The University of Melbourne
Master of Urban Planning
Minor Thesis

Principal Researcher: Dr. John Stone
Student: Jorge Javier Andrade Benítez (1340791)

Student Number: 590005

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Abstract

The objective of this minor thesis was to evaluate the state of public transport in Ibarra, a city in the North of Ecuador, with an emphasis on the management scheme and arrangement of responsibilities among stakeholders. To do so, interviews to key stakeholders and field observations were made. Through the identification of issues it has been possible to and to seek possible scenarios for improvement. A positive and unexpected outcome was found where self-regulation from the private service providers produced a series of changes that have significantly enhanced the system. However, other issues persist and the possibilities to change them regard in the Council assuming further responsibilities over planning, regulation, funding, control and operation of public transport in this City.
Declaration of Authorship

This thesis does not contain any material that has been accepted for the award of any other 
degree or diploma in any educational institution and, to the best of my knowledge, contains no 
material previously published or written by another person, except where due reference is 
made in the text of the thesis.

Signed:

Date: 13th June 2014
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Chapter 1: Introduction

1.1 Background and Context

1.1.1 Ecuador in the South American Context

Ecuador is a country in the Pacific Coast of the northern part of South America. Its direct neighbours are Colombia in the north and Peru in the south. It is crossed by the equator, being this the reason for its name. With 276,841sq. km, it is the second smallest country in the continent with an area comparable to New Zealand. It has four geographical regions: The Coastal Region, The Andean Region, The Amazon Region, and the Galápagos Islands. Its political division consists of 24 provinces subdivided in a total of 221 councils.

The population of Ecuador is the seventh highest in South America with 15.8 million inhabitants. This results on a density of 54.49 inhabitants per square kilometre, which makes the country with the highest population density in the continent. Quito, Ecuador’s capital, with 1.6 million inhabitants is the second most populated city in the country after Guayaquil which has over 2.5 million.

The country has had democratically elected authorities for 39 years, however, the 1990’s and early 2000’s were characterized by political instability. Three of the last four elected presidents were ousted before completing their terms. The current is its longest lasting democratically elected President with nearly seven years in power. As a consequence of this volatile period, the national currency was substituted by United States Dollars in 2000 as a measure to stop inflation.

The first Ecuadorian export is oil and has a GDP per capita of US $10,056, ranking seventh in South America (IMF, 2013), and a GINI coefficient of 47.7, which makes it the sixth worst ranking nation out of twelve countries in its continent (CIA, 2013).

1.1.2 Ibarra in the Ecuadorian Context

Ibarra is the Capital City of the Province of Imbabura. It is located in the north of the Andean Region at 2,200 meters above sea level. It is located 112 km away from Quito, 109 km away from the Colombian border and 185 km away from the Pacific Ocean. It has an area of 1,162sq. km from which 42 sq. km are urban and 1,120 sq. km are rural and is divided in five urban and seven rural parishes (IGM, 2013). In Ecuador, cities are formed by urban and rural land, therefore, a council has administrative responsibility over both.
Ibarra has a population of 181,175 inhabitants, from which 131,856 live in the urban area, and 49,319 in the rural area. This results in an urban population density of 3163 persons per sq. km and a rural population density of 44 persons per sq. km (INEC, 2010), consequently meaning that the two areas have completely different characteristics. In the Ecuadorian context, Ibarra is considered a medium size city being in the 15th place of the country in terms of population.

The main economic activity of the city is the services area with 58% of the population being employed in this activity, followed by the industrial activities with 19% and agriculture with 11%. Most of the economic activity of the city is gathered in the downtown area, which is also the historical centre. Here is where most of the retail and wholesale activities occur, creating 20% of the jobs in the city (Dávalos et al., 2013).

1.2 Study Focus: Public Transport System in Ibarra

Ibarra has a bus transport system that operates in both the rural and the urban areas. For the purpose and extent of this study, only the urban transport system of Ibarra will be analysed, since the characteristics of the rural transport system are substantially different and it would need a different study to be properly addressed.

Private cooperatives are in charge of delivering the service, and each of their buses is individually owned. The routes and frequencies for each cooperative are agreed with the council and ratified by the Ministry of Transport and Public Works. Once a route is accepted, the cooperatives pay the council for the right to operate in a determined route. This scheme is similar in the majority of the cities in the country.

The fares for public transport in Ecuador are determined by the government for both urban and rural services. Urban fares are usually US$0,25, for the “executive service” that features newer units, and US$0,18 for the “popular service” with older buses; costing the same throughout the country. The rural fares are determined by the distance of the trip and vary for each route, but they are usually established in a ratio of US$ 1 per hour of travel.

All the fuel that is sold in the country is heavily subsidized by the Government, who also determines its maximum commercial price. Buses in Ecuador operate on Diesel, which has a 68% subsidy in its cost. Smaller private cars normally use petrol, whose cost is also 58% subsidized (El Telégrafo, 2013). Owners of urban public buses also receive a monthly economic compensation from the government of US$ 350 for each unit that was agreed in exchange for not raising the fares.
There are two private cooperatives that operate in urban Ibarra. "28 de Septiembre" with 160 units and "San Miguel de Ibarra" with 127 units, which make a total of 287 buses (La Hora, 2013). Ibarrenians take an average of 157,423 trips a day in the bus system. 60% of them are served by the "28 de Septiembre" cooperative with an average ridership of 630 passengers a day for each unit, while 40% of the trips are made in the "San Miguel de Ibarra" Cooperative, averaging 541 daily passengers per unit (La Hora, 2010b).

