban transportation is provided by well-organized companies that have well-developed administrative and operational controls. The analysis of this transit provision is out of the scope of this research. Each of the models considered in this research is described below.

4.4.1 A Man and his Bus Model: Pure Model

The basic model for business and ownership model for bus provision in Mexico is known as "hombre-camion" model – loosely "a man and his bus" model – (Molinero, 1997; EMBARQ, 2006; World Bank, 2010). Cervero (2000) also refers to this model as a common model that exists in countries in developing countries or that are in various stages of development.

Box 4: Ivan Vazquez: A Man and his Bus Operator

From Monday to Saturday, Ivan gets up at five o'clock in the morning and is out of the house by 5:30. It is a ten-minute drive to the avenue where he has driven over the past 15 years. He drives a 20 years old minibus to provide public transportation in Greater Mexico City. Avenida Central, his job place, is located in the Northern part of the city and connects the municipality of Netzahualcoyotl to Mexico City. He works for the Route 3 – Ramal Impulsora – and primarily serves to the people living in the Impulsora Popular Avicola neighbourhood. The Metro station Moctezuma in Linea B is the primarily origin and destination depending on the time of the day.

Ivan learned the business of bus operation from his father's. His father bought a concession and the transit unit in 1986. During this period the government granted concessions to privates as a means of mitigating the problems of employment and mobility in the city. Ivan worked for some years in various companies. However, the advanced age of his father led Ivan to make the decision to take over his father' business in 1996. Ivan's current income is approximately USD $600. Ivan does not pay income tax and the money he obtains seems to be enough for making a livelihood. However, Ivan says that the business is no longer as it once was. Ivan says that in the early 90s, economic rents for the bus provision activity were considerable high; he could pay externals for the maintenance of the unit. Ivan said that the bus provision was contributed to employment; painters, tinsmiths, mechanics and car washes obtained some economic rents from Ivan' unit.

During the mid-1990s economic rents began to decline. Several factor had an influence on this decline. The government did not authorize fare increases. Instead, the government continues authorizing more concessions to operate in the corridor. As well, in 1999, the Metro system was extended into that area. The union took no forecasts or developed a strategy with the government that could help to mitigate the impact of that extension on their bus operators' income. Metro provides a faster transportation and the cost of using Metro is lower than the cost of the bus service.

Ivan began to learn all activities associated with the business: repair the unit, do oil changes and seek – mechanic – strategies to prolong engine repair of the unit. Ivan says that all operating supplies became also more and more expensive. Ivan does not have savings to renew his unit.
Ivan says that the current situation prevailing in Mexico City public transport system is shared. On the one hand, Ivan recognizes the limited business controls he had over his business. On the other hand, Ivan blames the government for the limited training programs dto understand how to run a business. Ivan and his father never saved a set amount for renewing the transit unit. No training programs were promoted to improve business controls on quality standards and reinvestment strategies.

Ivan expresses a strong desire to be part of Metrobus – franchise systems formed by private bus operators in the City. A franchise system such as that operating in Metrobus can guarantee remaining in business. The business, as it is currently provided, will gradually disappear if no government action is taken. Of 121 units that once operated in Ramal Impulsra, today, only 54 remain in operation. Ivan indicates that he does not operate the unit every day. The unit is in such bad conditions that it makes it impossible to operate it every day.

In this model, the concession right and the vehicle are owned by the same person. The owner drives and performs – in some cases with the help of members of their "extended family" – all operating activities such as cleaning, maintenance and repairs. Service is typically provided in small transit vehicles including modified vans with capacity ranging from 9 to 16 passengers and minibuses with capacity for up to 50 people including standees. Maintenance is often not a priority and, as a result, vehicles are often in poor condition. When maintenance is done, it is frequently completed on Sundays or during non-peak times to minimize the revenue impacts. Concession holders sometimes will engage family members or other trusted colleagues in the operation of the business. Concession holders may not have storage facilities available for their transit units. These are usually parked outside the holder's home, leaving the units unsecured and exposed to damage.

In the man and his bus model, the vehicle owner also oversees all components of the business. This allows the owner/driver to have complete control over revenues, eliminating problems between drivers and owners experienced in other models. Given their limited business training and energies spent on operations, however, man and his bus companies tend to demonstrate the least advanced business methods. The owners are often not eligible for any loans, because they are unable to demonstrate income through having paid taxes.

Operators in this model have seen a significant decrease in revenues over the years as a consequence of oversupply, increasing operating costs and fares that have remained unchanged for several years. This business and ownership model is no longer the most representative model in some parts of Mexico, particularly in the north. The model is commonly practiced in central Mexico and remains the dominant delivery mechanism in the southern part of the country.

4.4.2 Concession and Vehicle Lease Model

A concession and vehicle lease model, shown in Figure 23, involves the owner of the concession entrusting his vehicle to one or two drivers who are usually paid a set daily fee to operate and collect revenue. Drivers are usually hired based on other owners' or family recommendations. The motivation for concession holders to enter into this type of agreement include an inability or unwillingness to operate due to age or physical capacity; the total number of vehicles that they own; or high opportunity costs associated with driving given that these owners have the potential to earn more in other businesses.

The fee, functions, responsibilities and working schedule are the result of a verbal commitment between the two but generally depend on local context and route demand characteristics. Commonly, drivers' salary is the revenue remaining once the fee and the agreed responsibilities are covered. Drivers' pay may be:

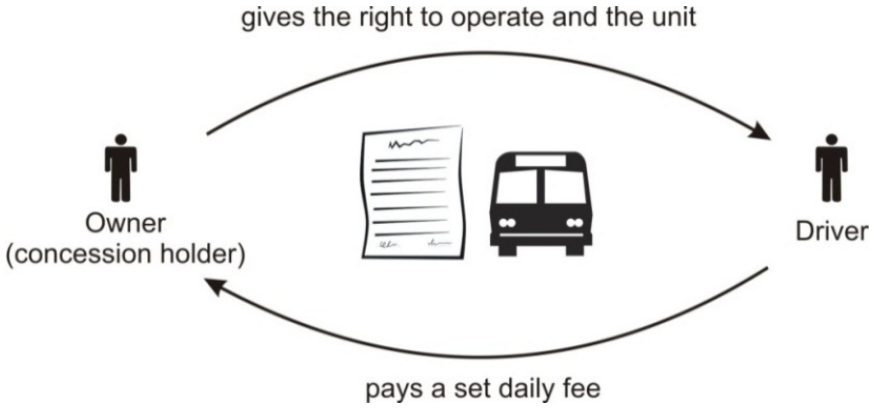
[1] fares collected above a daily fixed amount, once operating costs are covered;
[2] fixed for daily service but include incentives based on the number of passengers carried;
[3] based only in terms of their productivity, i.e. they receive a percentage of revenue generated;
[4] calculated as the difference of revenue collected, operating costs, and an appropriate fee for the concession holder.

The payment scheme most commonly used in the studied areas is [1]. Evidence of payment scheme [4] was described by concession holders during fieldwork in the city of Queretaro where the model is applied in areas with low demand.

In theory, drivers are also responsible for the cost of collisions or accidents that occur during their shifts. In practice, when such accidents occur, drivers sometimes abandon the vehicle; in other instances drivers accept responsibility but are not able to pay these costs. Curiously, the number of incidents increases significantly when concession holders' supervision is lessened during vacations or when the concession holder is sick.

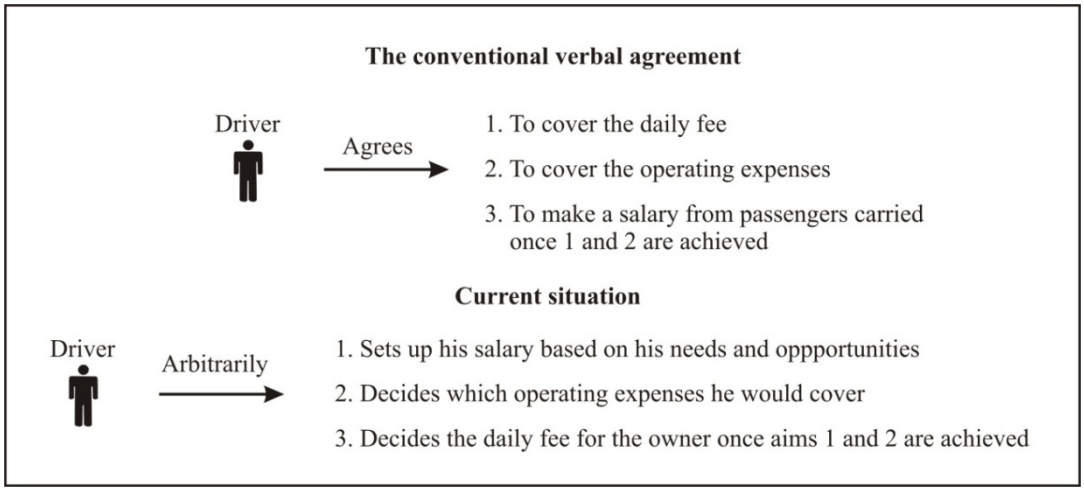
In some cases Routes - transport organizations – pay for the costs in the event of a collision. Private bus operators pay a flat monthly fee for the Route services. Routes in exchange for these fees offer some sort of service such as compensation in case of death in a traffic accident or other basic services.

Figure 23 - Concession and Vehicle Lease Model



The type of transit units used for this business and operational model varies but typically service is provided in units with greater capacity than the minibus. Competition and therefore driving practices vary in this model depending on the payment agreement between concession holders and drivers.

Figure 24- The Relationship between Concession Holders and Drivers



One major weakness of this model is that drivers are motivated to report lower than actual numbers of passengers transported. To remedy this, some concession holders have introduced passenger counting technology. However, many cities offer discounted fares particularly for students; as a result, drivers are able to explain lower than expected revenues because of the number of reduced fare riders. From the interviews, I learned that many concession holders are concerned that drivers have taken over control of the business. In contrast with payment scheme [1], where concession holders' income is the daily fixed amount paid by the drivers, in recent years, concession holders have indicated that their income is now equal to the remaining of the total fare once the driver's salary – arbitrarily decided – and operating costs are covered. As shown in Figure 24, in many cases drivers actually establish their own compensation rates and concession owners receive the remaining revenue.

In addition to revenue collection, care of the vehicle may pose challenges. Usually, drivers are asked to store the vehicle when not in service. This provides opportunity for the vehicle to be used for purposes other than public transport; instances of vandalism of vehicles have also occurred while units were not in the possession of the owner.

4.4.3 Concession Only-Lease Model

A third type of model involves concession holders offering leases for only the right to provide service. Figure 25 shows that in this case the driver is responsible for obtaining the transit unit through purchase – usually a second-hand unit – or by lease from a third party. The legal dynamics of this relationship are both complex and interesting. Formally, the driver or third party who owns the unit has to transfer the ownership of the unit to the concession holder since legally the right to operate and the vehicle must belong to the same person. Informally, bus associations will generally recognize the driver as the vehicle owner. However, in case of a legal dispute between the owner and the driver, the driver can lose the unit.

The complexity extends to accidents as well. The concession holder is the person responsible to the authorities for any issue associated with service provision. In the case of a collision, the concession holder is the one who deals with those involved in the incident and the authorities. Typically, however, verbal agreements exist between the concession holder and the driver such that the driver is fully responsible for the cost of the incident he might have caused. In cases of major collisions, drivers will often abandon vehicles leaving the concession holder responsible to resolve the situation. While many cities have legal frameworks to prevent this situation, the executive entities that regulate transit provision rarely enforce these laws.

Figure 25 - Concession Only-Lease Model

License fees are usually paid on a monthly basis. While their values depend on the route demand characteristics, they are in this model considerably less than in the previous model. Because drivers' incomes depend on the number of passengers carried, extensive competition typically exists in

corridors. Problems with deferred maintenance and storage of units are similar to what was described for the man and his bus model.

Fieldwork conducted in Mexico confirms that this type of ownership model is practiced in cities such as Villahermosa, Tabasco and Ciudad Victoria, Tamaulipas.

4.5 Ownership Models, Concession Holders' Reactions and Willingness to Participate in Transit Improvements

In previous sections, it is identified the changes that are necessary to implement improved transit supply and defined the current operational models by which transit is being delivered. In this section, I attempt to map concession holders' reactions to proposed transit improvements based on the different ownership and business models. I follow the six components presented in Figure 21.

4.5.1 New Legal Entity

Modifying the legal structures that allows current concession holders to provide for-profit urban transportation is contentious for all models. Concession holders associate government intervention with a gradual loss of their legal right to operate. Although the new legal entity will grant concession holders with legal certainty, they often fail to trust the new legal arrangements with the government. Moreover, modifications are proposed based on the assumption that concession holders understand the benefits of modifying current legal features of the concession. This fear can be greater if the proposed transit enhancement is made through a bidding process in which others than the current bus operators can participate.

Positive reactions to form a new legal entity include being able to access loans for fleet renewal and introducing a fare collecting system. Moreover, it was noted during fieldwork that a new legal entity is perceived as a protection of business against groups associated with drug cartels. Particularly in the Northern and Western part of the country, private bus operators are extorted by these groups for continue operating. These groups threaten private bus operators with burning their transit units if a sort of "protective fee" is not covered, usually in a monthly basis. These fees also "ensure" that the number of units operating in a given route remain stable.

In several meeting with private bus operators, it has been also noted that cultural aspects reduce private bus operators' motivation to evolve to a more efficient types of legal figures for providing service. Specially, for private bus operators working under the concession-lease and concession-only-

lease model, modifications in the legal rights to operate imply introducing order and new working schemes, which are not necessarily well-received by some operators. Some operators have achieved a sort of "state of comfort" in which current business practices provide them with resources to make a decent live. I prefer keep receiving "30 dollars" a day, which is more than enough to buy some beers and watch football than receiving "50 dollars" but having to have more responsibilities, a private bus operator indicated (name withheld, personal communication, June 2011).

4.5.2 New Administrative Entity for Business Management and Operations

Introducing a new administrative entity for business management and operations disrupts the habits and customs associated with current transit provision. This is particularly acute for those concession holders who still perform all the activities of transit provision such is the case in the man and his bus model. In this instance, current concession holders lose not only control of their business, but also must give up activities such as driving, cleaning and performing maintenance. These holders may also have to find an alternative mode of transport to get to their new workplace if they elect to continue working in the new company. In a man and his bus model, units not only provide service to others, but also serve as primary vehicles for travel from home to the area where service is provided.

Negative reactions for all models also include uncertainty about the alteration of the extended family interactions and new fiscal obligations. Many concession holders associate their current status with the traditional transit provision and, as such, are eager to preserve business as usual.

Positive reactions to a new administrative entity amongst all models often result from having more time to dedicate to other activities. Road-based urban transportation is a time-consuming activity. It is not unusual for owner / drivers to work 16 hours a day. Those who entrust their unit or lease the license to a third party may also have to dedicate extensive resources to business management. In our interviews, more than one owner indicated that they "*have to live with the phone in hand*" to deal with any problems associated with the unit or with an incident caused by the driver. New administrative entities may make income flow more secure, which is particularly important for older concession holders who wish to reduce their commitment to day-to-day operations.

The new administrative agency may also appeal to concession holders by enhancing the safety and operating costs of their vehicles. Transit improvements guarantee a central place to store units. This central location also allows for owners to capitalize on the economies of scale associated with transit maintenance and the purchase of spare parts. It is important to note that the operating cost reductions

are not particularly felt by those holders who only lease the right to operate. These holders also experience fewer negative reactions to a new administrative entity for business and operations.

4.5.3 Fare Collection System

The introduction of a fare collection system is perhaps the most sensitive and contentious of all potential improvements. Concession holders are reluctant to lose control of daily income flows for a variety of reasons. Our interviews suggest that most concession holders rarely use alternative methods such as credit cards or soft loans to finance business expenses; purchases are mainly done using cash. With a fare collecting system revenues are usually distributed on a monthly or biweekly. This has profound effects not only on business, but also on household management habits.

For all models, concession holders also associate a fare collection system with government intervention or control over revenues. For this reason, in some improved systems such as those in Villahermosa and Tuxtla Gutierrez, leaders of bus organizations gather every night with the personnel of the legal entity that manages the collecting system to validate daily cash flows. In addition to this perceived need for oversight, centralized fare collection systems often require participants to pay an administration fee. This added cost is not often well received.

However, a fare collection system is particularly attractive for those concession holders who operate via one of the concession models. Although concession holders have recently improved passenger controls, many still experience significant money leaks. One respondent during our interviews expressed his frustration saying: "*a unit that does not produce enough money to be stolen by the driver, is not business*."