Of all the units, only 19% are less than 12 years old, which is the maximum age for a bus to be considered as "executive service". The majority of buses are over 16 years old, and 30% exceed 20 years of use. There are even 13 units from the 1980's. All of the units are second hand buses that have been bought in cities with more strict regulations like Quito or Guayaquil. Policies in Ibarra allow the use of units of up to 30 years of age (La Hora, 2010a). It is argued that the old age of the fleet and its poor maintenance imply poor levels of service, unreliable and even unsafe units, inadequate conditions for passengers and environmental pollution because of high carbon emissions (La Hora, 2009a).

In Ibarra, there are 23 urban public transport routes. Of them, the "28 de Septiembre" Cooperative operates 14, or 57%; and the "San Miguel de Ibarra" Cooperative operates 9, or 43%. Of these routes, 90% go through the downtown area of the city, especially near the "Amazonas" market, heart of the retail activities of Ibarra. This high concentration of routes in the same area causes congestion and dispute among the bus drivers in some of the stops, where a bus is rushed to disembark and embark passengers, because it has to leave the stop in approximately 25 seconds. This occurs while residents of other areas of the city complain about being underserved by insufficient or units of the bus system (La Hora, 2010b).

Another issue that greatly affects the quality of urban transport in Ibarra, is the fact that, despite part of a cooperative, each bus is individually owned and the profits that it produces are not shared among the members of the cooperative. This causes that bus drivers disregard public transit regulations, attempting to embark as many passengers as possible to increase the revenue produced by each bus. For this reason, there are constant complaints in the press about bus drivers racing each other for passengers or not stopping at the designated places.

The Council of Ibarra (2010) determined the rapid growth of car ownership as a threat to urban mobility in the city. It was argued that, despite around 70% of people in Ibarra use public transport, the poor service levels of the bus system, combined with an increased purchasing power in the country, have caused a greater number of people to turn to car ownership. This has caused a yearly
increase of 11% in the number of cars in the city (La Hora, 2011), rapidly making the situation of transit in Ibarra "desperate", as "La Hora (2008)", a local newspaper, called it.

1.3 Research Questions and Objectives

Citizen complaints and media publications have made the problems in the public transport system of the city evident, however, in order to suggest possible scenarios for improvement, it is necessary to obtain a more precise knowledge of them and make a closer analysis to the factors that cause the present issues.

Before any attempt to create plans for the improvement of the public transport system of Ibarra, it is necessary to have a complete understanding of its problems and the dynamics that caused them. The main questions that this study attempts to answer are: What are the main issues that the public transport system of Ibarra faces? And what possible scenarios for improvement exist?

This study aims to contribute to develop the first diagnostic step by analysing the transport system of Ibarra looking to provide a better understanding of its current situation and the issues that it faces. To acquire this information, the geography, infrastructure, demographics, regional economic circumstances and political structures of the city will be analysed, and will use international best-practice projects in cities with similar characteristics to Ibarra as a baseline for comparison and to structure alternatives for improvement.

The project aims to be useful as a baseline for engaging in future proposals for reforms to the transport system of Ibarra. Providing this research to city officials may help them expand their understanding of the situation of public transport and make better informed decisions about transport planning in this city. It is also important to point out that most of the cities in Ecuador are in a very similar situation to Ibarra regarding Public Transport, which makes this study not only relevant for this city, but also for many others in this country as a reference for understanding their own condition through a similar case.

1.4 Thesis Structure

This thesis has been divided in six chapters. The first gives an Introduction to this study by explaining the background and context of the place of research, the focus of the study, its research questions and objectives, and an explanation of the Thesis structure.
Chapter two makes a review of the current state of knowledge expressed in literature. It starts by showing what is the official position and regulations from the Government and Councils. Then, it summarizes what the media reports have shown about the situation. It also reviews the academic literature that addresses the successful features of public transport systems. After this, the assessment studies useful tools for this research, to finally explain about literature addressing best practice studies that can be used for comparison.

Chapter three is about the Research Methodology and Design. It explains how the approach for research in this thesis was designed, the processes used for data collection and analysis and it ends by explaining its limitations.

Chapter four presents and analyses the results of the research process, explaining what the main issues for public transport in Ibarra are. For this, it uses an analysis of the interviews, findings in the literature and a comparison with best practice cases as a basis for comparison with the case in Ibarra.

Chapter five proposes possible scenarios for improvement using the findings in the analysis of the current situation to explore for the possibilities of what can be done in Ibarra by using concepts of the literature and ideas from best practice case studies.

Chapter six presents Conclusions and possibilities for further research within this topic.

**Chapter 2: Literature Review**

**2.1 Official Literature**

**2.1.1 Official regulations**

The Ecuadorian Constitution includes three levels of Laws and Regulations that are of direct application to the transit and transportation of the country: one at constitutional level, another at regulative level, and the last one at local regulation level. Besides these regulations, there are Resolutions about specific aspects of Transit or Transport that are taken by the National Agency for Regulation and Control for Land Transportation, Transit and Road Safety (CNTTTSV acronym in Spanish).

On top of the hierarchy of the previously mentioned Laws is the Land Transportation, Traffic and Road Safety Act. It is a part of the Constitution and its objectives are the "organization, planning,
promotion, regulation, modernization and control of the Land Transportation, Transit and Road Safety" (La Asamblea Constituyente, 2008). This Act also establishes three levels for organizations that regulate Transit and Transport in Ecuador. The Ministry of Transport and Public Works, as a general national regulator; the CNTTTSV, a national entity to regulate, plan, control and coordinate with the local governments; and the Councils that are in charge of planning, regulating and controlling transit and transport inside their circumscriptions. This last part is especially important because it transfers the responsibility for planning and control of public transportation to the local councils. Specifically regarding public transport, this Act says that the Government has to ensure its provision and creates the differentiation of urban transportation being the one that operates only inside the urban areas of cities.