Generally, owners operating under the man and his bus model are much more sensitive to fare collection systems. These owners / drivers are most resistant to the introduction of government intervention as they collect the revenues themselves and, as a result, do not experience the money leakage problem with drivers. Concession holders who lease their vehicles to a third party to perform transit service experience a positive impact on their total earnings because drivers will not be responsible for managing passenger fares. In the concession only-lease model the concession holder is not directly influenced by the implementation of the system but the driver experiences the same reactions as the owner in the man and his bus model.

4.5.4 New Transit Units

Introducing new units for transit provision can be particularly complicated for areas dominated with operations under the man and his bus model. Compared to the other two models, concession holders belonging to a man and his bus model are the least wealthy, making it difficult for them to access the capital resources necessary to procure new vehicles. Given that these holders dedicate most of their time to performing activities directly associated with operating and managing the unit, they value their units – both economically and emotionally – significantly more than concession holders belonging to the other two models. Therefore, because the introduction of new transit units usually involves scrapping the units to be replaced, extensive delays may be experienced with many man and his bus operators.

It should be highlighted, however, that some concession holders belonging to the concession-lease model experience negative reactions to having to buy new transit units because of the financial risks that prevail in a country with limited economic stability such as Mexico. During the 1980s and 1990s, Mexico experienced economic crises that affected the credibility of people in financial loans. The transport sector was one of the most affected by these events; many private bus operators lost an important part of their patrimony because of the purchase of new units in this period. The authorities forced bus operators to renew their vehicle fleet during this period. The authorities had no prevision of the problems that could cause economic instability (Angel Molinero, personal communication, June 2011).

Positive reactions to the introduction of new units for transit include an improved unit performance and image of the transit business.

4.5.5 Fixed Infrastructure and Planning, Regulating and Monitoring

The provision of fixed infrastructure for transit is attractive to all concession holders. Fixed infrastructure that supports overall transit improvements has a positive effect on riders' experience, which may produce a modal shift from cars to transit or, at a minimum, reduce the number of current riders who would consider buying a car for performing their daily activities. On the other hand, government involvement in planning, regulating and monitoring is negatively perceived by some concession holders who, at worst, fear losing their business or perhaps having to pay "gratuities" to civil servants to maintain operating rights.

4.5.6 Analyzing Concession Holders' Willingness to Participate in Improvements

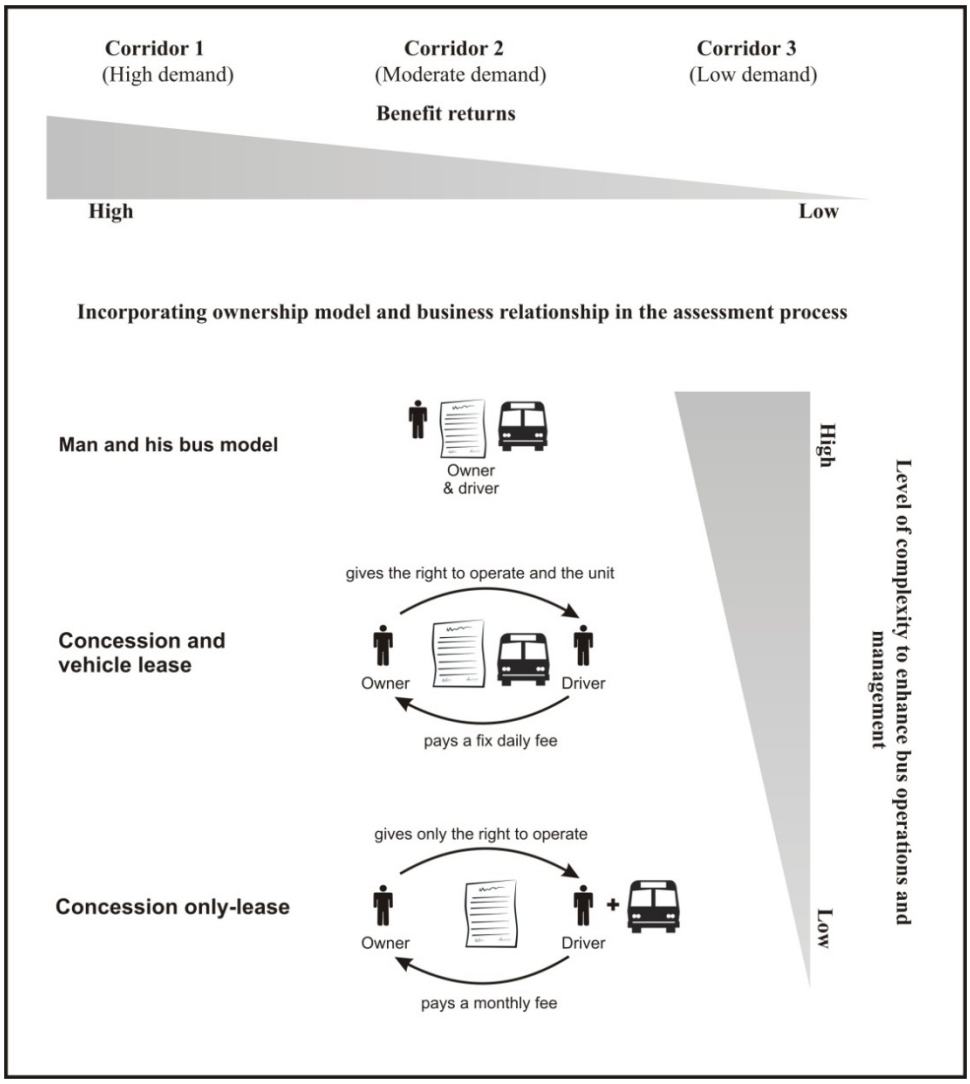
To summarize, each operating model creates circumstances that tend to influence individual concession holder's reactions to proposed transit enhancements and, commensurately, the holder's willingness to participate with governments to implement these improvements. Table 5 summarizes the concession holder's reaction – operating under each model – to each requirement of a new transit proposal.

To determine the concession holder's degree of willingness to participate in transit improvements, both negative and positive reactions, as previously discussed, are analyzed. While a low willingness to participate results when negative reactions prevail over positive reactions, a high willingness is achieved when the proposed improvement is socially and economically positive for the concession holder. In the man and his bus model, for example, owners spend more time in business, have greater control over decision making, manage finances more directly and do not experience "money leakage"; these owners also tend to be least educated and least business savvy. All of these factors tend to decrease their willingness to participate in transit enhancements relative to the other models. In Figure 26, it is shown these results graphically. Generally, complexity in owner involvement with transit provisions increases as we move from a concession-only lease model to a man and his bus model.

Table 5- Ownership Models and Concession Holders' Willingness to Participate to Proposed Improvements

Operation and business models	Legal entity	Operations and management	Fare collecting system	New transit units	Fixed infrastructure	Planning and monitoring
Man and his bus	Low / Moderate	Low	Low	Low / Moderate	High	Low
Concession and vehicle lease	Low / Moderate	Low / Moderate	Moderate	Low / Moderate	High	Low
Concession only-lease	Low / Moderate	Moderate / High	High	Moderate	High	Low

Figure 26 - Integrating Ownership and Business Models into Cost-Benefit Examaninations



Significant improvements can be made to the transit planning process by incorporating this understanding of how ownership models influence willingness to participate. When selecting areas or corridors for improvements, recognition of existing ownership models – particularly where concession models exist rather than man and his bus model – may allow for greater driver involvement reducing implementation times and costs and maximizing social benefits. These benefits may be substantial and can result in the selection of corridors that based solely on demand would have been otherwise overlooked.

4.5.7 Illegal but Tolerated Transit System

Our field investigations have also made us aware that some transit routes are served by illegal but tolerated systems. The three aforementioned ownership models can be found on these routes. What should concern decision-makers is that the willingness to participate in this type of transit provision is highly influenced by the recognition of the legal right to operate.

The area of Villahermosa, Tabasco has extensively worked on the introduction of transit enhancements using franchise systems. To date, four corridors have been improved, covering more than 70 percent of the total daily trips made by road-based urban transportation. The system includes a corridor previously served by illegal but tolerated service. The initiative to improve this corridor was developed by the operators themselves without government intervention because the operators were displeased by the prevailing characteristics of lawlessness. Operators in this corridor observed a window of opportunity to obtain legal recognition by changing their operational and management practices, the leader of this group indicated. Once they convinced themselves of the required modifications, the group approached the government to negotiate their legal recognition in exchange for improving the quality of service. The improvements came with a minimum amount of resources dedicated for negotiations; the improvements were also supported by technical assistance provided by the transit authorities (personal communication with the staff at the Communications and Transport Secretariat in Tabasco, October 2010).

4.6 Conclusions and Recommendations

This chapter summarizes the information gathered through extensive fieldwork (interviews) conducted in several Mexican cities over the past year. In this chapter, the common components that are introduced as part of moving transit supply from purely private provision to franchise type systems are identified. The types of business models that exist between concession holders and drivers has been also defined and explained. For each model, operating conditions that influence both positively and negatively the owners' willingness to participate in the implementation of new, presumably improved ownership model are examined.

Results suggest that because of the greater economic and personal investments felt by concession holders operating under the man and his bus model, these concession holders are typically least willing to participate. Therefore, if the area of improvement is dominated by the man and his bus model, negotiations with these concession holders may require the most government resources to

have major enhancements implemented. For this reason, I advocate for improving communication channels between authorities and these transport providers to clearly identify the needs and concerns of both parties – government and operators – when transitioning from current to more centralized type systems. Better understanding of motivations and impacts may help to identify methods to mitigate the potential loss of operators' personal, economic and social well-being and, thus, increase the political feasibility of project.

In areas with concession-based models, owners' and drivers' willingness to participate may be substantially higher. Opportunities also exist, based on evidence in Villahermosa, to achieve major transit improvements in exchange for legal recognition of previously unrecognized but tolerated transit providers.

Chapter 5
Evaluating Private Bus Operators' Willingness to Participate in Transit Improvements in Mexico

Overview

This chapter provides valuable inputs for the decision-making process of transit improvements in developing countries. By analyzing private bus operators' willingness to participate in transit improvements, the political feasibility can be assessed and the likelihood of successful implementation can be increased. Data from 156 surveys conducted in various cities in Mexico are used to develop probabilistic models that quantify the influence of private bus operators' characteristics, perceptions about business and operating efficiencies as well as their relationship with government on their willingness to participate. Evidence shows that several elements can increase the willingness of private operators to participate in government-led proposals. These include: the level of trust and communication between private bus operators and government authorities; the economic power of private bus operators; and the attachment to the status quo. Several features were shown to limit operators' willingness to participate, including: the model of operation, the likelihood of lost revenue through taxation and concerns about the potential modifications of their legal rights to operate. An analysis of Mexico City and surrounding areas demonstrates the need to establish a well-defined strategy for engaging private bus operators in transit improvements; failure to do so has resulted in much less trust of government and led to more conflicts in future projects. The chapter reveals the importance of analyzing private bus operators' participative profiles in the assessment of transit improvements. Selected areas for improvements might present challenges for engaging private bus operators in the proposed improvement.

5.1 Introduction

The implementation of transit improvements in developing countries has been a challenging undertaking. Besides financial and institutional limitations, the nature of transit provision – a large number of private concessionaries operating medium-to-small-capacity vehicles – creates additional challenges to introducing new operating and management initiatives. These initiatives represent a major disruption for many operators' daily routines and may produce a potential net welfare loss because of the changing personal – social and economic – dynamics. Transit improvements have either been delayed or canceled because of the lack of consensus between the authorities and private bus operators (EMBARQ, 2006; Nava and Ramírez, 2008; Dodero et al., 2011; Ardila, 2008).

Proposals to introduce changes to transit delivery have created significant social unrest in many cities. In the past decade, strong opposition to proposals has been observed in countries such as Colombia, Brazil, South Africa and Mexico. In these countries local authorities have frequently been confronted by private bus operators that oppose giving up operations, being relocated (forced to operate in other areas) or changing the organizational structure of their current operations and management practices (Hidalgo, 2009; Quintero and Bolaños, 2008; El Tiempo, 2010;News 24.co, 2010). As such, it becomes important to conduct research on the factors that may influence willingness to participate and expedite project approvals, thus reducing implementation time, reducing borrowing costs and improving transport systems in developing countries.

In Dodero et al. (2011) it is proposed a theoretical framework to assess both external and internal factors that may influence operators' willingness to participate in the planning and operation of upgraded transit systems. Externally, it is suggested that network characteristics and the strategy used for franchising systems are strong influences on willingness to participate. Internally, following Ardila (2004) and Nava and Ramirez (2008) and Dodero et al. (2012) it is noted that reactions to proposed transit improvements are affected by operators' ages, levels of education, entrepreneurial motivations and, in general, by their current business practices and model of operation.

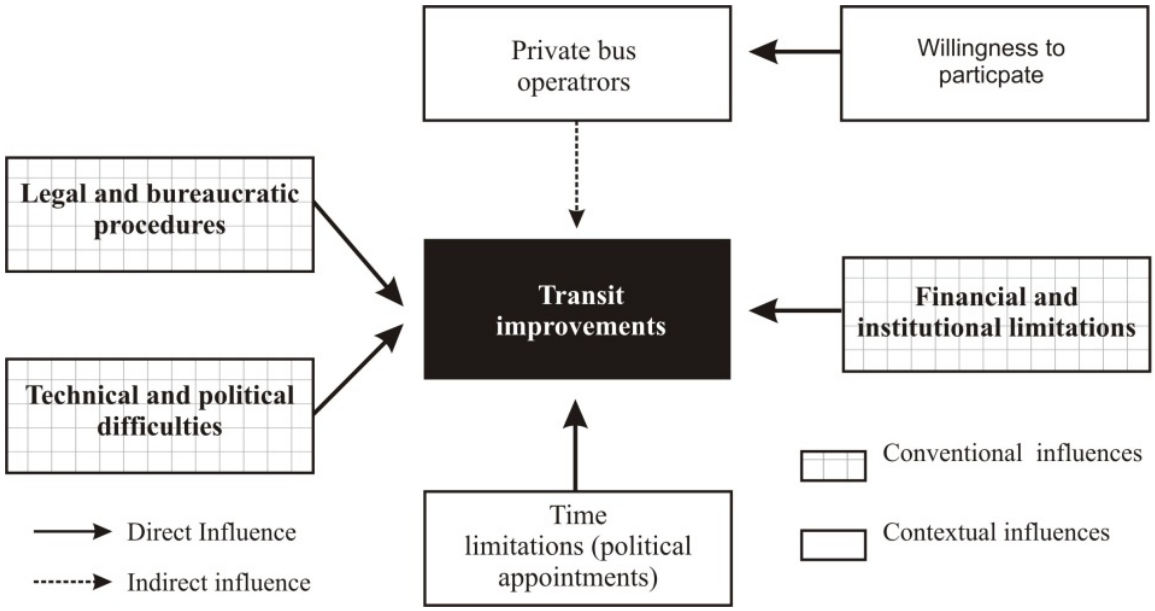
This chapter attempts to quantify these variables' impacts on private bus operators' reactions to transit improvements by analyzing an open-ended survey conducted in various cities in Mexico. It is estimated the likelihood that a private bus operator is willing to participate in these improvements as a function of a number of factors including: individual and business characteristics; these operators' managerial and operational practices; perception about current service provision; and relationship with the government and actors associated with the service provision.

In the following sections the critical elements that have the greatest influence on private bus operators' willingness to participate are identified. From this theoretical framework, the chapter analyzes data collected from private operators. Using a Logit model, variables are tested to quantify their explanatory strength in predicting private bus operators' willingness to participate in transit improvements. The chapter also analyzes the reactions of private bus operators in Mexico City to demonstrate the importance of having a well-defined, inclusive public transport strategy. Finally, the chapter suggests incorporating an analysis of the willingness to participate element into the decision making process for transit improvements.

5.2 The Influence of Private Bus Operators in Transit Improvements

Planning for transit improvements in developing countries is far more complex than in the developed world. In Figure 27, those elements that influence transit planning are classified into two main categories: conventional challenges and contextual factors. Conventional challenges include the technical ability to conduct appropriate technical analyses, for which expertise may not be available; the presence (or absence) of financial and institutional capacity to deliver proposed contracts; and legal and bureaucratic procedures to obtain authorization for the use of local or federal resources.

Figure 27 - Direct and Indirect Influence of Private Bus Operators



Contextual elements refer to those that are common in developing countries. In developing countries there is lack of continuity in policies for the implementation of improvements in all areas of development. Priorities may change as a result of major events or a shift in political power (Dodero et al,2011; Banjo and Dimitriou, 1983; Ardila, 2002). One additional contextual factor, which is the focus of this paper, is the indirect influence that private bus operators may exert on the likelihood of successful transit implementation. Arguably, more successful projects are likely to be built with less opposition when the proposal contains an inclusive strategy motivated by an understanding of the factors that influence operators' willingness to participate in such projects (Dodero et al, 2011).

5.3 Analyzing Private Bus Operators' Influence on Transit Improvements

In Dodero et al. (2011) and Dodero et al. (2012), it is argued that private bus operators experience various reactions – from reluctance to willingness to participate – in transit improvements proposed by government authorities.

Figure 28 - Private Bus Operator's Negative and Positive Reactions to Transit Improvements

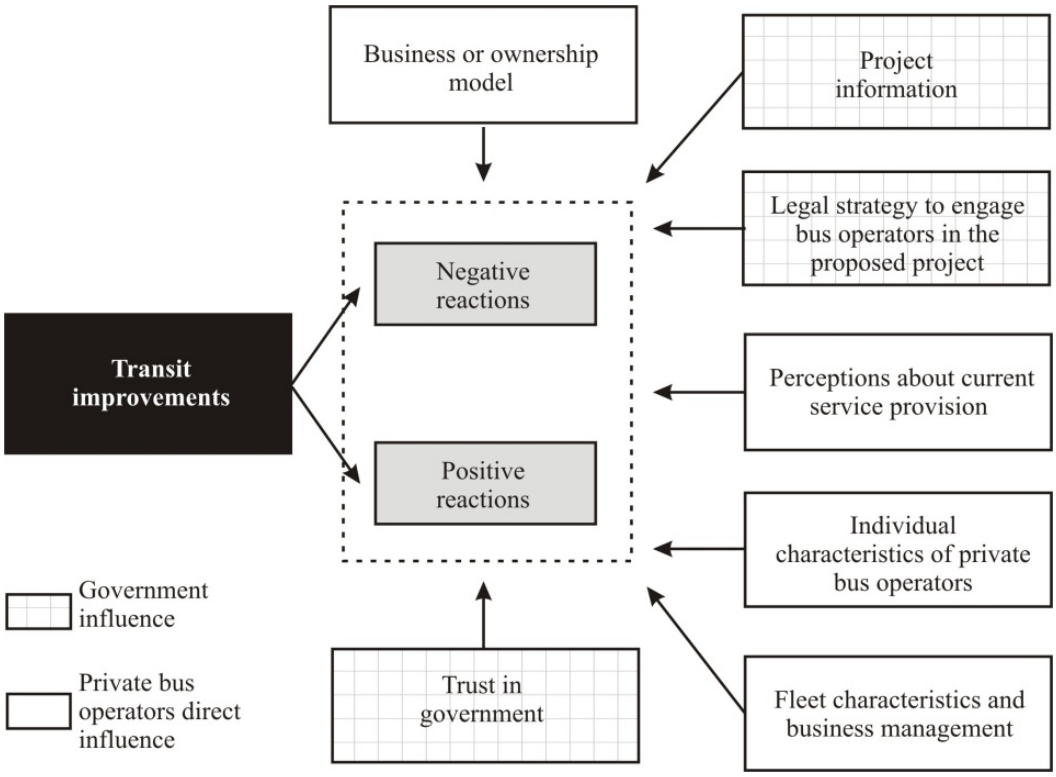


Figure 29 shows that two groups of factors influence this range of reactions: those over which the government can exert a direct influence and those that relate to the nature of private bus operators. These operators' characteristics include a range of economic issues as well as social and cultural elements that have evolved over long periods (see Chapter 4). The difference between Figure 28 and the Figure presented in Chapter 4 (Figure 22) is the identification of the above mentioned factors of influence. This differentiation becomes relevant for designing policies to reduce the possibility of negative reactions.

5.3.1 Business or Ownership Model

In Dodero et al. (2012) it is suggested that reactions to transit improvements are influenced by how business is performed by private bus operators. Private bus operators that operate the vehicle and manage the activities associated with business – the "man-and-his-bus model" – are generally less likely to participate in transit improvements. These operators have a stronger attachment to the status quo and lower purchasing power. Instead, private bus operators that entrust their vehicle to drivers – the "concession lease model" – are more willing to participate in these improvements. These operators have complex management practices and also face issues with drivers.

5.3.2 Project Information, Taxes and Fare Collecting System

Greater information and less uncertainty increase the likelihood of positive reactions from participants. In recent transit improvements in developing countries, private bus operators have been the primary private investor in proposed projects; naturally, private operators are more willing to assume this risk when they have access to all relevant information regarding the proposed project. Operators are also reluctant to be engaged in new operating models due to fiscal uncertainty. Contemporary transit improvements often include fare collecting systems. For private bus owners who rely on drivers to provide service this may be perceived either negatively or positively. On one hand, a fare collection system may reduce some profits because of third party fees for managing revenues. On the other hand, some owners may see fare collecting systems as positive because approximately 30 percent of the total passenger fares are not reported by drivers to bus operators (Ardila, 2004; Dodero et al. 2012).

5.3.3 Legal Strategy to Engage Bus Operators in the Project

Private bus operators tend to reject project proposals that preclude them from continuing to operate systems. In Dodero et al. (2011) four distinct legal strategies are defined that have been used when

franchising road-based transport systems in developing countries. While engaging private bus operators can create long-term consequences on the project sustainability, conflicts are minimized when all current bus operators are invited to be part of the proposed system (Flores and Zegras, 2012).

5.3.4 Perceptions about Current Service Provision

Reactions to proposed transit improvements depend on operators' levels of understanding of efficiency in transit delivery. Many private bus operators do not perceive problems or inefficiencies in the way service is provided. Although many recognize that revenues have decreased over time for a variety of reasons, these operators are under the impression that service provision can be improved only with fare increases and not through modifications in management and operational practices (A. Molinero, personal communication, June 2010; Dodero et al. 2012).

5.3.5 Individual Characteristics of Private Bus Operators

Individual characteristics of bus operators are associated with willingness to participate in transit improvements. Ardila (2004) notes a positive correlation between education levels of the bus operators and these operators' willingness to support the first BRT line in Bogota. Nava and Ramirez (2008) suggest that the lack of entrepreneurial motivations amongst bus operators delayed negotiations for the first BRT in Mexico City. Moreover, bus operators' willingness to participate is influenced by operators' ages and leadership, as well as by the number of years in business (EMBARQ, 2006; Dodero et al. 2011; Dodero et al. 2012; Ramírez, 2006; López, 1997).

5.3.6 Characteristics and Perceptions about the Legal Right to Operate

Some private bus operators are under the impression that their concessions are valid "for life" and are reluctant to enter into franchise agreements that are to be renewed periodically. In other cases, bus operators lack certainty about the legal arrangement that allows them to provide transit service; in several cities concessions have expired. In these cases private bus operators are reluctant to participate in proposed transit improvements because they fear being excluded from the project.

5.3.7 Fleet Characteristics, Business Management and Economic Power

Bus operators with more power in terms of fleet size and with better management practices are more comfortable participating in government-sponsored transit improvements (Nava and Ramírez, 2008; Dodero et al. 2011). Moreover, the likelihood of success in attempts to improve transit depends on

the sophistication of the bus operators' organization. (Dodero et al. 2012). Likewise, private bus operators with low economic power are risk averse. These operators are reluctant to accept negotiations with an uncertain payoff. As such, bus operators with additional income are less risk averse and exhibit greater incentives to participate in transit improvements.

5.3.8 Relationship with Government

The likelihood to succeed in the implementation of transit improvements is influenced by how communication channels and trust are developed between private operators and local authorities. Reactions to transit improvements are the result of the nature of the implementation process, given that the implementation is primarily conducted through governmental channels. Some suppliers are uncertain about the impacts of official monitoring and regulation. Bus operators associate government involvement with a potential displacement from their current business.

5.4 Data collection and descriptive statistics

To validate the existence and strength of the relationships described above, extensive field work was conducted in various parts of Mexico. This field work and initial results are described here.

5.4.1 Data Collection

Data was obtained during five visits to different cities and meetings in Mexico over a period of 1 year and 6 months (October 2010 – March 2012). The data collection efforts began with a short, pilot survey of private bus operators applied to private bus operators in the cities of San Luis Potosi, Mexico City and municipalities in the State of Mexico (see Annex 1). The initial survey was used to evaluate the reaction of private bus operators to a larger survey and to obtain preliminary evidence about the factors influencing private bus operators' willingness to participate in transit improvements. The initial survey was followed by a much longer survey containing 88 questions with the aim to test the validity and the strength of the relationships shown in Figure 2 in Chapter 1 (see Annex 2).

Approximately, 35 percent of the surveys were obtained during the XVIII Annual Meeting of Private Bus Operators (CONTURMEX) that was held in Ixtapa Zihuatanejo, Mexico. At this meeting, consultants and experts present advances in bus operation and management. As such, private bus operators that attend these meetings are more interested in the long-term stability and efficiency of their business. Annual meetings, however, are also perceived by these operators as an opportunity for recreation. Of the total attendees, less than 50 percent attend the conferences (Mario Hernandez,

General Coordinator of CONTURMEX, personal communication June 2012). While I recognize that data collection at this event may introduce systematic bias in the results, I believe that the benefits associated with coordinated data collection offset this potential bias.

5.4.2 Descriptive Statistics

A total of 156 surveys were completed by private bus operators from different cities. Of the total surveys, 38 percent were obtained from private bus operators serving Mexico City (DF), 18 percent in Queretaro, 11 percent in Morelia, 6 percent in Saltillo, 5 percent in the State of Mexico and 22 percent in other cities, including Veracruz, Puebla, Irapuato, Oaxaca, San Luis Potosi, Guadalajara, Villahermosa, Culiacan and Aguascalientes. Figure 29 shows these results.

Figure 29 - Percentage of surveys by city

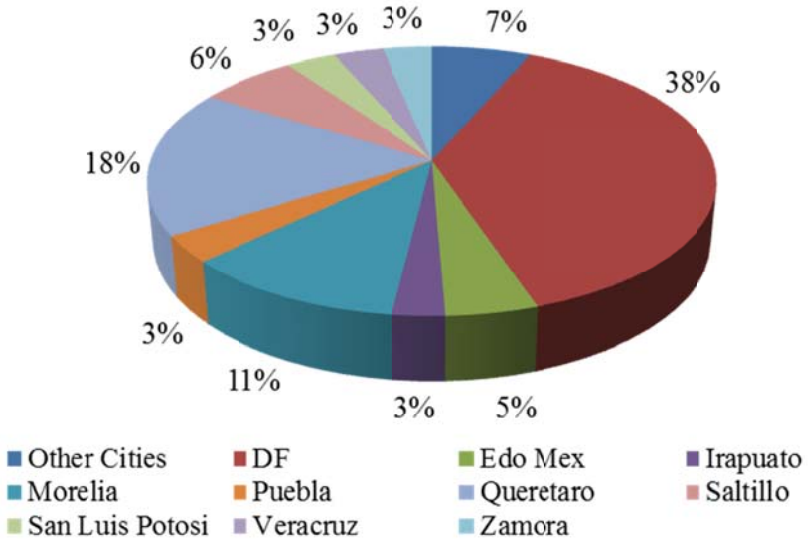
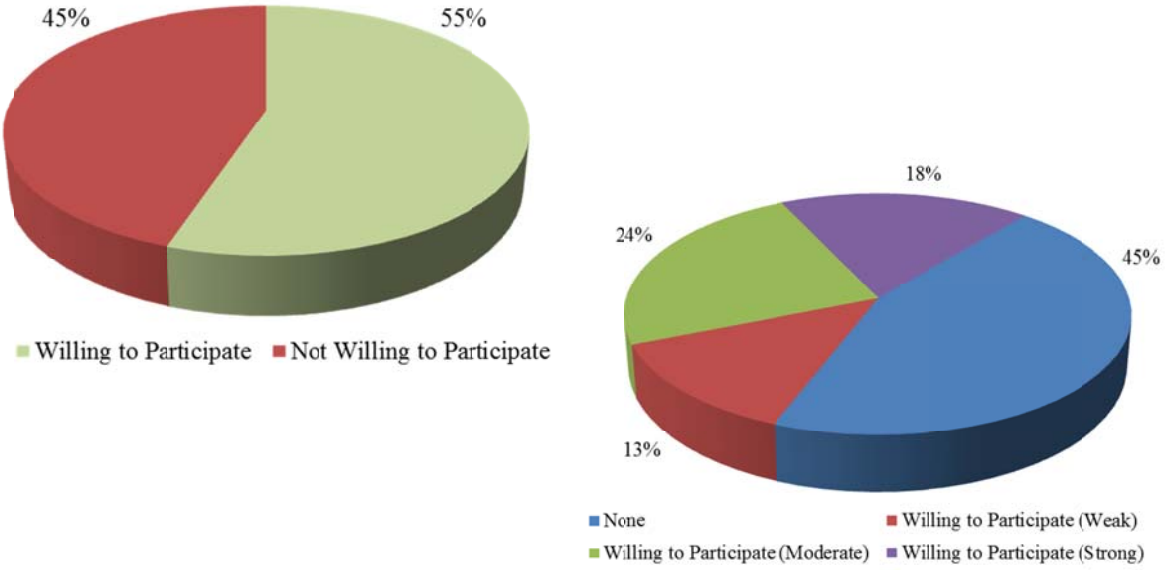


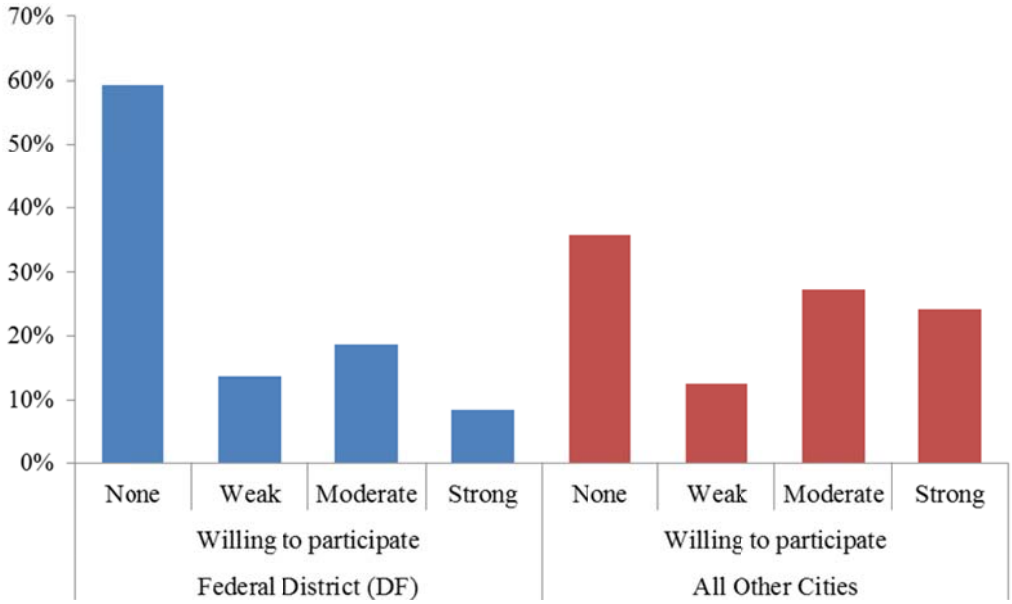
Figure 30 shows that of 156 surveys, 55 percent of private bus operators indicated a desire – whether low, moderate or high – to participate in transit improvements. Figure 5.4 also shows the percentage of percentage of private bus operators willing to participate in bus improvements by level of desire.

Figure 30 - Willingness to participate (percentage)



Regarding willingness to participate in bus improvements grouped by city, results show that the majority of private bus operators serving the Metropolitan Area of Mexico City – which include respondents from Mexico City and municipalities of the State of Mexico – have no desire to participate in bus improvements. Figure 31 shows these results.

Figure 31- Willingness to participate grouped by city (percentage)



Results regarding ownership model show that 58 percent of total respondents operate under a concession lease model; 42 percent were man and his bus operators. Regarding ownership models and willingness to participate responses, result show that man and his bus operators were less willing to participate. Figure 32 and Figure 33 show these results.