Underneath the Act, the General Regulation for its Application establishes "the norms of application to which the drivers, pedestrians, passengers and transport operators are to compel" (Presidencia de La República, 2012). Regarding public transport, it establishes that it should respond to the conditions of: Responsibility of users and operators to comply with the Law, universality of the service with no distinction made to citizens, accessibility to all citizens, comfort for passengers according to regulations, continuity of the service, adequacy of transit infrastructure, quality of transportation services, standardization of vehicles to comply with regulations, and the compliance with environmental regulations and principles. To assure these conditions, it presents a set of regulations regarding public transport that are the ones used across the country for its control.

Bellow the Act and its General Regulation, the Ordinance for the Creation of the Special Committee on Traffic and Land Transportation of Ibarra has been created to respond to establish an authority and regulations to deal with transit and Transportation matters at a local level (Concejo Municipal del Cantón Ibarra, 2009). Through this Ordinance, the council assumes responsibility for planning, adequate provision and control of public transport in the city.

2.1.2 Official reports

As part of its responsibilities, the Council of Ibarra has produced a Plan for Sustainable Transportation and Transit for the City of Ibarra, which in its second chapter makes a Diagnosis of the Urban Public Transport System. This study does a quantitative assessment to the efficiency and performance of the public transport system of Ibarra. It does not address any aspect of analysis for social, political, regulatory, or environmental aspects. According to Torres (2008), consultant for the Plan, The main results are:
- That 93% of the fleet of buses is used daily and the other 7% is a reserve.
- That the average distance per route of service is 23.76 km.
- That the average number of daily passengers in the system is 157,423.
- That the "28 de Septiembre" Cooperative performs 60% of the trips while the "San Miguel de Ibarra" performs 40% of them.
- That the "28 de Septiembre" Cooperative carries 630 passengers per day per operational unit and the "San Miguel de Ibarra" Cooperative carries 541.
- That for the general system, the number of passengers per kilometre (IPK) is 3.9. Slightly below 4.0 that is considered acceptable.
- That 72% of passengers paid the complete fare (US$ 0.18), while 28% of passengers paid a concession fare (US$ 0.09), resulting in an average fare of US$ 0.15 per passenger.
- That the total net amount produced by public transport fares is US$ 7,653,157.
- That the system produces a net average of US$ 0.59 per kilometre. And that there would be an economic imbalance in case of a restructuration of the Public Transport System.

2.1.3 Official plans

The Plan for Sustainable Transportation and Transit for the City of Ibarra produced by Torres (2008) in its section regarding public transportation proposes a better integration of the current transport system cooperatives of the city attempting to balance offer and demand for the service, and also to balance the economic and financial aspects of the operation. It relies in these main ideas to accomplish that objective:

- The creation of a general operating entity that equitably distributes routes and frequencies among the cooperatives and ensures adequate service for all sectors of the city.
- A new system for stops where fares are collected at the stop and can be pre-paid before boarding the bus.
- The use of GPS technologies for life tracking of the units.
- A centralized fare collection system that are later distributed among bus owners equitably.
- Two types of units that are distributed according to the demand in each route. A conventional urban bus for 60 to 70 passengers, and an urban "minibus" for 40 to 50.

2.2 Press articles

2.2.1 Transit congestion
The local newspaper of Ibarra, La Hora (2008, 2009b, 2010b), has constantly reported problems of transit congestion in the city. For instance, La Hora mentions that driving a vehicle in Ibarra and finding a parking spot is reported to be increasingly difficult, especially at peak hours. This is mainly attributed to a yearly growth of 11% in the number of cars at much faster speed than the transit infrastructure. Additionally, La Hora has reported an insufficient number of parking spots in the downtown area of the city. The transit congestion is also blamed to the lack of organization of the routes and frequencies of the public transport and the bad driving habits of bus drivers.

2.2.2 Public transport

The same newspaper has also published several articles regarding issues with the public transport system of Ibarra. Topics like the age and conditions of the buses that provide the service have been addressed. An old fleet of buses, many of which pass 20 years of service with poor conditions of maintenance have been reported. It has been argued that the system is disordered and that some areas have an excess in routes of buses while others have insufficient. Problems regarding the bus stops have also been identified. Their physical conditions, as well as their location are argued to be inadequate (La Hora, 2010a, 2008, 2010c).

2.2.3 Proposals

There have been press articles that depict ideas, proposals or plans for improving public transport in Ibarra. Most of them point out to the urgent need for taking action for tackling the traffic and transportation issues of the city. They describe measures that were taken, such as not allowing bus drivers to pick up or drop passengers in places different that the designated stops, but were later disregarded or not enforced. Furthermore, ideas for construction of additional road infrastructure, like the creation of an express way for freight and interprovincial transport vehicles not to cross through the city (La Hora, 2007).

Other articles make reference to the Plan for Sustainable Transportation and Transit for the City of Ibarra which was intended to create proposals for the improvement of the general quality of transit and transport for the city (El Comercio, 2009), but also explain that its presentation was delayed due to problems with the consultant, bringing problem for its implementation (La Hora, 2010d). Some of the concepts of this plan are already under going for implementation, such as the use of a centralized fare collection with the objective of avoiding drivers competing for passengers (La Hora, 2013).

National plans for modernization have also been reported to be announced, like the one made by the President of Ecuador, who offered a modernization of the operation of the system of public
transport in the first trimester of 2014, with the use of prepaid cards for users, GPS tracking of units, real time display of arrival times of units, and centralized fare collection to eliminate competition for passengers (El Norte, 2013).

### 2.3 Features of successful public transport system

#### 2.3.1 Infrastructure, physical characteristics and network

There is extensive literature written about the adequate physical characteristics needed for adequate public transport infrastructure. To narrow the research to documents that can be relevant for this study, the criteria used for this purpose was the similarity on the size of the city and/or its context, when compared with Ibarra.