Figure 32 - Ownership model (percentage)

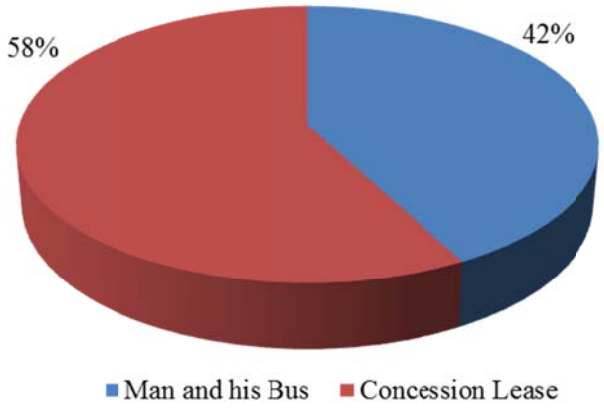
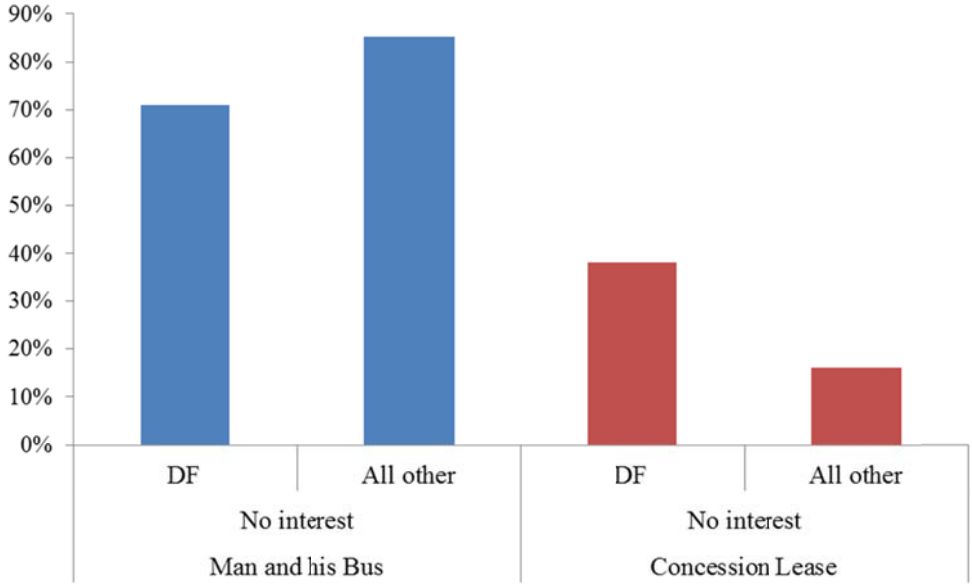
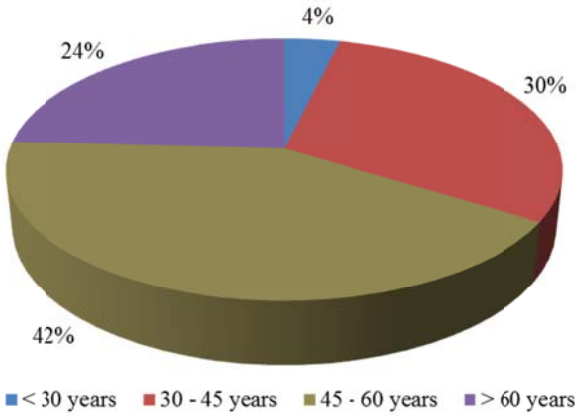


Figure 33 - Ownership model and non-acceptance to participate in bus improvements



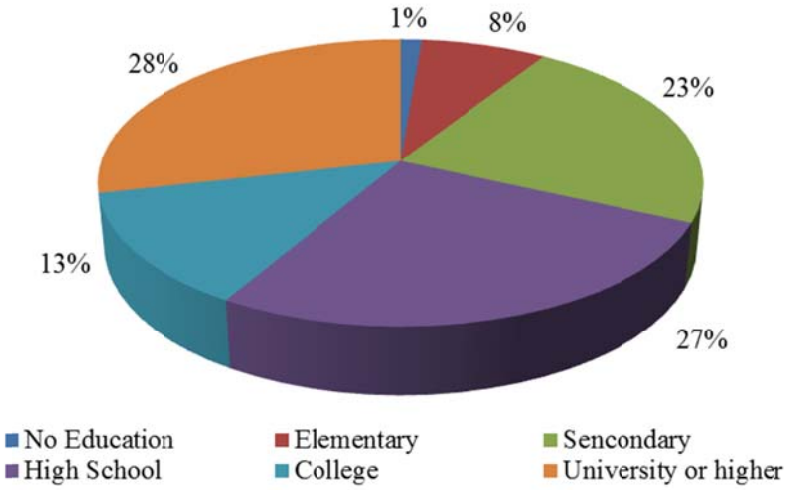
Results also show that the average age of respondents is 47 years old; 72 percent of total respondents have between 30 and 60 years old. Only a subset of the total operators interviewed is less than 30 years old. Figure 34 shows these results.

Figure 34 - Age (percentage)



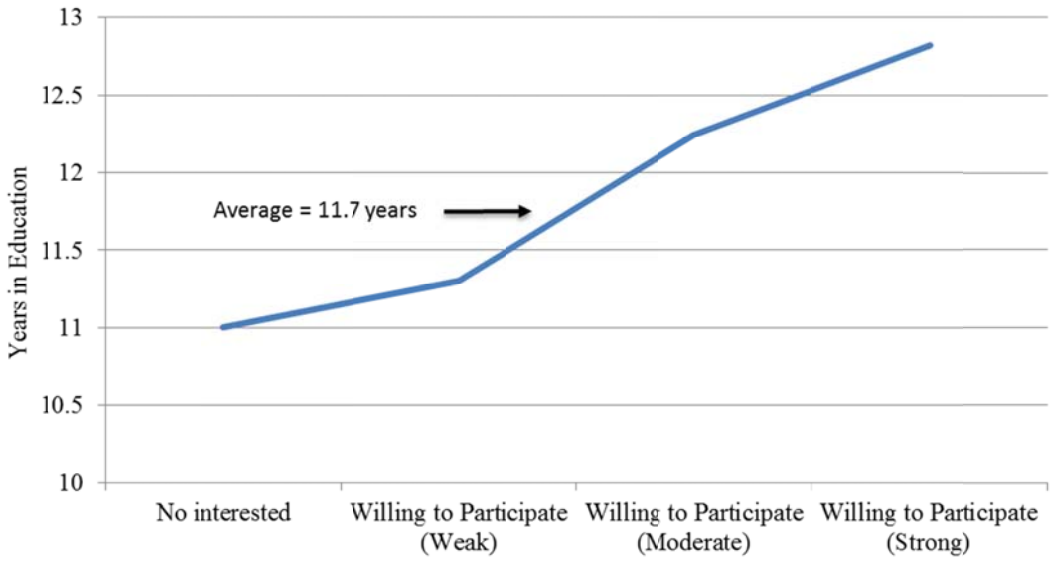
Average schooling from this sample was 11.7 years, which is the equivalent to a high school level. This evidence gives sights of the limited professionalism that prevails in the sector. These results also suggest the importance of having to dedicate extensive period of time and strategies for rationalizing the benefits associated with transit improvements in proposed projects. Strategies for rationalizing become more important for man-and-his bus operators whose average schooling is 10.7 years: the equivalent to junior high school. Figure 35 shows these results.

Figure 35 - Level of education



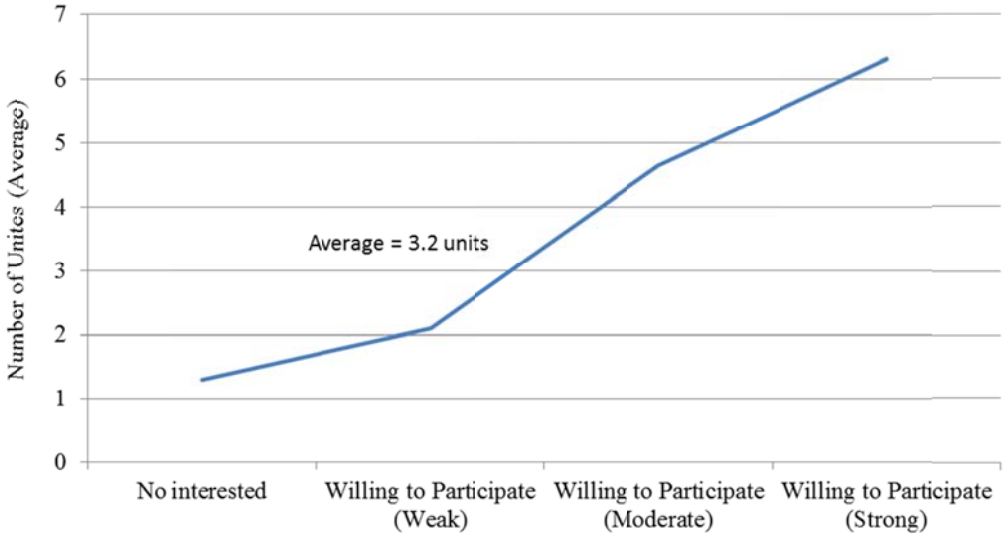
Notably, the level of willingness to participate in a bus improvement is highly correlated to the level of education. Figure 36 shows that as the level of education increases the willingness to participate in bus improvements increases.

Figure 36 - Level of education and willingness to participate



Another important element associated with private bus operators' willingness to participate is that of number of units. Figure 37 shows that the number of units is correlated – positively – with the private bus operator's willingness to participate. These results give evidence of the problem of managing a large number of employees – drivers mostly – and to the economic losses that private bus operators face because of old-fashioned or conservative approach to manage business.

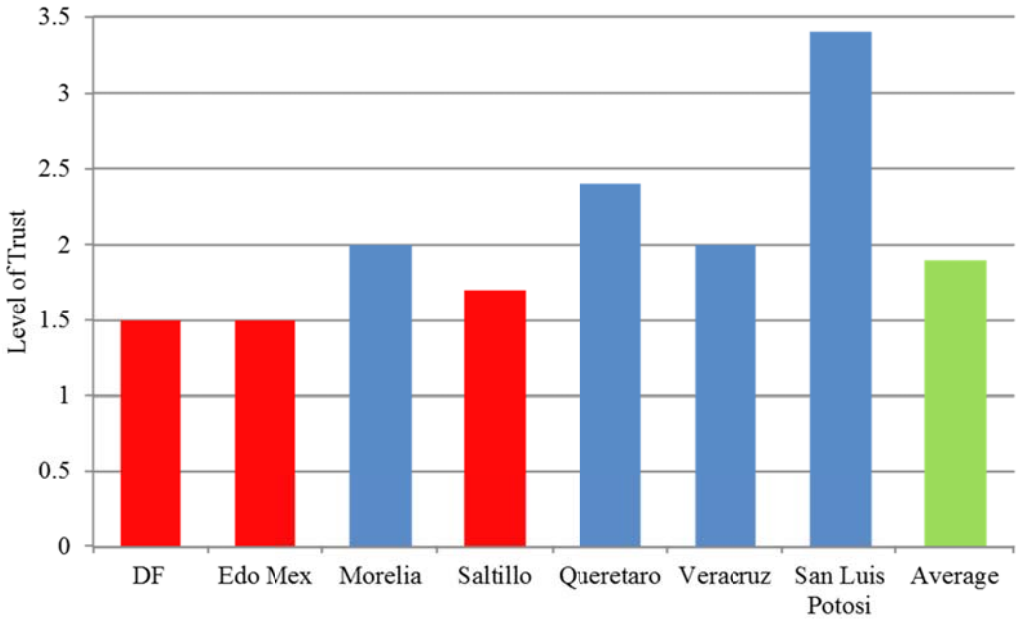
Figure 37 - Number of units and willingness to participate



Regarding private bus operators' level of trust in government authorities, data show, on average, a low level of trust. On a scale from 1 to 5 – where 1 is no trust and 5 is total trust – results obtained indicate that average trust is equal to 1.9. Mexico City and municipalities in the State of Mexico show, on average, the lowest level of trust. In contrast, private bus operators in the city of San Luis Potosi and Queretaro indicated, on average, a moderate-to-high level of trust.

Fieldwork conducted in these two cities confirms the authorities' motivation to work with private bus operators in the proposed projects to improve bus service. Another factor that may be influencing these results is the existence – in some corridors – of formally organized bus companies. Administrators of these companies have been at the negotiating table with the government. These administrators provide some sort of validity and credibility to the plans outlined by the government. Moreover, having representatives of bus companies in the negotiation process forces authorities to have a high technical knowledge of the proposed improvements; this increases the credibility of the project. Figure 38 shows figures of level of trust for most representative cities.

Figure 38 – Level of trust in government



In the following section, a Logit Model is developed to measure the statistical significance of selected variables over private bus operators' willingness to participate.

5.5 Logit Models

In this section, it is examined the factors that influence private bus operators' reactions to transit improvements using a logistic regression. I define willingness to participate (*WP*) as a proxy variable that captures these reactions. *WP* is a dummy variable that equals 1 if the private bus operator indicates interest – whether low, moderate or high level – in participating in transit improvements, and equals 0 if the private bus operator indicates no interest in such improvement. Thus, the variable *WP* indicates the conditional probability that a private bus operator is interested in participating in a transit improvement.

A general model is constructed which includes variables associated with the individual characteristics of private bus operators. It is also included a set of variables that incorporates private bus operators' reactions to (i) current system operation and management; (ii) franchising or centralizing management and operations; and (iii) government intervention. As these perceptions differ depending on the type of ownership model in which the private bus operator provides the service, only a subset of these variables is included in the general model.

It is important to note that many variables – that seem relevant for estimating the probability to participate in bus improvements – were excluded from the Logit model problems; there was evidence of *multicolinearity*. For example, variables such as *Income* and *Number of Units* were highly correlated with the variable *Ownership Model*. While man-and-his bus operators have only one transit unit, concession-lease operators own more than one unit. Thus, the relative importance of the variables *Income* and *Number of Units* are captured in the variable *Ownership Model*.

Two groups of variables are identified in this model. Variables in which the government can exert a direct influence (that related with trust, the legal recognition to operate and taxation) and variables that are difficult to modify (their nature is the result of the business activity and private bus operators' perceptions about business having created for extensive period of time).

The general model is formulated as:

$$WP = \beta_1 + \beta_2 OwnMod + \beta_3 GovT + \beta_4 Taxes + \beta_5 LegalC + \beta_6 YOwn + \beta_7 Edu$$

$$+ \beta_9 AddInc + \beta_{10} FamT + \beta_{11} BusAs + \beta_{12} LessRev\_LessWork + \beta_{13} MorePass\_MoreRev$$

$$+ \beta_{14} Storage\_Unit\_Concern + \sum(\beta_i X_i) + \mu_i$$

$$i = 1 \ldots n$$

Where:

OwnMod equals 1 if the bus operator works under the man-and-his-bus model, and equals 0 if the bus operator works under a concession lease model;

GovT is the bus operator's level of trust in government on a scale from 1 to 5, where 1 represents NO TRUST and 5 is TOTAL TRUST;

Taxes equals 1 if the bus operator expressed concern about having to pay taxes as a result of the proposed improvement, otherwise 0;

LegalC equals 1 if the bus operator expressed concern about how his/her legal certainty to operate will be modified as a result of the proposed improvement, otherwise 0;

YOwn is the private bus operator's total years in business;

Edu is the private bus operator's level of education in years;

AddInc equals 1 if the bus operator has additional sources of income, otherwise 0;

FamT equals 1 if the business was inherited from family, otherwise 0;

BusAs equals 1 if the bus operator has a seat in a bus association, otherwise 0;

LessRev_LessWork equals 1 if the bus operator is comfortable with sacrificing revenues to reduce his workload;

MorePass_MoreRev equals 1 if the bus operator believes that an increase in revenues can only be produced by carrying more passengers, otherwise 0;

Storage_Unit_Concern equals 1 if the bus operator has concerns about storage of the units, otherwise 0;

X represents a vector of other explanatory variables that are not included in all models. These variables are: [1] *ImproPT_IncrFares* a dummy that equals 1 if operators perceive that improvements comes only with increasing fares, otherwise 0; and [2] *Drivers_Level_Trust* is the private bus operator' level of trust in drivers on a scale from 1 to 5, where 1 represents NO TRUST and 5 is TOTAL TRUST; and

μ is the error term.

The expected signs of the most relevant explanatory variables on *WP* are shown in Table 6:

Table 6 - Model Variables, Signs and Rationale

Type	Variables	Sign	Rationale
	OwnMod	(-)	Private bus operators serving under the model *man-and-his-bus* are more attached to the status quo and have limited assets to invest in transport improvements.
variables influenced by government actions	GovT	(+)	Greater levels of trust in government result in an increased interest to participate in improvements.
	Taxes	(-)	Private bus operators are less likely to participate in improvements if the proposed improvement results in having to pay taxes.
	LegalC	(-)	Private bus operators are less likely to participate in transit improvement if they do not have total certainty about the characteristics of their legal right in the proposed improvement.
Characteristics of private bus operators	YOwn	(?)	Private bus operators with a reduced number of years in business may have low emotional attachment to the status quo. However, operators with several years in business have also experienced a drop in business; as such they understand that improvements are needed.
	Education	(+)	Better-educated operators understand better the need for improvements in operation and management.
	AddInc	(+)	Private bus operators with additional income are less risk averse to transit improvements.
Variables associated with the status quo	FamT	(?)	Private bus operators that have inherited from family are more attached to the status quo and are less motivated to participate in transit improvements. However, these operators may also have greater incentives to participate in improvements if the proposal will bring greater security to the business.
	BusAs	(?)	Private bus operators that have a seat in bus associations may have fewer incentives to participate in improvements; such improvement can result in the elimination of these activities, reducing their bargaining power within the association. However, these operators are also in direct contact with the authorities, have a greater understanding about the project and have a greater negotiating power with the authorities. They use this information for their own benefit.
Variables associated with business	LessRev_ LessWork	(+)	Private operators that are willing to sacrifice revenues for having to work less are more open to participate in transit improvements. Many bus operators expressed dissatisfaction with current conditions. Man-and-his-bus operators spend more than 14 hours a day in the business.
	MorePass _ MoreRev	(-)	Private bus operators that do not associate "more" revenues with improving all elements associated with the transit delivery service are less willing to participate in improvements.
	Storage_ Unit_Con cern	(-)	Private bus operators with concerns about storage of their units are more willing to participate in improvements. In many cases, transit units are the most valuable asset that private bus operators have.

To enhance the analysis, the general model is split into two secondary models. By estimating these secondary models I aim to evaluate differences in reactions by type of private bus operators. Two

models are estimated: (1) for private bus operators working under a man-and-his-bus model and (2) for operators working under the concession lease model.

5.6 Model Results

In this section, results of the general and secondary models are shown. Table 7 summarizes the results. Figures in parenthesis are the estimated standard errors. Pearson Chi-square tests were used to test the independence of all independent variables. A 90 percent confidence interval – p-value = 0.10 – is used to determine statistical significance of the independent variables. Variables significant at the 90 percent level are shown in bold.

Table 7 – Results: General model, concession-lease model and man-and-his bus model

Dependent Variable: WP	**General**		**Concession lease**		**Man and his bus**	
	(i)		**(ii)**		**(iii)**	
Variables	**Coefficient**	**p-value**	**Coefficient**	**p-value**	**Coefficient**	**p-value**
OwnMod	**-1.6844** (0.6076)	0.0056				
GovT	**1.5028** (0.3459)	0.0000	**2.6547** (0.7793)	0.0007	**1.0722** (0.5707)	0.0603
Taxes	-1.2136 (0.8215)	0.1396	-0.9052 (1.4962)	0.5452	**-2.5043** (1.3711)	0.0678
LegalC	**-1.7468** (0.8702)	0.0447	-2.2963 (1.6366)	0.1606	-3.4483 (2.2149)	0.1195
YOwn	**0.0823** (0.0359)	0.0220	**0.1217** (0.0704)	0.0839	**0.1152** (0.0560)	0.0396
Edu	0.0613 (0.0864)	0.4778	**0.2766** (0.1434)	0.0538	-0.0611 (0.1698)	0.7189
AddInc	**1.5706** (0.6263)	0.0122	1.2338 (1.0511)	0.2405	**2.7241** (1.3097)	0.0375
FamT	**1.4493** (0.6107)	0.0176	**2.0171** (1.0186)	0.0477	**2.0843** (1.2517)	0.0959
BusAs	**1.2168** (0.6174)	0.0487	1.8188 (1.1606)	0.1171	**1.5589** (0.9720)	0.1088
LessRev_LessWork	**1.8435** (0.5856)	0.0016	1.5018 (0.9366)	0.1088	**2.5332** (1.1190)	0.0236
MorePass_MoreRev	**-1.8071** (0.7831)	0.0210	**-4.8205** (1.8740)	0.0101	0.9533 (1.4257)	0.5037
Storage_Unit_Concenr	**2.2622** (0.9831)	0.0214	**4.3286** (1.7475)	0.0132		
Drivers_Level_Trust			**-1.4821** (0.5689)	0.0092		
ImproPT_IncrFares					**-2.4080** (1.3393)	0.0722
Constant	**-5.710103** (1.884943)	0.0025	-5.230628 (3.296337)	0.1126	-4.3091 (2.7801)	0.1212
R^2	0.5468		0.5581		0.4998	
Observations	154		89		65	

5.6.1 General Model

The coefficients of the variables on which the government can exert an influence are statistically significant and show expected signs. Increasing the level of trust in government produces a commensurate rise in the probability of participating in a transit improvement plan. In contrast, the lack of certainty about private bus operators' legal right to participate in a proposed transit improvement or concerns about the nature of the new concession – specifications of the service to be provided, responsibilities and duration – reduce, on average, the likelihood to participate in such improvement.

Results also show significant differences in the willingness to participate in transit improvements based on operational models. On average, the likelihood of participating in a transit improvement falls if the private bus operator works under the man-and-his-bus model. Several factors such as those associated with the economic power can explain these results. Operators working under a man-and-his-bus model own only one unit and typically have lower education levels than those working under the concession lease model. In our sample, the average schooling for man-and-his-bus operators was 10.7 years, approximately two year less of education than those working under the concession lease model. As such, these operators may have less-developed understanding of the benefits associated with transit improvements.

Variables representing the nature of private bus operators' activity and their perceptions about business are also statistically significant. Results show a positive correlation between a private bus operator's willingness to participate and concerns about the storage of the transit units. Moreover, private bus operators with a limited understanding of operating costs – believing that more passengers equal more revenues – do not perceive the need to change operations or management and are less willing to participating in transit improvements.

Other sensitive variables are those associated with the status quo. Private bus operators that have inherited or learned their business from a family member are more willing to participate in transit improvements than those that entered the business in other ways. It is our perception that private bus operators with a sense of tradition in the transit business are more open to consider the evolution to a model that would increase the possibility of keeping the business. Our results highlight the importance of knowing the terms of the negotiation of the proposed improvement. Often, bus operators that have a seat in a bus association are more willing to participate in negotiations for a proposed improvement.

Our results also emphasize the importance of having an additional source of income on private bus operators' willingness to participate in transit improvements. Operators with additional income are less risk averse to transit improvements.

5.6.2 Concession Lease Model

Results for the concession lease-model indicate that concession-lease operators with concern about the safety of their units are considerably more willing to participate in transit improvements that would lead to greater protection of their assets. These operators also experience less emotional attachment to the status quo; they are more concerned about preserving the profitability of the business than preserving the precise form of the business they inherited or learned from family members. These operators often invest heavily in fleet, operation and management. Thus they are very open to participate in improvements that would guarantee the possibility to expand or keep their business in the coming years.

For concession holders, removing drivers from the fare collection process lessens the amount of passenger fares not reported by drivers. Efficiencies in management and operations as a result of transit improvements also eliminate the need to monitor drivers' care of the transit units. Statistical results show a negative correlation between the likelihood that a concessionaire lease operator would participate in a transit improvement and the level of trust that the operator has in his/her driver.

5.6.3 Man-And-His-Bus Model

Results for the man-and-his-bus model show that the likelihood of participating in transit improvement falls if a private bus operator is concerned about the tax implications that result from the "formalization" of the business. This group of operators typically manages all aspects of transit service and usually does not pay taxes; they tend to be very sensitive to taxation that would reduce their expected gains. Other important findings are those associated with having to work less. This group of bus operators experience very long working hours. Results indicate that the willingness to participate in transit improvements increases, on average, if the operator perceives an opportunity to work less, even if profits are lower with the proposed improvement. Also of interest is that the probability of participating in transit improvement falls if the bus operator has the perception that public transportation service can be improved with only increases in fares.

Results also show that man-and-his bus operators may be less interested in participating in transit improvements if the nature of the legal right to operate is modified. It is our perception that these operators have very limited knowledge about the characteristics of their concession; they often assume that their concessions are valid "for life". While statistically it should be considered rejecting the null hypothesis, concerns about preserving legal rights to continue operating were mentioned by several man-and-his-bus operators in interviews.

Another noteworthy finding from the examination of the survey and not included in the model is that man-and-his-bus' operators have specific concerns related to the storage and to the alternative use of their transit units. All private bus operators that expressed a desire to participate in transit improvements indicated having problems with storage of their units. In contrast, all private bus operators with negative desire to participate in transit improvements indicated using their units for activities other than those associated with the transit business. Given the absence of variation in the responses, these variables were not included in the model.

5.7 Analyzing private bus operator's level of trust: Mexico City

In the analysis of the above-presented model, implicit is the assumption that the differential effect of the variable *GovT* is constant for all private bus operators serving in different cities. In many cases, this assumption may not be true. A city with unclear strategies regarding the incorporation of private bus operators in a proposed improvement can reduce the willingness to participate compared with cities where the government seeks a more participative strategy. There may be an interaction effect between the variable *GovT* and a variable that differentiates between cities.

Data exhibit that the private bus operators' levels of trust in the Mexico City and the State of Mexico are the lowest compared with operators serving in other cities. As it is shown in Figure 38 for all cities, the level of trust is 1.9 on a scale of 5. In Mexico City and the State of Mexico, operators' level of trust is 1.5.

5.7.1 Interaction Effect and Transferability Cost

In previous research, Dodero et al. (2011) highlight the importance of consistency in the legal strategy for engaging private bus operators in the planning process. The implementation of one project can influence the willingness of operators in other areas to enter into agreements with governments on similar projects. This influence is defined as a transferability factor – either as a benefit where trust is established or as a cost where trust and willingness to participate is lost. When a government is

inconsistent in its legal strategy, for example, that produces a high transferability cost – unwillingness for groups to participate in the next round of improvements. Thus, a high transferability cost is expected in cities with large variability (or limited consistency) in their legal strategy to engage operators.

Mexico City and the surrounding areas present an opportunity to evaluate the transferability cost by evaluating a differential effect. Recently, the government of Mexico City has introduced operational and managerial improvements in the form of franchising. The political strategy to engage bus operators in a proposed improvement, however, has not been consistent in the four improved corridors. Following Dodero et al. (2011), the classification of the legal strategies used for franchise systems and their expected transferability cost, in Figure 8 the following is presented:

Table 8 - Legal Strategies and Transferability Cost in BRT Improvements in Mexico City

Transit Improvement	Legal Strategy: who was engaged	Transferability Factor (cost)
Metrobus Linea 1	All private pre-existing bus operators	Low
Metrobus Linea 2	Only a subset of pre-existing bus operators	Medium
Metrobus Linea 3	Pre-existing bus operators in association with a private inter-urban transport company	High
Metrobus Linea 4	Granted directly to a group formed by private bus operators that also operates Metrobus Linea 1	Most likely to be high (Operators in other areas might perceive that the government is favoring a specific group of operators)

To differentiate private bus operators working in Mexico City and the State of Mexico from operators working in other areas, I introduce the variable *Mexico City* that equals 1 if the respondent operates in DF or surrounding areas, otherwise 0. I also measure *Mexico City's* interaction with *GovT*. The differential effect of the variable *GovT* may not necessarily be constant amongst private bus operators working in other cities.

5.8 Results

The values in Table 9 indicate that *GovT* is not constant for bus operators serving the Mexico City and the State of Mexico. These results suggest a negative transferability effect that, arguably, results

from the absence of a clear strategy regarding the engagement of private bus operators. Specifically, authorities forced pre-existing bus operators to partner with a private inter-urban transport company for the Third Line of the BRT. This strategy may have contributed to the already deteriorated level of confidence of private bus operators to the government. Several route associations serving in other areas and in other cities supported disruptive actions that took place in Mexico City (Valdez, 2010).

Table 9 - Results of the Interaction Effect

Dependent Variable: WP	General	
Variables	**Coefficient**	**p-value**
Edu	0.0654 (0.0902)	0.4686
FamT	**1.2870** (0.6124)	0.0356
GovT	**1.9280** (0.4628)	0.0000
YOwn	**0.0880** (0.0368)	0.0167
BusAs	**1.5285** (0.6665)	0.0218
AddInc	**1.6312** (0.6648)	0.0141
OwnMod	**-1.2147** (0.6585)	0.0651
Taxes	-1.1095 (0.8353)	0.1841
LegalC	**-2.0639** (0.9345)	0.0272
LessRev_LessWork	**1.7613** (0.5949)	0.0031
MorePass_MoreRev	**-1.7131** (0.7943)	0.0310
Storage_Unit_Concenr	**2.1578** (0.9417)	0.0219
Mexico City*GovT	**-0.7010** (0.3601)	0.0516
C	**-6.2686** (1.9757)	0.0015
R^2	0.5658	
Observations	154	

Allowing private participation other than that coming from existing operators in transit improvements, however, can be also appreciated as a strategy to enforce the negotiations between government and private bus operators. The “formalization” of this private participation becomes a real threat for current bus operators (Onesimo Flores, PhD student Department of Urban Studies and Planning at MIT, personal communication July 2012).

It should be noted, however, that the relationship between private bus operators and the government authorities in Mexico City has been uneven for decades. Decisions on policies governing public transport in the city are merely political. The political bias of these decisions has its basis on the characteristics of the bus concession: 94 percent of the existing concessions for bus service provisions are expired.

Authorities use the lack of certainty about the legal arrangement that allows operators to provide transit service as a coercive instrument during the negotiation process for transit improvements. Likewise, the level of trust in government has been affected by the constant disputes between bus operators and the government to increase the low rates prevailing in the city. Fare increases in Mexico are a political decision and do not result from a technical study. Fares in Mexico City remain the lowest in Mexico (USD $0.25 compared to places such as Veracruz with fares of USD $0.57).

Thus, the differential effect captured in the model may not only be the result of the constant changes in the legal strategy to engage private bus operators in a proposed improvement.