PROCEED (2009) gathered a European collective of experts in urban transport planning to create Principles of successful high quality public transport operation and development. They established a series of guidelines for small and medium cities. Regarding infrastructure for public bus systems, the recommendations were the following:

- Creation of bus only lanes and bus only links to avoid congestion with general traffic.
- The use of Lay-by bus stops or bus capes to improve access and safety for passengers.
- A careful consideration of the impact of traffic calming elements, since it could affect buses more than cars.
- Choose the size of vehicles in such way they adapt to the demand level, operating efficiently according to the structure of the city.
- The use of fully accessible vehicles for wheelchairs and baby carriers. Low floor buses can be an adequate option for this objective.
- The provision of intelligent transport system services in vehicles. This benefits passengers and can improve the efficiency and attractiveness of the system.
- Establishment of on-board safety and security measures through the use of CCTV systems, emergency buttons, communication systems, etc. to create a secure environment.
- The use of vehicles that are efficient and attractive. The use of design requirements for vehicles can create a clear system identity. The fleet should preferably be new and comfortable and be kept in tidy conditions.
- The use of environmentally friendly vehicles that produce low pollution and noise levels.
- Create a hierarchy of bus stops to help prioritize investment and locate the adequate facilities in each place based on the importance and accessibility of the stop location and the lines serving those stops.
- Accessibility should be fully guaranteed in bus stops. They should be located at an adequate distance from each other (400 m) and allow access for wheelchairs or elderly people.
- Bus stops should be safe and secure, adequately equipped and provide passengers with appropriate information.

Nielsen (2005), in the best practice guide about public transport network planning that developed for HiTrans, described a series of principles that could be used to create the basis for a simple high frequency network for a medium size city. They are summarized as:

- Concentrate resources, being careful with opening new lines, since they can mean reductions in other parts of the system. He argues that the number of lines should be as few as possible for the system to be efficient and high quality.
- Strategies to deal with the increase of demand in peak hours should be established. A possible strategy could be to double the number of departures for the busiest frequencies.
- Unnecessary transfers between lines should be avoided since this could be an inhibitor to use public transport. Long lines that connect important origins and destinations and cross each other is likely to produce journeys that have only one transfer.
- There should be a limited number of "tailor-made" direct lines, since the emphasis of the system should be directed to provide access to all parts of the city through the use of economics of scale. Public transport similar to the individual use of cars is unsuccessful.
- The use of many direct lines complicates the network for users; it is more complex to plan and operate, and more vulnerable to operational disturbances.
- A complex, multi-line network creates difficulties for its operation. Many common route sections cause congestions at bus stops and difficulties to reach high frequency services.

2.3.2 Management scheme

The city of Guayaquil, recently implemented a new public transport system based on high capacity buses running on exclusive lanes. It has proven to be successful in the Ecuadorian context. Arias (2006), the main consultant for the project, establishes a set of principles that are recommended for a management scheme of a public bus transport system:
- The creation of a regulatory agency at local level that regulates and monitors public transport operations.
- The creation of a management entity external to the council for coordination of the operation of routes, frequencies, etc.
- The inclusion of current operators, but gathered into companies that replace the old "one bus - one owner" scheme for a shareholding participation of previous owners.
- New routes are approved by the regulatory entity and operated by newly formed operating companies.
- All new operators and public works to be chosen through a bidding process.

Chapter 3: Research Methodology and Design

3.1 Research Design

3.1.1 Approach

Two main methods are used in order to provide possible answers to the research questions of this study. It is expected that by the application of these methods, this study helps construct a clearer understanding of the situation of Public Transport in Ibarra from a variety of perspectives. By applying several approaches, it is also possible to compare the results that each one has produced, and determine if they are supportive or contradictory.

The objectives of this study are to analyse the current issues of the public transport system in Ibarra and to provide with possible scenarios for improvement. Therefore, the methods used in it respond directly to these objectives. A qualitative approach has been used due to the scope and aims of the study, and to the available resources.

The first of these methods is a documentary search, where the literature concerning this topic is analysed with the objective of finding answers to both research questions. The documents used are either informative of the current or similar situations, or contain concepts or cases that provide with ideas for improvement scenarios. The second method uses interviews to key stakeholders related to the Public Transport System of Ibarra looking to gather and analyse their points of view.

3.1.2 Scope
For the documentary search, the scope to be used is that of the available relevant related literature. The main focus was towards analysing documents that help to explain better the current situation, understanding concepts and ideas related to the topic, and studying similar cases regarding context and circumstances.

The in depth interviews was made to ten key stakeholders related to the Urban Transport System of Ibarra. They have been chosen from a variety of backgrounds with the intention of having a diverse set of opinions. Since the approach that each can have about the topic is likely to be different, the interview may be adapted, but the general lines of discussion will be kept.

The Index of Sustainable Mobility has 87 indicators used to evaluate a variety of aspects of sustainable urban mobility. However, it is flexible enough and adapts to different urban contexts where certain indicators are not available, since they can be removed from the calculation and still obtain the results for the Index (Miranda and Rodrigues da Silva, 2012).

3.1.3 Limitations

The principal limitations are related to the availability of data needed for the study, and the disposition of stakeholders to address issues that may be controversial or can represent some kind of compromise because of their own situation.

Most of the specific data needed to carry on with this study is held by the Council of Ibarra. In preliminary approaches that have been done to their officials, there has been a disposition of collaborating with the information they possess. However, cities of the characteristics of Ibarra, in the Ecuadorian context, often have a limited amount of data regarding public transport. This deficiency in data is expected to be covered by the opinions and expertise of the interviewees and by the comparison to similar, more studied, situations.

3.2 Data Collection and Analysis

3.2.1 Documentary Search

The documentary search will be done using the available literature regarding the current situation of public transport in the selected context, as well as the topic of urban public transportation systems in relatable situations.

For acquiring data regarding public transport in the selected context, three main sources will be used: State and council regulations, reports or plans; national or local press articles that address
planning, transit and public transport in the area; and independent or academic studies about the selected topics.