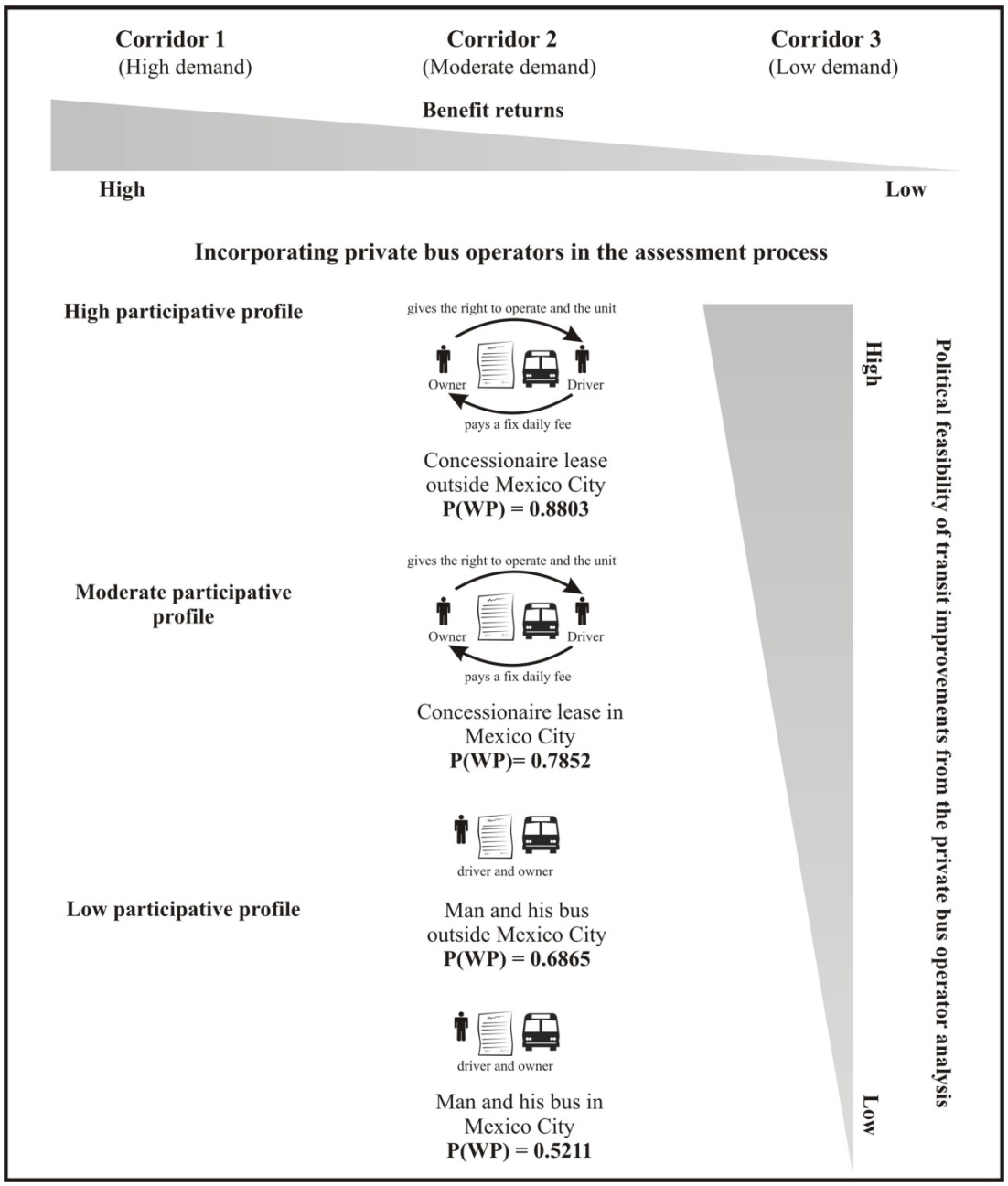
5.9 Private bus operators participative profiles in the assessment of transit improvements

In developing countries, it is argued that although some corridors may exhibit a great number of trips — and thus produce greater benefits if service is improved — these corridors may present a high level of complexity to engage existing bus operators. In Dodero et al. (2011) and Dodero et al. (2012) it is noted that these corridors may exhibit low political feasibility – *ceteris paribus* – to complete the project given the period of time of the political appointments and the availability of resources. For this reason, in countries where transit is dominated by a large number of single concessionaries the decision making process about candidate proposal should also include evaluation of the likelihood to reach consensus amongst private bus operators to participate in the proposed improvement. With this, several actions can be taken to reduce the sensitivity to variables by which the government can exert a direct influence to increase the political feasibility of the project.

Figure 39 shows the likelihood that a private bus operator may be willing to participate in transit improvement as a function of four profiles. Probabilities were estimated from the general model that includes the differential effect for the case of Mexico City. The values of the independent variables are the medians of the survey responses for each variable. The generic profile used for the estimation of the probabilities is:

A private bus operator whose activity was inherited or learned from a close family member, with low level of trust in government, with fifteen years in business as owner, that has a seat in the bus association, that prefers less revenues if he/she dedicates fewer hours to current business and does not assume that more passengers translate into more revenues.

Figure 39 - Defining private bus operators' participative profiles



Results presented in Figure 39 confirm what it was indicated in Chapter 4: *complexity in owner involvement in transit improvements increases as we move from a concession lease model to a man-and-his-bus model*. This complexity is even greater in Mexico City, where the relationship between government (and other authorities) and private bus operators is suspect. Private bus operators serving Mexico City and surrounding areas, working under the man-and-his-bus model are, on average, 31 percent less willing to participate in transport improvements than those working outside Mexico City. Concession-lease operators working outside Mexico City are, on average, 69 percent more willing to participate in improvements than man-and-his-bus operators working in Mexico City.

5.10 Conclusions

This chapter analyzes the information gathered through field work and surveys of private bus operators serving several Mexican cities. The main results suggest that willingness to participate in a transit improvement is considerably lower for a private bus operator working under the man-and-his-bus model compared to concession lease operators.

Moreover, the model presented suggests that improving the level of trust in government – presumably through better communication channels and through a defined legal strategy that engages current private bus operators in the implementation process – can increase the political feasibility of the proposed transit improvement. Introducing mechanisms that enhance certainty about the nature of the new concession – specifications of the service to be provided, responsibilities and duration – and about means to mitigate the potential reductions in gains as a result of taxation can ease the negative reactions of private bus operators to the "formalization" and improvement of the transit service. More information regarding the benefits of migrating to more efficient transit systems in terms of management and operations can also enhance these operators' willingness to participate. The chapter encourages planners to undertake the appropriate level of engagement and dissemination of information before the proposed improvement is "filtered" between private bus operators.

Finally, this research provides insight into the decision-making process for transit improvements in developing countries. By estimating the probability that a private bus operator would participate in transit improvements – given these operator' characteristics and perceptions about business and such improvements – the political feasibility of the project from the operators' perspective can be estimated. I am aware of the limitations of using the estimated values for making decisions about improvements. However, the methodology employed can assist transportation planners in the

identification of critical elements that could influence the political feasibility of the project. With this, the likelihood of making good decisions about where improvements should take place in light of political and social time frames can be enhanced.

Chapter 6
Conclusion remarks, recommendations and suggestions

6.1 Concluding remarks

This thesis presents a well-structured analysis on how transportation planning in developing countries is influenced by contextual elements. In Mexico, as in many developing countries, transportation planning deals with unique social, political, financial and cultural elements that are not found in developed countries, where the conventional planning process for transit improvements was developed. One of these elements has its roots in the privatization process of bus transit service that led to the growth of individual bus concessionaries and these concessionaries' influence on transit decisions. The role of private bus operators is a very important subject, the importance of which has not been completely described or adequately emphasized in the literature of transportation planning. While privatization brought about important benefits, privatization also contributed to the decline of public transport service and government capacity to execute one of its basic functions in society: strengthening enforcement of law.

Research conducted in Mexico contributed to the assessment of problems of privatization and to the recognition that other contextual elements are also exerting an influence on transportation planning. These elements – also referred here as *indirect costs* – are associated with the time of political appointments, the opportunity cost of the use of public resources and financial and human constraints faced by the public transport sector, including private bus operators and institutions.

This thesis demonstrates that these elements create a bias in transportation planning towards the consideration of political rather than technical constraints. The resulting bias raises new challenges and considerations in the evaluation or selection of public transport proposals. Normally, this evaluation is based on these proposals' ability to maximize benefits associated with the transit provision. This thesis shows the consideration should also include these proposals' ability to minimize indirect costs and maximize the political feasibility of completion. The thesis demonstrates these elements' relative importance in transportation planning and develops a framework that rationalizes these problems in the evaluation of transport improvements. The proposed framework incorporates their effect on the overall evaluation criteria.

The thesis also indicates that a critical element to improve the political feasibility of projects is that of private bus operators. Private bus operators can assist in reducing implementation time and in

minimizing the opportunity cost of the use of public funds. Furthermore, legal strategies – franchising systems – to provide private bus operators' legal certainty about their business can be used to mitigate the problem of the limited capitalization of the sector. Franchising makes private bus operators eligible for financial loans which reduce public sector financial participation in proposed improvements. Recognizing private bus operators' legal rights to continue operating also helps to reduce political conflict that may arise as a result of potential welfare loss of this sector and negotiation time.

The thesis goes beyond mere description and formalization of the contextual problem in Mexico. The main contribution of this thesis is the formulation of conceptual elements that *advance* transportation planning theory regarding the strategies and factors to incorporate private bus operators in a proposed transit improvement. The thesis examines and demonstrates under what circumstances is possible to engage private bus operators in public transport improvements, minimizing their influence on the planning process. The lack of understanding of these strategies and factors contributes to the already limited capacity of policymakers, who are still promoting transit solutions based on conventional transport approaches.

To fill this gap in the literature of transportation planning, the thesis – based on extensive fieldwork in several cities in Mexico – presents an in-depth examination of individual and group characteristics associated with bus concessionaries and of the operational characteristics of areas in which improvements have taken place. Semi-structured interviews assisted this research to identify and categorize private bus operators according to their operational and individual characteristics. The analysis of these factors provided with a heightened sense of the conditions prevailing in the analyzed areas and of the policy elements needed to succeed in the completion of proposed improvement. Fieldwork in cities facing obstacles in introducing transit improvements allowed this research to compare these cities strategies' with those followed in successful implementation. By examining these factors the thesis demonstrates that transportation planners can enhance provision of transit improvements in a more effective way.

The thesis also examined a set of legal strategies that have been applied worldwide to improve public transport and that have been used to engage private bus operators in a proposed transit improvement. Strategies were categorized according to their impacts on private bus operators' negative reactions to participate in such improvement. Strategies were also categorized according to

their potential impacts on factors associated with the replication of the planning process to improve other areas in the city. The thesis refers to this factor to as *transferability factor*.

The rationale of the *transferability factor* is fundamental for transportation planning theory because this factor refers to the long-term ability authorities may have to improve public transport in their jurisdiction. The conditions prevailing in Mexico, and in other developing countries, impede policy makers to implement projects of great magnitude – in terms of investments and extension. The *transferability factor* for developing countries is critical as these countries follow a sort of incremental approach in which major changes can occur by the accumulation of "small" changes that take place over time. The thesis demonstrates that a strategy that aims at incorporating existing bus operators in a proposed project is politically more feasible than a strategy without certainty about operators' engagement. Incorporating existing bus operators in a proposed improvement also presents a *transferability factor* that may guarantee the implementation of future projects.

Another important contribution of this thesis is the development of mechanisms that provide insight into the political feasibility of projects. Based on a well-structured framework, the thesis evaluates the influence of private bus operators in a proposed project from the estimation of their willingness to participate using a Logit model. This formulation evaluates the statistical significance of factors associated with the characteristics of private bus operators – personal and operational – and with their reactions – negative or positive – to proposed improvements. The methodology employed contributes to the transportation planning literature regarding the identification of critical elements that can influence the political feasibility of the project considering the qualitative, contextual elements presented above. The analysis presented in this thesis is also innovative as it formalizes a methodology to quantify qualitative elements in the planning processes of transport improvements.

6.2 Broader contribution

It should be highlighted that, in a broader perspective, the thesis not only contributes to the theory of transportation planning but also to different disciplines in social and political science. Firstly, the thesis provides evidence of a poorly studied area: the role, characteristics and organization of private bus operators. This sector poses unique cultural and anthropological characteristics that have been established over a long period of time; how private bus operators maximize their welfare certainly differs from traditional economically rational thinking. These characteristics make it difficult for policy makers to understand how system failures have prevailed over time; *improvements should not*

be based on a blanket treatment with conventional or textbook solutions. The thesis was thus a useful vehicle to compile the voices and experiences of the private bus operators' sector to highlight the relevance of this sector in the planning literature for developing countries.

Secondly, the thesis contributes to disciplines in political science with regard to recommendations to reduce social unrest and political conflicts that arises with governmental plans to improve the functioning of cities. The thesis demonstrates that several strategies can be designed and implemented – in advance – when planning and executing government actions. By socializing a proposed improvement with potentially affected actors, the political feasibility of the implementation increases. Results presented in this thesis demonstrate that the feasibility of projects improves as the level of trust in and communication with government authorities increases. For the specific case presented in this thesis, it can be concluded that ensuring the inclusion of operators' voices in the project and improving the understanding of these operators over the proposed project increase the likelihood to complete a proposed project successfully.

The understanding of cultural and anthropological elements and by socializing a proposed project can assist decision makers to shape discourses and strategies according to the characteristics of the actors or areas for improvement. The analysis presented in this thesis makes a small contribution to the well-developed arguments for a consultative approach that includes a key group of stakeholders in transportation in developing countries: private bus operators.

6.3 Research limitations and considerations

Several research limitations arise from this thesis, especially for the evaluation analysis presented in Chapter 5. Firstly, attempts to quantify qualitative elements are always controversial and give raise to technical debates. Secondly, the conclusions reached from the qualitative analysis can give rise to some sort of conflicts between "purist" and "modern" transportation planners.

On the technical side, the estimated values for the variables included in the Logit model should be taken as indicative rather than definitive. The problem of using the estimated values as definitive is the limited representativeness of these values on the private bus operators sector. It should be noted that representative values most be obtained from the use of adequate and proper sampling techniques to select participants and carry out the collection technique.

However, the use of adequate techniques would have made it impossible to carry out this research in a period of four years given financial limitations. Moreover, having to dedicate time to improve the

collection technique, it would have led this research away from its main purpose. Thus, the discussion should not focus on whether the values are representative or not; these sorts of debates, particularly in social sciences, are very common. Strictly speaking, questions can arise regarding the role of the interviewer – who could bias the collection technique – or the role of the respondent who could be influenced by any event – whatever this event might be.

On the qualitative side – and on the conclusions reached from this qualitative analysis – limitations arise from the limited – or absence – of analysis dedicated to understand how the inclusion of private bus operators in a proposed project affects areas associated with system performance. Improving or maximizing system performance is a critical element in transportation planning theory. As such, decisions about improvements are based on the expected benefits returns from the resources – human and financial – earmarked to such improvements. Given that a strategy merely based on negotiations may not necessarily result in best returns, to include social and political elements on technical approaches contradicts – or creates conflicts – on the foundations that govern the discipline of transportation planning.

However, this argument should not be taken as weakening the discussion presented in this thesis. Arguments for the consideration of contextual elements in the evaluation process are more than sufficient to validate the conclusions reached from this thesis. In countries such as Mexico, where almost the entire transport system is weak, transportation planners must find a balance between social, technical and economic returns. It is in the quest of this balance where the analyses – and emphasis – presented in this thesis becomes relevant and contributes to the theory of transportation planning.

6.4 Suggestions for future research

With regard to the arguments about systems performance and the sustainability of projects being managed by private bus operators, recent evidence reveals that the effectiveness of franchising in Mexico is at risk. Several reports show issues in the management of these franchise systems at the private level, such as limited accountability and corruption, raising issues regarding the financial sustainability of projects. As it is presented in this thesis, franchising in Mexico has involved including traditional bus operators as shareholders in the new system, which buffers their resistance to franchising; this thesis has shown the importance of engaging private bus operators in the proposed improvement.

However, negotiations with traditional bus operators have resulted in soft contractual conditions that allow them to manage their franchises with limited accountability. Recent reports suggests that franchise managers have been accused of taking advantage of the limited understanding shareholders have of their rights. As it is documented in this thesis, one of the problems facing the public transport sector is the low level of education of private bus operators. Accountability issues and corruption raise new challenges for authorities to improve public transport in other corridors as these weaken the credibility of franchising; traditional bus operators fear losing their livelihood because of corrupt franchising managers. The *transferability factor* developed and introduced in this thesis may be influenced by these corrupt practices. Limited accountability and corruption also increase the potential for bankruptcy of these companies which impacts city finances.

Future research should looks at analyzing the benefits of introducing competitive tenders, prioritizing traditional bus operators and having more rigorous components in management practices as strategies to avoid corruption and accountability issues. I recommend complementing the analysis of introducing a competitive tender strategy with examining the benefits that training programs – to strengthen the understanding of traditional bus operators' legal rights and responsibilities as shareholders – can create. Future research should be conducted on analyzing the role of the management bodies – created by the authorities as a result of franchising to plan and regulate operation – in supervising these problems.

Finally, I would say that I am aware of these problems and of the consequences these problems' can have on the national policies promoted by Mexican authorities to improve transport systems throughout Mexico. I am currently leading this project and the results and recommendations that will arise from this project will be presented in forums dedicated to transportation planning for developing countries.

Appendix A

Private bus operators

Interview subject and questions: Private operators. The topics that will be covered with these interviews are:

General Information:

Age:	Education level:
Family members:	Other Business:
Number of units:	Number of years in the business:

a) History and Nature of Public Transport

a. How did transit begin in the city?
b. Was it publicly-or privately-provided?
c. What sort of transition in terms of transit units have the city experienced? E.g. from small capacity vehicles to high capacity to small capacity units.
d. When did the city experience a significant increase in the number of buses?
e. What was the motivation to allow small capacity vehicles for transit?

b) Concessions

a. What is the process to get a concession? Can you explain both the bureaucratic and informal process? Who helped you to obtain your concession?
b. How difficult was it for you to get your concession? Economically and bureaucratically speaking?
c. How many hours did you work to pay for the concession?
d. If you were to buy a new concession, how many hours would you have to work to pay for the concession?
e. How did you get you unit? How did you pay for it?
f. Has the process changed over the last years particularly during the 1980s?
g. Is it more difficult to get a concession? Legally or informally?
h. What are the characteristics of the concessions? Have the characteristics of the concessions changed over the last years?
i. How many concessions do you have? How many in your family have a concession?
j. Did you help them to get a concession or vice versa?

c) Valuation of business and operation

a. Can you explain to me the feelings associated with having a bus concession? Is it the most important asset you have?
b. Would you experience a type of fear if you were to lose the right to operate your bus?

c. Can you describe what it means to be a private bus operator?
d. For how long have you been in the bus business?
e. How did your life change when you obtained the concession and the unit?
f. Did your life and the life in your family improve after acquiring the unit and the concession? Can you describe that in detail?
g. Do your children, neighbours or relatives have routines associated with the operation and management of the business?
h. How many hours a day do you spend on activities associated with your bus?
i. Can you describe your routines on weekdays?
j. Can you describe the routine on weekends?
k. How often do you clean and repair the bus? Do you do that?
l. How old is your bus?
m. Do you name your bus?
n. Do you have pictures of your family in your bus? Other things?
o. Are you considering buying a new bus or concession? Why?
p. Have you ever replaced your unit? How often do you change your unit?
q. What do you do with your old unit?
r. Were you a driver before being a bus owner? If so, can you explain the differences between a driver who works for someone else and a driver who owns the bus and the concession? E.g. working hours; reckless driving; management.
s. Do you drive your bus? If not, do you miss driving your bus? why did you decided to give up driving?
t. If you were to decide to give up the bus business, what would you expect to do with your unit and concession?

d) Working environment and health

a. How many hours a day do you spend in operation?
b. Have you increased the time you spend in operation over the last years? Can you explain the reason? Analyze 1) whether the increase in the time spent in operation is the result of more competition or the result of having to spend more in bus maintenance, thereby requiring collecting more passenger to increase revenues; 2) more competition; 3) ridership decrease; 3) traffic; 4) other reasons.
c. How do you manage the time that you need for having your meals?
d. What do you do if you need to go to the washroom? Are there washroom facilities that you can use?
e. What is the loss of income associated with breaks?
f. Do you live close to the area where you operate?
g. Has your route location influenced your decision of where to live?
h. How do you deal with your holidays? Who takes care of the business during your away? Have you ever stopped your vacations because something unexpected happened with your unit or with authorities?
i. Do you have health issues related to the operation of your unit? What kind?
j. Do you have insurances? For your unit? Health? Pension plan?

k. What do you do in case of an accident?

e) Relation with government and consultants

a. How is your relation with the government?
b. How often do you discuss with the government issues associated with public transportation? Explain in detail.
c. Consider that you complain about something or disagree with a government decision, have you ever had a type of repercussions for not supporting that decision?
d. Have you ever been sanctioned for not meeting government requirements for bus transportation? Describe.
e. Given natural political cycles in Mexico, how does that influence the relationship between government and private operators?
f. If you were aware that administration is about to change, would you be interested in supporting a major transportation policy reform or project? Why?
g. In terms of major policy reforms and projects, how important is to have certainty about political cycles? E.g. you know that despite a natural political cycle, you will deal the proposed project with the same people.
h. When deciding about public transportation, the government is not really concern about private operators. What do you think about this statement? Agree? Disagree? Why?
i. What do you think about consultants?
j. Have you ever had the opportunity to discuss with consultants about how to improve your business? Why?
k. When deciding about public transportation improvements, the consultant will protect the interest of the government more than the interest of the private operators. What do you think about this statement? Agree? Disagree? Why?

f) System operations

a. How does the government control the operation of public transport?
b. As an operator, do you follow the rules and official recommendations for the operation?
c. What kinds of factors influence effective operation?
d. Do current rules and recommendations match the type of transit system? Were these rules and recommendations established with operators' consent?
e. Have rules and recommendations been modified over the last years?
f. How does the government plan routes, stops or terminals? What kind of influence do you have on these decisions?
g. Are there routes with fewer operational problems than others?
h. What are the reasons of such differences?

g) System information, transfers and quality

a. How does the government deal with issues associated with system information and quality of service? How does the operator deal with these issues? Do operators discuss their concern directly to the government? or, internally in their associations?
b. How is the coordination with other bus operators when a journey requires transfer?

h) Improvements in the Past

a. Can you tell me about previous public transportation improvements?
b. Did these improvements improve the operation, quality of service and system information?
c. What kind of aspects impeded or facilitated the introduction of such improvements?
d. What would you have proposed instead?

i) Improvements – Today

a. What drives you into participating in the new improvements?
b. What is the most important feature of this implementation? What kind of problems does the improvement address?
c. What kind of issues hindered or facilitated the implementation of such improvements?
d. How did the government help to address the obstacles associated with such improvements?
e. How was the area of improvement selected? Any considerations?
f. In which period of the administration did the planning of this improvement begin?
g. When you first heard about the proposal for the new improvement, what was your reaction to it? Any critical issue? Explain in detail.
h. What was the legal strategy used for this implementations? Was there any other strategy?
i. How have the political and legal strategy influenced the relationship with other private operators in other areas? Have you ever told private operators in other areas that the new project is improving your quality of life and that this is or is not the correct approach to improve service?
j. Can you describe the differences between the past and today in terms of operations and your quality of life?
k. Do you feel proud about being part of the improved system? Describe? Do you miss something about traditional operations?
l. What would you have done to have a better project?
m. Have you even been influenced by improvements in other cities in Mexico, e.g. Metrobus in Mexico City?
n. How long did the negotiations last?
o. What were the most important concerns associated with the improvements?
p. Did private operator's opposition change the original course of action?
q. Given the original course of action, were private operators considered for the improvement?
r. Were the reactions about the improvement varied amongst private operators?
s. Do you think that there were operators that were more willing to participate than others? Why?
t. What were the characteristics of the operators that were more willing to participate?

j) Bus Associations

a. Can you explain the work in your association?

b. How does the association protect the interest of their members?
c. How does the association deal with issues associated with the operation of the route? Can you explain something about operation controls?
d. Do you have to pay a “membership fee”?
e. What kind of benefits do you get from that fee?
f. Over the last years, what does your association has done to improve the operation and image of the route? Analyze other aspects such as driving courses, uniforms, etc.
g. What has been the reaction of the passengers to those improvements?
h. Was your association willing to participate in the new improvement?
i. Were some associations more willing to participate than others in the propose transit improvements? Why?
j. Can you describe a correlation between the organisation of the association and the characteristics of the leaders?

k) Employment opportunities

a. Traditional bus operation creates employment opportunities for several people. How many persons were working for you before the implementation? What was the reaction of them about the new improvement? Any concerns about their source of income?
b. How does the proposed transit project improve the quality of life of all people that make a livelihood through traditional bus operation?
c. Private operators develop an attachment to current business practices and routines, can you describe how do this attachment influence the implementation process of transit improvements?
d. Have you notice differences amongst private operators about this attachment?

l) Other considerations

a. Who is your competitor? The operator who is behind you? Private Automobile? Explain.
b. What sort of government structure has been created to supervise the effective operation and management of the new system?
c. In the coming years, buses will gradually deteriorate and the system may become obsolete, have you or the government thought about this potential problem? What kind of measures or strategies does the government or the operator consider to mitigate the coming problems?
d. Has ridership been improved since the implementation of the project?
e. Do you know about other measures that may help to improve ridership?
f. Would you suggest other private operators in other areas to participate in systems such as the one you are part of?
g. Today, how do you see yourself: are you a private operator or a business man?

Government Officials, Transport Experts and Consultants Interview

a) History and Nature of Public Transport

a. How did transit begin in the city?
b. Was it publicly-or privately-provided?
c. In terms of transit units, what sort of transition has the city experienced? E.g. from small capacity vehicles to high capacity to small capacity.
d. When did the city experience a significant increase in the number of buses?
e. What was the motivation to allow small capacity vehicles for transit?

b) Concessions

a. What is the process to get a concession? Can you indicate laws and regulations?
b. Has the process changed over the last years particularly during the 1980's?
c. What are the characteristics of the concessions?
d. How many concessions can person legally have?
e. Did the government promote single concessionaires?

c) Operations

a. How does the government control the operation of public transport?
b. Has these controls changed over the past years?
c. How does the government plan routes, stops or terminals?
d. Are there routes with fewer operational conflicts than others?
e. What are the reasons of such differences?

d) System information, transfers and quality?

a. How does the government deal with issues associated with system information and quality of service?
b. How does the government asses these issues?

e) Improvements in the Past

a. Can you tell me about previous public transportation improvements?
b. Did these improvements improve the operation, quality of service and system information?
c. What kind of aspects impeded or facilitated the introduction of such improvements?
d. How did improvements changed the issues associated with a "man and his bus" model?

f) Improvements – Today

a. What was the driving force for the new improvements?
b. What is the most important feature of this implementation? What kind of problems does the improvement address?
c. What kind of issues hindered or facilitated the implementation of such improvements?
d. How did the government address the obstacles associated with such improvements?
e. How did the government use the factors that facilitate the implementation?
f. How was the area of improvement selected? Any considerations?

g. In which period of the administration did the planning of this improvement begin?
h. What was the legal strategy used for these implementations? Was there any other strategy? Why did the government select the strategy?
i. How has the political and legal strategy influenced the relationship with other private operators in other areas? Are private operators in other areas more willing or less willing to participate in transit improvements?
j. Will the legal strategy be different than the one implemented in the first improvement? What is the motivation of this change?
k. Did private operators refer to improvements in other cities in Mexico, e.g. Metrobus?

g) Private Operators

a. How do private operators influence the planning of the project?
b. What kind of opposition was experienced?
c. How did the government address issues associated with such opposition?
d. How long did the negotiations last?
e. For private operators, what was the most important concerns associated with the improvements?
f. Did private operator's opposition change the original course of action?
g. Are the negotiations with private operators in future areas for improvements different from previous negotiations? More difficult?
h. Given the original course of action, were private operators considered for the improvement?
i. Were the reactions about the improvement varied amongst private operators?
j. Were there private operators that were more willing to participate than others?
k. What were the characteristics of the operators that were more willing to participate?
l. Did operators that were more willing to participate facilitate the process of implementations? How?
m. Are private operators in other areas willing to participate in transit improvements after the implementation? Why?
n. What were the major operators' reasons for opposing to the proposed improvements?
o. How did the government address such reasons?

h) Bus Associations

a. Considering that private operators are normally grouped in associations, did negotiations vary amongst associations?
b. In terms of operations, organization, and business practices, are there differences amongst associations?
c. How do these differences influence in the planning process for transit improvements?
d. Can you describe differences amongst leaders of those associations?
e. Were some leaders more willing to participate than others in the proposed improvements?
f. Can you describe a correlation between the organisation of the association and the characteristics of the leaders? E.g. more educated leaders, with respect to transportation and business knowledge, have more effective bus associations.

i) Employment opportunities

a. Traditional bus operation creates employment opportunities for several people. How does the government address the employment factor?
b. How does the transit proposal improve the quality of life of private operators and to all others that make a livelihood through traditional bus operation?
c. Private operators develop an attachment to current business practices and routines, can you describe how does this attachment influence the implementation process of transit improvements?
d. Have you noticed differences amongst private operators about this attachment? E.g. Younger generations are more willing to participate than older generations

j) Funding, opportunity cost and future improvements

a. Considering all public services and responsibilities, is public transportation a top priority for the city?
b. Public transportation is capital intensive and for this reason there is an opportunity cost associated with public involvement in transit. How did or does the government address the funding constraint?
c. Is there any transportation master plan?
d. Does the government rely in any kind of consultancy that would help the implementation of the project?
e. What is the reaction of private operators to having to work with consultants?
f. Do private operators perceive that consultants protect more the government interests than their interests?
g. Has the government ever considered working in a more bottom-up approach in which private operators select the consultant that they want to build up the strategic master plan, thereby reducing the negotiation process?

k) Political appointments

a. Bus improvements also require a significant amount of time devoted to negotiations. Big plans are not politically feasible due to natural political cycles. How does the government deal with the political problem?
b. In you view, how important is the time of political appointments? Is the time of political appointment more relevant than the financial problem in any attempt to improve public transportation?
c. Has the government ever thought of having an independent entity as a mean to isolate transit decisions to political cycles?

l) Other considerations

a. What sort of government structure has been created to supervise the effective operation and management of the new system?
b. In the coming years, buses will gradually deteriorate and the system may become obsolete, has the government thought about this potential problem? What kind of measures or strategies does the government consider to mitigate the coming problems?
c. Has ridership been improved?

d. What other measures is the government implementing or is planning to implement to improve ridership? Push or pull strategies?
e. Is there any document which informs whether riders' experience has improved?
f. Has the government considered changes in the current bus network to adapt it to current travel observations?

Appendix B

Por favor conteste en los espacios en blanco y marque con una **X** la respuesta que corresponda.

Ciudad: _____ Ruta: _____ Ramal: _____ ☐ Urbano ☐ Foráneo

Datos generales del transportista

1. Edad: _____ años

2. Indique el número de integrantes de su familia, además de usted: _____ personas

3. Nivel máximo de estudios:

( ) Sin estudios ( ) Secundaria ( ) Escuela técnica
( ) Primaria ( ) Preparatoria ( ) Universidad o superior Carrera: _____

Información sobre su actividad como transportista y como miembro de una asociación

4. Indique el número total de años que lleva usted en el negocio del transporte público: _____ años

¿Cómo dueño?: _____años ¿Cómo chofer o realizando alguna actividad relacionada al transporte?_____ años

5. Indique la edad a la comenzó usted a trabajar en el negocio del transporte público: _____ años

6. Indique si su padre o algún otro miembro de la familia fue transportista: ( ) Si ( ) No

7. ¿Aprendió o heredó la actividad de transportista por algún familiar? ( ) Si ( ) No ¿De quién? _____

8. En su negocio, ¿trabaja con usted alguno de sus hijos o miembro de la familia cercano?

( ) Si ( ) No ¿Cuántos? _____ ¿Qué función realizan? _____

9. Indique el número de unidades (microbuses, minivans y camiones) con los que cuenta usted

Camiones: _____ Microbuses y minivans _____ ( ) No tengo unidades. Rento las placas, un tercero da el servicio

10. Es usted chofer de su unidad? ( ) Si ( ) No ( ) Manejo en ocasiones mi camión

11. Indique si en algún tiempo fue usted chofer de su unidad

( ) Si, ¿Por cuántos años? _____ años ( ) No, nunca he sido chofer de unidad

12. ¿Utiliza usted alguna de sus unidades para realizar actividades diferentes a la de prestar el servicio, por ejemplo ir de compras o ir de paseo con la familia? ( ) Si No ( )

13. Indique cómo obtuvo la mayoría de las concesiones con las que usted cuenta. Las concesiones las obtuve a través de:

( ) Un amigo ( ) Un familiar / heredado ( ) Conocidos políticos ( ) Directamente en gobierno

14. En promedio, ¿cuántas horas al día le dedica al negocio? _____ horas

15. ¿Forma o ha formado usted parte de alguna asociación de transportistas? ( ) Si ( ) No ¿Por cuántos años? ____

16. ¿Ha usted ocupado algún cargo dentro de la asociación (Presidente, Tesorero, Vocal, otro)?

( ) Si, ( ) No ¿Por cuántos años? _____ años

Información sobre mantenimiento y cuidado de unidades

17. Indique el número de personas o empleos que dependen directamente o indirectamente de su negocio (incluye choferes, mecánicos, talacheros, contadores, electricistas, lavadores, pintores etc.)

( ) yo realizo todas las actividades ( ) 1-4 personas ( ) 5-8 personas ( ) más de 8 personas

18. ¿Dónde guarda o duerme su(s) unidad(es)?

( ) En la calle ( ) Estacionamiento privado ( ) En las instalaciones de la asociación Otro: _____

19. Es para usted un problema el no tener un garaje o instalaciones seguras para guardar la(s) unidad(es)? ( ) Si ( )No

20. Tiene usted programados los mantenimientos de la(s) unidad(es)?

( ) No, el mantenimiento se da cuando se requiere ( ) Si ¿Cada cuánto les da mantenimiento? _____

21. ¿Cuenta con instalaciones para darle mantenimiento a la(s) unidad(es)?

( ) No, el mantenimiento se lo doy afuera de mi casa ( ) No, el mantenimiento se le da en un taller mecánico
( ) Si, cuento con un patio o garaje para dar mantenimiento

22. Tiene usted un control sobre el manejo de refacciones?

( ) No, las refacciones las compro cuando se requiere ( ) Si, manejo un inventario de refacciones

Datos relacionados a la relación laboral con los choferes

23. ¿Cuántos choferes trabajan en su negocio? _____choferes

( ) No tengo choferes. Yo manejo mi unidad ( ) No tengo choferes Yo solo rento el derecho de concesión a un tercero

SI USTED NO CUENTA CON CHOFERES PASE A LA PREGUNTA 30.