The search for documents that address relatable situations, proposals or solutions will be made in academic or scientific literature regarding the urban transport planning subject in similar contexts or circumstances. Also, the analysis of this documents will be used to establish general concepts or objectives to be used for evaluating the current situation as well as ideas about possible scenarios for improvement.

3.2.2 In depth Interviews

These interviews were carried out with key stakeholders related to urban transport planning in Ibarra or in similar contexts. The objective is to gather information useful for the assessment of the current characteristics of public transportation of the city, or for alternatives for improvement through new concepts or best practice cases.

The stakeholders to be interviewed were government officials, public transport of transit consultants and academics, members of citizen groups related to public transport or transit, and members of the companies that currently provide public transport service in Ibarra. There are 9 identified individuals to be interviewed.


The interviews will be audio recorded and their most relevant parts will be transcript. These opinions will be used to depict the coincidences and divergences regarding the current situation and the improvement alternatives for public transport in Ibarra.
Chapter 4: Findings

This chapter contains the findings of the interviews to relevant stakeholders and observations of the author conducted as part of the research. The document analysis that was also proposed as methodology is located in the literature review section since it was considered to aid in a better understanding and depiction of the background section of this research.

The results have been arranged in a chronological order that was established by the distinctive periods to which the interviewees referred to, with the objective of depicting plans, policies and outcomes as part of a dynamic process.

The previous situation sub-chapter describes what occurred until approximately the end of the previous administration in charge of the Council, around 2010. The current situation section explains what has been done during the last term and the condition in which the public transport in Ibarra was found at the moment of the interview. The future plans section closes by explaining the notions that were informed to be programmed by the stakeholders and how they will modify the current conditions. Each of these sections is divided into three common themes that relate to the main features of public transport that were derived from the literature review and from the most common arguments expressed in the interviews. They are: management of the system, physical aspects, and operational aspects. By this arrangement, it is possible to better observe the processes through different themes in public transport.

4.1 Previous Situation

4.1.1 Management of the system

Policies and investment

Until 2008, when the Land Transportation, Traffic and Road Safety Act was approved as part of the New Ecuadorian Constitution; it was the Central Government who was in charge of regulating and controlling public transport in most cities of the Country. Councils had limited responsibilities and their roles were secondary mostly related to route planning, although the ultimate approval stage was also in control of central governmental entities. The concession of routes to a determined operator, revision of units to be incorporated to public service and control of their compliance to regulations was also performed through a centralized system.
Investment in public transport in Ibarra and most cities in Ecuador has been shared between the council and/or government agencies, which were responsible for the provision and maintenance of stop facilities, signage and roads; in the other hand, operators were to assume the costs of transport units, their maintenance and all the operational costs necessary to run the system. Additionally, a subsidy was established by the government to compensate operators for the discounted fares of concession passengers.

Management scheme and fare system

In Ibarra, besides the planning and control responsibilities that were shared between the national government agencies and the council, the operation of the system was in charge of two cooperatives formed by private owners of transport units. In most cases, every member possessed only one unit. As mentioned by both the representatives of the cooperatives and the Council officials during the interviews, levels of coordination and assistance among the stakeholders were perceived as low and insufficient. Conflicts often rose, especially between the two private operators, which were in a situation of constant competition for being awarded what they considered the most profitable routes, as well as for outracing other units to collect a higher number of passengers along the routes.

This occurred due to the fact that revenues were not shared among all members of the cooperative, but each unit owner would receive the profit that their own bus produced. Additionally, all interviewees agreed when indicating that the current fare is inadequate to maintain acceptable levels of service. The public transport fare in Ecuador has traditionally been established at a national level and has not changed since 2002 when it was fixed at USD 0.25 per trip for urban routes. Since 2006 a subsidy was created arguing compensation to bus owners for concession fares. However, the representatives of the operators and the public transport academic stated that the subsidy is still not sufficient to allow major improvements in the system.

4.1.2 Physical aspects

Characteristics of public transport units

According to Council officials, the average life time of public transport units in Ibarra was 22 years until 2010. Their level of maintenance was poor and most units did not comply with national regulations or standards. They had mechanical issues as well as unsatisfactory features regarding passenger comfort and unit upkeep. Many of these buses were converted from freight truck chassis, therefore not meeting regulations for public transport units.
Among the features reported as unsatisfactory by the interviewees, were that none of the buses had full disabled accessibility or preferential sitting spaces; that seats in most units were not to standards; that aisle spaces were smaller than required; that there was only one door to both access and exit the bus; and that the platform of the bus was high requiring at least to steps to reach it.

**Stops and signage**

Council officials and transport operators representatives reported that most bus stops did not have other infrastructure than the post and the signal that designates them. A few stops had weather protection but, in general, they were in poor maintenance conditions. In the stops, no information was given about the routes, timetables or destinations. Such information was not available in any format at any agency or cooperative. Users of the system relied exclusively on information given by other passengers or bus drivers regarding routes or destinations.

4.1.3 Operational aspects

**Coverage, routes and frequencies**

When routes were established in the city, it was the cooperatives that made the proposal regarding which specific areas of the city buses should go through. As recognized by the Council officials of Ibarra, the routes were planned to the economic convenience of operators, therefore, only the most profitable origins and destinations were served. This caused that certain neighbourhoods of Ibarra were left with poor or non-existing public transport service, while others had an excessive number of units going across them to the point of creating transit congestion. Most interviewees agreed that this was one of the main issues regarding the system in the city.

However each cooperative established timetables for their units, they were not shared with the public and they were very often disregarded by the drivers, who, in the majority of cases, were not penalized for such actions, as recognized by the same cooperative representatives. Additionally, this encouraged races between units that competed to arrive first to the following stop and gather more passengers.

**Tracking of units and information to passengers**

Until 2012, all control of compliance with timetables and routes were done using card clocks at certain checkpoints designated for each route. In most cases, they were located in the beginning and the end of the laps. As confirmed by the officials in the council, every driver would be given a card that was supposed to be stamped at every check point. However, this created problems regarding to the inaccuracy of card clocks and to the fact that allowed drivers to deceive control by, in many
cases, using a third person to check the card on time while they would be otherwise located. The control over the units was executed by the same cooperatives to which they belonged, which made it unaccountable from a public perspective. Regarding live information of units and time to stops, as the control was done rudimentarily, there was no system established to make it available for passengers.

4.2 Current Situation

4.2.1 Management of the system

Policies and investment

With the new Ecuadorian Constitution that was approved in 2008, responsibilities over planning, regulation and control of public transport were programmed to be regularly transferred to local governments. Ibarra is currently going through this process of decentralization and has been increasingly receiving new tasks regarding this matter. To accomplish this objective, the Council created an Agency in charge of public transport in the City, the Mobility and Transport Unit. Its main authority is directly appointed by the Major.

According to its Director, one of the first actions they took was making an inventory of all public transport units in both cooperatives to be able to evaluate what was the current state of the units that serve the City. This Unit is also now in charge of planning the routes, establishing timetables and controlling the compliance of buses and cooperatives to Council regulations. They have also been instrumental in achieving an agreement among the operators to coordinate routes and timetables.

Management scheme and fare system

The scheme of individual owners gathered into cooperatives is still current in Ibarra. However, there have been noticeable changes due to the agreement that was reached among all the main stakeholders. According to the officials in the Council and to the representatives of the Cooperatives, the main objective of creating this agreement was to improve the operation of public transport in the City and to create an effective mechanism for control of each unit of the system.

The interviewees explained how the cooperatives took the first steps towards the current improvements in an attempt to improve the efficiency of their own operations. The Council was reported to have seized the opportunity and intervened to facilitate the agreement and sought additional improvements. By the time of the field research of this thesis, the stakeholders had agreed on and implemented a GPS tracking and control system, a coordinated timetable and routes,
and penalties to be imposed to drivers who disregard them. The current level of cooperation among Council and cooperatives was reported to be the best in years by the relevant interviewees.

The fare for the system has remained unchanged. However the central government transferred the responsibilities of public transport to councils, the fare is still established as a national policy. The subsidy that was given by the government has also remained unchanged. All interviewees agreed on the fact that this complicates the possibility for improvements since the cooperatives report to operate at a minimum level of revenue.

4.2.2 Physical aspects

Characteristics of public transport units

When the officials at the council were asked about what they considered to be the main improvements in public transport in the City, they all argued that the reduction on the lifetime of units was a positive change. The new average is 12.5 years old. This has also allowed incorporating new standards of service in the units; most of them are now compliant with the majority of regulations and standards in the Country.

The seats and aisles have been standardized and are now of adequate dimensions, the units now have two or three doors to differentiate access and exit from the bus, mechanical conditions of the buses were also reported to have been enhanced, and their general upkeep condition is now perceived as superior. However, some issues persist, they are still not fully accessible and preferential seating has been designated but it does not comply with standards. Council officials also argued that it is suspected that CO2 emissions from the units are high, but it is impossible to test since the Council does not possess equipment to perform evaluations.

Stops and signage

The Council has started a process of upgrading public transport stops in the City, newly built structures have been put in place and their characteristics offer better comfort and weather protection than the former ones. However, the representatives of the cooperatives argue that they are still too few. At the moment of the field research, there was no signage about routes or timetables placed in the stops.

4.2.3 Operational aspects

Coverage, routes and frequencies
The routes of public transport in Ibarra have not gone through major changes and the only current difference could be the inclusion of new areas in the coverage of the system. However, operators and council officials agreed on the fact that areas of the City still have poor coverage while other have an excessive number of lines and units serving it.

Among the features of public transport in Ibarra that have gone through significant improvement, the creation of and compliance with a coordinated timetable is stated by council officials, and operator representatives. After the agreement was reached among the stakeholders, the interviewed official of the company performing the GPS control of transport units reported that compliance with routes and timetables has increased from nearly 40%, registered in the beginning of the monitoring, up to 90% now that the system is in full operation. As a result of this improved control and agreements, the interviewees in Ibarra noted that racing between bus drivers has dramatically dropped, and that in general terms there is an increase on the service levels and efficiency of public transport in the City.

Tracking of units and information to passengers

As reported by the operator representatives, one of the cooperatives, ‘28 de Septiembre’, was the first to establish a GPS tracking system with the objective of controlling the efficient operation of their units. Their main interest was to maximise the revenue of their members by stopping irregular procedures of the bus drivers. The other cooperative, ‘San Miguel de Ibarra’, adopted the same control system after observing the benefits of better controlling their operation.

Facing this situation, the Council decided to facilitate the process and sought an agreement between the cooperatives to coordinate and control a timetable. Currently, an external private company performs this task and the results are sent to each cooperative and the Council. Economic penalties were established for units that were not compliant. However, these fines are collected by each Cooperative, and are once a year distributed equally among all of its members, creating a system in which the units that had less infractions are rewarded and the ones with more infractions are penalized. The role of the Council in this arrangement is of an observer more than an enforcer.

The representative of the company that provided the GPS control system of units, stated that the technology for establishing real time information for passengers both in stops or on line was ready to be tested, but it was not currently in operation.

4.3 Future Plans

4.3.1 Management of the system
Policies and investment

As suggested by [Torres, 2008] in his Plan for Sustainable Transport and Transit in Ibarra, the Council officials stated that the creation of two bodies within the council to regulate and control public transport in the City would be a desirable setup for its appropriate administration. The first body would be in charge of creating plans and establishing regulations, while the other would have the responsibility to implement plans and policies and control the operation of public transport cooperatives. This alternative was being analysed to be implemented by the Council and it was likely to be implemented at the time of the field research.