24. Si usted cuenta con choferes, indique la forma en que estos obtienen sus ingresos

( ) Les pago una cuota fija mensual/quincenal/semanal (no importa el número de pasajeros transportados)
( ) Les pago una cuota fija + un porcentaje por el número de pasajeros transportados
( ) Los choferes cubren una cuenta diaria fija y los gastos de operación. Ellos se quedan con el dinero restante.

Otra: _____

25. ¿Quién paga por el mantenimiento de las unidades o reparación en caso de accidente o problema mecánico?

( ) Yo, como dueño. Es responsabilidad del dueño
( ) Depende del tipo de daño, pero usualmente el chofer cubre unos costos y el dueño otra parte
( ) El chofer cubre todos los gastos por reparación y mantenimiento

Otro: _____

26. ¿Utilizan los choferes las unidades para realizar actividades diferentes a la de prestar el servicio, como por ejemplo, ir de compras o salir de paseo con la familia? ( ) Si ( ) No

27. Indique el nivel de confianza sobre sus choferes. Dónde 1 = NO confío, 3 = confío ALGO y 5 = confío TOTALMENTE

( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5

28. Indique el número aproximado de accidentes viales que sus choferes han tenido en el último año: _____

29. ¿Forman sus choferes de su negocio parte de un sindicato o gremio? ( ) Si ( ) No

Información sobre renovación de parque vehicular

30. En promedio, ¿cada cuánto renueva su vehículo o parque vehicular?

( ) Nunca lo he renovado ( ) Cada 5 años ( ) Cada 10 años ( ) Cada 15 años o más

31. Edad promedio de su parque vehicular _____ Si tiene una unidad ¿cuál es la edad de su unidad? _____

32. ¿En qué año renovó su(s) unidad(es) o la mayor parte de su parque vehicular? _____ ( ) Nunca la he renovado

33. En caso de haber renovado su parque vehicular ¿cómo pagó por sus unidades?

( ) A través de un crédito bancario ( ) Pagué la mayor parte con crédito bancario y el resto con efectivo
( ) Pago en efectivo ( ) Pagué gran parte de la unidad en efectivo y una pequeña parte con crédito bancario

34. ¿Cuál de los siguientes dos escenarios representa mejor su forma de actuar respecto de la renovación de unidades?

( ) Renuevo una unidad hasta que tengo la totalidad del recurso para adquirirla. Nunca recurro a créditos bancarios
( ) A veces recurro a créditos bancarios para renovar alguna unidad que está causando problemas u observo que hay una oportunidad de mejorar mi empresa

35. Indique el nivel de aceptación que tiene usted respecto de los créditos bancarios para la compra de unidades. Dónde 1 = NO aceptación, 3 = ALGO de aceptación y 5 = TOTAL aceptación

( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5

Información sobre las características de la concesión

36. ¿Cuál es la vigencia de su(s) concesión(es)?

( ) 0 – 5 años ( ) 6 – 10 años ( ) 11 – 15 años ( ) de 16 a 20 años ( ) más de 20 años

37. La(s) concesión(es) que usted tiene, ¿es o son prorrogable(s) o pueden extenderse en su vigencia(s)? ( ) Si ( ) No

38. ¿Ha prorrogado o extendido la vigencia de su concesión? ( ) Si ( ) No ¿Cuántas veces? _____ veces

39. La(s) concesión(es) que usted tiene ¿puede o pueden ser transmisible(s) a un tercero beneficiario? ( ) Si ( ) No

40. La concesión(es) que usted tiene es individual o fue emitida por el gobierno para avalar:

( ) una empresa ( ) una ruta ( ) Es individual, fue emitida para avalar una unidad o unidades

41. ¿Forma usted o su empresa parte de un sindicato o gremio? ( ) Si ( ) No

Información sobre conocimientos de otros sistemas y deseo de participar en mejoras de transporte

42. ¿Conoce usted los planes de gobierno para mejorar el transporte público en la ciudad? ( ) Si ( ) No

43. ¿Considera usted importante realizar cambios a la forma actual de operación del transporte público? ( ) Si ( ) No

44. Indique si usted está de acuerdo o en desacuerdo respecto de las siguientes frases:

Opinión sobre las unidades	**Totalmente en desacuerdo**	**En desacuerdo**	**A veces**	**De acuerdo**	**Totalmente de acuerdo**
El estado actual de mi(s) unidades es una preocupación. Mi(s) unidades se están volviendo viejas y cada vez dedico más tiempo y dinero en darles mantenimiento.	( )	( )	( )	( )	( )
El servicio de transporte público se mejora solo con introducir nuevas unidades.	( )	( )	( )	( )	( )
Los transportistas necesitamos adquirir unidades nuevas con mejor tecnología que permita bajar los costos de operación.	( )	( )	( )	( )	( )
Opinión sobre organización y operación	**Totalmente en desacuerdo**	**En desacuerdo**	**A veces**	**De acuerdo**	**Totalmente de acuerdo**
Actualmente le dedico mucho tiempo a mi negocio. Es necesaria una nueva forma de administración y organización.	( )	( )	( )	( )	( )
En los últimos años, el número de horas en operación de mi(s) unidad(es) o camión(es) ha incrementado pero mis ingresos no han incrementado.	( )	( )	( )	( )	( )
Actualmente existen muchas unidades en circulación.	( )	( )	( )	( )	( )
Competir por pasajeros es un problema para mí negocio. La competencia hace que mis unidades se desgasten más.	( )	( )	( )	( )	( )
Competir por pasajeros es un problema para la sociedad. La competencia por pasajeros genera accidentes viales.	( )	( )	( )	( )	( )
Entre más pasajeros transporte en mi unidad o camión mayores son mis utilidades.	( )	( )	( )	( )	( )
Los ingresos del transportista deben de obtenerse con base en el número de kilómetros operados y no con base en el número de pasajeros transportados.	( )	( )	( )	( )	( )
El no tener un lugar seguro donde guardar y dar mantenimiento a mi(s) unidad(es) es un verdadero problema.	( )	( )	( )	( )	( )

Intervención de gobierno	**Totalmente en desacuerdo**	**En desacuerdo**	**A veces**	**De acuerdo**	**Totalmente de acuerdo**
Para mejorar la calidad de servicio del transporte se necesita más intervención y regulación por parte del gobierno.	( )	( )	( )	( )	( )
El transporte público funciona de manera eficiente, no necesitamos cambios ni intervención por parte de gobierno.	( )	( )	( )	( )	( )
El servicio del transporte público se mejora si el gobierno autoriza un incremento en la tarifa.	( )	( )	( )	( )	( )

Opinión sobre una nueva forma de administración	**Totalmente en desacuerdo**	**En desacuerdo**	**A veces**	**De acuerdo**	**Totalmente de acuerdo**
Debemos crear nuevas forma de administración para bajar los costos de operación. Debemos agruparnos para conseguir refacciones y mantenimiento a mejor precio.	( )	( )	( )	( )	( )
No me importaría que disminuyan un poco mis ganancias actuales **siempre y cuando** disminuya la cantidad de trabajo que actualmente le dedico al negocio.	( )	( )	( )	( )	( )
Es importante para mí el poder contar con beneficios sociales como ISSSTE, IMSS o INFONAVIT.	( )	( )	( )	( )	( )
Es importante para mí que las personas que trabajan para mi cuenten con beneficios sociales como ISSSTE, IMSS o INFONAVIT.	( )	( )	( )	( )	( )
Con una nueva organización podríamos crear más y mejores trabajos y nuevas oportunidades de negocio.	( )	( )	( )	( )	( )
El problema de crear una forma de administración es el decidir **quién** va controlar y administrar los ingresos.	( )	( )	( )	( )	( )
El problema conformar una nueva forma de administración y operación es el decidir **cómo y cuánto** voy a obtener de ingreso.	( )	( )	( )	( )	( )
El problema de crear una nueva forma de administración es que podría cambiar la naturaleza jurídica de mi(s) concesión(es).	( )	( )	( )	( )	( )
La imagen del transportista en la sociedad está muy deteriorada.	( )	( )	( )	( )	( )
El problema de contar con una nueva forma de administración es que surgen nuevos costos cómo impuestos, cuotas de IMSS o ISSSSTE y de administración.	( )	( )	( )	( )	( )

45. Si usted tiene choferes, indique si usted está de acuerdo o en desacuerdo respecto de las siguientes frases.

SI USTED NO TIENE CHOFERES PASE A LA PREGUNTA 46.

	Totalmente en desacuerdo	**En desacuerdo**	**A veces**	**De acuerdo**	**Totalmente de acuerdo**
Es difícil encontrar choferes de confianza que entreguen cuentas claras y cuiden las unidades.	( )	( )	( )	( )	( )
Anteriormente, el chofer se preocupaba por: (1) cubrir la cuenta diaria, (2) obtener ingresos para cubrir los gastos de operación y (3) obtener su ingreso. **Actualmente**, el chofer se preocupa por: (1) obtener sus ingresos, (2) decidir cuánto destinar a gastos de operación y (3) decidir cuánto darle al dueño de cuenta.	( )	( )	( )	( )	( )

	Totalmente en desacuerdo	En desacuerdo	A veces	De acuerdo	Totalmente de acuerdo
Me preocupa que mi chofer utilice la unidad para otras actividades que no sean las de brindar el servicio. Mi unidad se desgasta más.	( )	( )	( )	( )	( )
Lo que me interesa es que mi chofer sea capaz de poder competir con otras unidades para poder llevar más pasajeros.	( )	( )	( )	( )	( )
Lo que me interesa es que mi chofer maneje con precaución y traten bien al pasajero.	( )	( )	( )	( )	( )

46. ¿Conoce o ha escuchado de sistemas de transporte como METROBUS (Ciudad de México), MACROBUS (Guadalajara), OPTIBUS (León), CONEJOBUS (Tuxtla Gutiérrez), TRANSBUS (Villahermosa)? ( ) Si ( ) No

47. ¿Está usted de acuerdo en que la ruta o ramal para la cual trabaja se transforme en una EMPRESA cómo METROBUS, MACROBUS, MEXIBUS, OPTIBUS, CONEJOBUS, TRANSBUS?

( ) Si ( ) No ¿Por qué?_____

48. Piensa usted que su negocio podría mejorar si su ruta o ramal se transforma en una organización como METROBUS, MACROBUS, OPTIBUS, CONEJOBUS O TRANSBUS?

( ) Si ( ) No ¿Por qué?_____

49. Indique el NIVEL DE DESEO o INTERÉS para que su ruta o empresa se transforme en una empresa de transporte como METROBUS, MACROBUS, OPTIBUS, CONEJOBUS, TRANSBUS. Marque la respuesta que mejor refleje su sentir:

( ) No me interesa NADA ( ) Me interesa un POCO ( ) Me interesa ( ) Me interesa MUCHO

Información sobre relación con gobierno

50. Respecto de los planes de gobierno para mejorar el servicio de transporte público. ¿Cómo considera que ha sido el nivel de comunicación con el gobierno en los últimos años?

( ) Muy malo ( ) Malo ( ) Normal ( ) Bueno ( ) Excelente

51. Respecto de los últimos 5 años, ¿Cómo definirías la relación que has tenido con el gobierno?

( ) Muy ríspida ( ) Algo ríspida ( ) Normal ( ) Buena ( ) Excelente

52. Indique el grado de confianza que tiene usted en el gobierno. Donde 1 = NO confío, 3 = confío ALGO, y 5 = confío TOTALMENTE:

( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5

Información adicional

53. En promedio, ¿Cuántos pasajeros al día transporta en su(s) unidad(es)? _____ pasajeros al día

54. ¿Cuál es la tarifa de adulto que normalmente se cobra? _____ pesos

55. ¿Cuál es el ingreso promedio mensual que genera su negocio de transporte?

( ) 0 – 5,000 ( ) 5001 – 15,000 ( ) 15,001 – 30,000 ( ) 30,001 – 50,000 ( ) más de 50,001

56. ¿Cuenta usted con ingresos adicionales de actividades diferentes a la del negocio del camión?

( ) Si ( ) No ¿Aproximadamente a cuánto ascienden sus ingresos adicionales? _____

57. Indique de las siguientes dos opciones aquella que represente mejor sus hábitos de gasto:

( ) Mis gastos están sujetos a lo que obtengo de ingresos cada día
( ) Planeo mis gastos con base en lo que en promedio obtengo cada mes.

58. ¿Ha usted trabajado para el gobierno? ( ) Si ( ) No

59. ¿Ha usted obtenido algún cargo de elección popular? ( ) Si ( ) No

60. ¿Ha usted o algún miembro de su familia obtenido algún cargo de elección popular? ( ) Si ( ) No

Appendix C

El objetivo de esta encuesta es el analizar información sobre los transportistas y sobre su deseo a participar en proyectos como METROBUS. La información obtenida es de carácter confidencial y será utilizada con un fin académico. Agradezco su participación. Por favor llene y marque con una X en donde corresponda.

Ciudad en donde opera: _____ **Ruta:** _____ **Ramal:** _____

1. Edad: _____ **2. Condición Civil:** ( ) Soltero ( ) Casado

3. Número de integrantes en la familia, además de usted:
( ) ninguno ( ) 1-2 integrantes ( ) 3-4 integrantes ( ) 4-5 integrantes ( ) más de 5

4. Nivel máximo de estudios:
( ) Sin estudios ( ) Estudios de Primaria ( ) Estudios de Secundaria
( ) Estudios de Preparatoria ( ) Estudios Técnicos ( ) Estudios Universitarios o Superior

5. Número de personas que dependen de su negocio de transportista (choferes, mecánicos, etc)
( ) solo yo ( ) 1-2 personas ( ) 3-4 personas ( ) 5-6 personas ( ) más de 6

6. ¿Con cuantas unidades (microbuses) cuenta usted?
( ) 1 unidad ( ) 2 unidades ( ) 4 unidades ( ) 5 unidades ( ) más de 5

7. ¿Cómo obtuvo la concesión? A través de:
( ) Un amigo ( ) Un familiar ( ) Trabajo político y relaciones ( ) Directamente en gobierno

8. ¿En qué año renovó por última vez su parque vehicular: _____

9. ¿Cuántos años tiene usted en el negocio del transporte público? _____

10. ¿En qué edad comenzó usted a trabajar en el negocio del transporte público? _____

11. Fue transportista su padre o algún otro miembro de la familia ( ) Si ( ) No

12. Es usted chofer de su unidad? ( ) Si ( ) No ( ) Manejo en ocasiones mi camión

13. ¿Cuántos miembros de la familia trabajan directa o indirectamente en el negocio con usted?
( ) solo yo ( ) 1 persona ( ) 2 personas ( ) 3 personas ( ) más de 3

14. ¿Está usted de acuerdo en que su ruta (ramal) se transforme en un sistema como METROBUS en el que es una sola empresa y los permisionarios forman parte de esta empresa?

( ) Si ( ) No

¿Por qué? _____

15. Indique por favor el nivel de deseo en participar en proyectos de transporte como METROBUS. Marque la respuesta que mejor refleje su sentir

( ) No me interesa en NADA participar en METROBUS. No confío en este tipo de proyectos. Quisiera seguir teniendo el control de mi negocio.

( ) De entrada, no me interesa participar en METROBUS, aunque me gustaría conocer de los beneficios del sistema. Si me garantizan tener mi mismo nivel de ingreso consideraría participar en el proyecto.

( ) Me interesa, creo que el transporte público necesita un cambio. Un sistema como METROBUS podría ofrecer ese cambio. Entiendo EN PARTE los beneficios de METROBUS.

( ) Me interesa mucho, estoy TOTALMENTE convencido de que el transporte público necesita un cambio. Sistemas como METROBUS ofrece el cambio. Entiendo TOTALMENTE los beneficios de METROBUS. No se puede operar en la forma en que se viene haciendo.

16. Indique el nivel de confianza que usted tiene del gobierno. Siendo 1 no confío y 5 confío totalmente:
( ) 1 ( ) 2 ( ) 3 ( ) 4 ( ) 5

17. ¿Cuánto es su ingreso promedio mensual?
( ) 0 – 5,000 ( ) 5001 – 10,000 ( ) 10,001 – 15,000 ( ) 15,000 – 20,000 ( ) más de 20,001

18. ¿Cuenta usted con ingresos adicionales de actividades diferentes a la del negocio del camión?
( ) Si ( ) No ¿A cuánto asciende estos ingresos adicionales? _____

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