Investments in public transport in Ibarra are not planned to change from the current scheme. When asked about the possibility of the Council having a bigger participation in the financing of the operation, Council officials stated that it would require a complete modification of the current management scheme and that, under the current one, public investment would not be advisable since the operation of the system is given as a concession to private company. In the other hand, the representatives of the cooperatives stated that they would not accept any public investments in their companies if it means losing control over their operations, and that they would prefer that any further improvements of the system occur under the current scheme.

Management scheme and fare system

As previously stated, both the cooperative representatives and the Council officials considered the current management scheme adequate and believed that further improvements to the system should be done maintaining such order. Bigger public involvement on the provision of public transport was seen as both, undesirable from the cooperatives that fear it would imply losing control over their operation; and as an unnecessary use of municipal funds by the authorities in the Council, since the provision of public transport is considered to be a private business.

However, the Ecuadorian academic expert on public transport that was interviewed suggested that the current scheme should need to be modified to favour further improvements through higher public participation in the operation of public transport, especially by increasing the levels of investment that can be done into units and operational features. Supporting this argument, when interviewed, the officials in the Council of Cuenca, an Ecuadorian city that is considered to have taken important steps towards an enhanced public transport system, argued that an instrumental part of the success of their policies and plans was the modifications introduced in the ownership and management scheme of the system with a higher direct participation of the Council in the operation.
Regarding the fare of public transport in Ecuador, there are no clear indicators of any modifications. The cooperative representatives indicated that there have been talks with the government aiming to increase the amount of the subsidy that they currently receive by at least fifty per cent, if this occurred they agree on maintaining the fare unchanged.

In the other hand, the cooperatives in Ibarra were in process of implementing a common fare box collection system in all their units. The main interest of the operators is to increase their revenue by preventing contracted drivers to keep part of the daily earnings they collect through the use of electronic payment systems. Additionally, this would allow the revenues of the entire system to be shared among all units, therefore eliminating the unfair competition for more profitable routes or the racing between units to collect more passengers, and to introduction of routes to areas previously considered of low economic return.

4.3.2 Physical aspects

*Characteristics of public transport units*

One of the most common features that were mentioned by officials of the council and operator representatives as subject of future improvement for the public transport of Ibarra was the enhancement of the physical characteristics of public transport units. The reduction on their life time, more spacious and better fitted buses, as well as accessible vehicles; were seen as desirable and plausible features to be incorporated to the system hereafter. No mention was made regarding less pollutant units or the incorporation of a different mode of transport.

*Stops and signage*

The plan of the Council at the moment of the interviews was to continue with the renewal of public transport stops according to a standardized design that includes weather protection, a seating space and a designated panel for information. The signage on these stops is planned to depict the relevant routes and timetables. The description of the areas served, which until now has been shown in the front of the buses, will be replaced by the number and the name of the route they currently serve.

4.3.3 Operational aspects

*Coverage, routes and frequencies*

Both, Council officials and Cooperative representatives, agreed on the necessity of a reorganization of routes. They recognized that this would allow to include currently underserved areas of the city into the coverage of public transport, and to reduce the congestion in other zones that have an
excessive concentration of units and claimed that this is being planned inside the Transit and Transport Unit of the Council. An additional notion these stakeholders mentioned as favourable for public transport service in Ibarra was the creation of transport corridors for buses to cross transit congested areas swiftly and to connect high demand origins and destinations.

As the current coordination of timetables between the cooperatives has produced what is perceived as positive results, the relevant interviewees mentioned that the agreement reached among the operators will continue in place adding any new routes into the same scheme.

**Tracking of units and information to passengers**

The GPS tracking system that is currently in use for all units in Ibarra is planned to continue in operation. All stakeholders agree on its success on improving the operation of public transport in the City. The interviewed official at the company that provides the tracking service argued that this technology is also planned to aid the common fare box collection system by informing the daily mileage of units, which would be the measure for payment under the new scheme. The same company is coordinating with the council tests to try a life information system at stops that announces oncoming units and times to stop to passengers, data which may be made available in the future via web or mobile applications.

**Chapter 5: Discussion**

This chapter has been arranged into the same themes than the former one with the objective of giving continuity to the notions, observations and arguments across relatable topics; they are preceded by a discussion of the reasons for the current condition of public transport in Ibarra. Recommendations for possible improvements are given in each section.

**5.1. An unexpected outcome**

By reviewing the relevant literature, the previous management scheme of public transport in Ibarra failed to meet most of the criteria recommended by authors like Arias (2006) or Nielsen (2005) regarding successful schemes of regulation and administration. Press reports (La Hora, 2011, El Comercio, 2009, El Norte, 2013) also acknowledged deficiencies on the system that could be attributed to an inappropriate management scheme. These arguments were confirmed by some of the interviewees like the Council officials or the cooperative representatives who claimed that the previous arrangement in which the central Ecuadorian government was responsible for regulative
and managerial aspects of public transport was inefficient and improvements were complicated due to an inflexible scheme.

By evaluating the situation found in the document analysis and due to the scarcity of recent literature that described the latest events regarding public transport in Ibarra, the expected state of affairs before the conduction of the field research was similar to the one described above. However, an unforeseen outcome was found once the interviews and the observation took place in Ibarra.

The cooperatives took the initiative of self-regulating their operation and, with that action, a series of changes occurred. The representatives of the operators argued that it was in their interest to improve the efficiency of their operation in order to increase economic revenues. This bottom up approach of self-imposed control by the service providers was described as unusual and unique in Ecuador by the public transport academic that was interviewed.

The first step taken by the cooperatives towards self-regulation had a noticeable impact on service levels, which were reported to have significantly improved by council officials and the provider of GPS tracking system, especially regarding compliance with the timetable and route. At the same time, the Council was able to take more action due to their newly acquired responsibilities in public transport and negotiate an agreement with operators to officialise the enhancements that were reached until that point and propose further ones. It could be argued that a higher involvement and decision power given to local authorities has demonstrated, in a short period, to have a positive and transforming effect, proving this policy effective.

5.2 Current management scheme

However the auspicious outcomes that have been reached, further and definitive changes are unclear under the current scheme. Stakeholders within the public transport system of Ibarra, both in the council and in the cooperatives, expressed their conformity with the status quo and their disbelief or unwillingness of supporting a deeper transformation that is described as necessary by the interviewed Ecuadorian academic expert and the officials in the Council of Cuenca.

When the current performance of the local government and the operators is contrasted with their responsibilities and regulations, it could be argued that they are being fulfilled (position shared by the representatives of both stakeholders) and that the levels of service are the ones that are expected from the public transport system in the City. However, if its characteristics are compared with standards like the ones established by PROCEED (2009) and Nielsen (2005) in their manuals, or even with what has been achieved in other cities in Ecuador like Cuenca; the system in Ibarra fails to
meet many of the features necessary to provide a public transport service that could be considered of acceptable quality.

This reality sheds light over the fact that, under the current scheme, there is a limited possibility of additional improvements than the ones that have already occurred. In order to take the necessary leap forward in providing quality public transport in the City, it is the council with their new attributions who would be the logic driver of change. The self-regulation that has occurred in the operators has taken place because it was also for their own benefit, and it is likely to reach its limit if their interests turn to be affected.

5.3 Physical aspects of the system

The main issues on the physical aspects of the system relate to the characteristics of public transport units, which are in charge of the private operators; and to the condition of stops, that are a responsibility of the Council. Under the current investment scheme, public funds are only destined to the maintenance of infrastructure and the actual provision of the service is exclusively a private operation. This operation is mainly financed by the revenue produced by fares, and a relatively small subsidy from the central government.

In diagnostic section of the Plan for Sustainable Transport and Transit in Ibarra by Torres (2008), it was stated that Cooperatives work under a minimum profit condition. This was corroborated by the interviewees that represented the operators and the public transport academic, who pointed out the economic impossibility of acquiring more recent or better fitted units due to the low margins of earnings that the transport cooperatives currently have.

When this situation is added to the unwillingness of the central government to allow a rise in the fare of public transport, it creates a scenario where the only apparent option for an improvement of public transport units is the investment of funds from the council in this aspect of the system. If the local government continues to restrict their funding to roads, stops and signalling; only a limited impact can be achieved in the overall service quality for passengers.

Experiences like those in Cuenca, Guayaquil or Quito; Ecuadorian cities that have been able to make advancements on public transport and that are described by authors like Arias (2006) or Torres (2008), have proved that with the sufficient political drive and adequate negotiations, public-private partnerships are possible and often show positive results. Ibarra could use those cases to find strategies for creating a scheme that creates the biggest benefits for users.
5.4 Operational aspects of the system

At the current state, public transport routes in the city follow a profit only logic; this has left areas of Ibarra with scarce bus lines, while others are congested due to an excessive number of units. There is the intention to reorganize routes so they are designed with a service approach linking previously unattended areas of the city. However, it does not yet become a plan and there is no clear consensus in the relevant interviewees over when this could occur. This reorganization of routes could be aided by the creation of the common fare box system that would allow an equal sharing of revenues among all bus owners and would eliminate the notion of only creating routes where high revenues are expected.

Timetables have now been coordinated and are being regarded by operators. It is reported that there is a satisfactory compliance level which has been acknowledged by all the relevant interviewees. Nevertheless, who is in charge of controlling this aspect of the operation is a private company that is completely funded by the transport cooperatives, and the penalties that are imposed on offenders are both collected by and destined to the operators. Therefore, creating a conflict of interests where this stakeholder acts as the controlled and the controller party. It would be advisable that a public or publicly funded entity takes charge of this task to allow for accountability and independence on the supervision on the operation of cooperatives.

Chapter 6: Conclusions

- A significant, yet unexpected, improvement in the public transport system of Ibarra has been reached, and that this was achieved by initiatives that came from both the Council and the private operators. While the transport cooperatives were able to modify their operation to be more efficient, the Council was able to use the opportunity to reach an agreement that compromised the operators to create further enhancements of their service and to coordinate operational aspects among them. This sort of agreement has produced a level of cooperation among all stakeholders that is described as the best in years.

- The current situation is not yet optimal and further improvements are necessary especially regarding: an unclear plan or path to be followed by authorities; an uncertainty over the continuity of policies along different political terms; an effective separation of political interests from the recommended technical solutions; transport units in still poor physical condition and deficient features; and a lack of efficient public control and accountability of the operation.
- Following the current path, it is unlikely that greater enhancements of the system can be reached, both the Council and the operators seem to be comfortable with the status quo and the arrangement under which public transport in Ibarra works is currently being fulfilled by all parties, nevertheless it has reached a limit under which there is no room for further improvements. In one side is the Council which is not willing to make further investments or assume further responsibilities, while in the other hand the cooperatives will only make modifications as long as it does not affect their interests.

- The public involvement on the provision of public transport in the city needs to be greater in order to foster an improved system. The council is the governmental instance that has achieved better results on this task and it would be advisable as the one that takes charge of a new managerial approach. Additionally, it possesses the necessary resources to finance the costs for the suggested features.

- A public-private partnership between the Council and the operators, as it has been done in several other cities of Ecuador obtaining positive results, could prove as an effective strategy to provide a better public transport service to the City.

- To reach all this changes, the initial and perhaps most important factor is the political will to take the necessary actions. The apparent political cost that facing the transport operators has, could be counterweighted with the fact that the big majority of citizens in Ibarra, near 70%, use public transport in a daily basis.
References


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