



AALBORG UNIVERSITY
STUDENT REPORT

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AAU 2015



BRT AS A WAY TOWARDS MORE SUSTAINABLE CITIES? : BOGOTA'S TRANSMILENIO

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“The Latin American busway has inspired the imagination of transport planners world-wide and is quickly becoming an option of choice. From North America to Europe to Oceania the busway will mostly likely be coming to your neighbourhood very soon”

(Wright, 2001, s21)

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Abstract

Cities in today's world are facing growing traffic congestion, environmental pollution and social exclusion. Especially in the developing world these problems constitute a serious issue. Unsustainability of the urban mobility becomes a threat to future development and the quality of urban life in many areas. The story of the Colombian capital, Bogota is a fascinating example of a huge effort taken in order to transform the city through the development of high quality bus rapid transit system – Transmilenio. The new integrated transportation project was a core of the political agenda of the key political figure in Bogota's history at the break of the millennium – Enrique Peñalosa. This paper investigates the planning and implementation process of the biggest BRT system in the world and attempts to draw lessons for planning that it can provide. The special focus is being put on the barriers the innovative, sustainable mobility projects face and based on the case of the Colombian experience, the author tries to point what are the key issues to be considered by the planners trying to realize similar projects in other cities.

1. Problem Formulation

The goal of this part of the report is to present the broader view to which the topic studied relates to. The issue of how transportation system innovatory projects can work in favour of the move towards more sustainability of urban development will be drawn. Later the focus will be narrowed down to description of Bus Rapid Transit (BRT) as a possible solution for public transportation that could possibly facilitate pro-sustainable changes in growing cities. At the end of this chapter the main research questions that this paper attempts to answer will be narrowed down and the structure in which the thesis is build will be presented.

Sustainability of urban transport

Sustainable development seems to be a dominant issue in debate over urban planning in recent years. Indeed there are serious reasons for that everybody can easily observe, especially in the developing world. Our cities have grown faster and faster, urban population worldwide have exceeded 50% just few years ago for the first time in history, despite being in the range of 30% just 50 years ago (WHO). This rapid process causes a lot of problems that have to be studied and tackled.

One of the most important of them is the relation between rapid urban development, transportation system capacity and resulting problems. Fast growing metropolises expand faster than provision of infrastructure and housing that inevitably results in low quality of life for millions of people, inequality, congestion and environmental degradation. Transport is so important because it has a huge impact on the quality of modern life (Gilbert, 2008). The nature of economy and the way of living nowadays results in a dramatic increase in total travel demand. People want to move faster and over longer distances (Banister, 2015). The economic progress, wealth accumulation and the aforementioned dynamics of urbanization process, combined with the insufficient supply of good public transportation systems lead to more and more people opting to private modes of transportation such as the car (Gilbert, 2008).

Car dependency continued to escalate throughout all the 20th century. The global share of pollutants and energy consumption that can be related to transport continues to grow as well (Banister, 2013). Road transport is responsible for around 80% of total energy used in the sector, having air travel at 13% and rail at 4% (Banister, 2013). This indicates that it is the road transport and especially the popularity of private cars that is the biggest challenge.

Going back to urban environment dominated by heavy car usage one can observe the phenomenon that can be called “the spiral of unsustainability”. Growing cars number causes the ever growing congestion on the road and therefore leads to growing demand for more road space. However if this demand is met and more road are built, it enables

even bigger amount of cars to circulate around the city, which has to result in more pollution, congestion and unpleasant urban environment. In such conditions any other travel than private car seem to be repulsive. Here the circle is closed as people opt out to even more private vehicles (Colvile, et al., 2004). Urban space is increasingly dominated by the presence of the car and related infrastructure. All of us know the familiar image of the city centers completely full of parked vehicles that occupy all the space, very often disabling other activities. Especially in the emerging economies, where with growing material prosperity the purchase of the car becomes affordable to large number of people in short period of time, the car numbers tend to grow rapidly (Gilbert, 2008).

The quote from Enrique Peñalosa, the mayor of Bogotá, Colombia, who was the person responsible for development of the transportation system studied in this thesis, describes this phenomenon very well:

“Mobility in the developing cities is a very peculiar challenge. Because, different from health, education or housing, it tends to get worse as the society becomes richer. Clearly an unsustainable model.” (Peñalosa, 2013)

Cities that fall into such a spiral become progressively dysfunctional (Gilbert, 2008). Ever growing congestion, environmental degradation, change in urban form that includes endless sprawl into the suburbs that is enabled by highway access, result in decrease in quality of life (Gilbert 2007). Such a model is unsustainable which means that it perpetuates itself deeper and deeper into problem. The question has to be stated: What can be done to replace it? How the circle can be reversed?

The experts from all range of disciplines, from urban planning to transport technology agree: In all cities the car dependence has to be tackled and limited both in short and the long term (Banister, 2015). As David Banister writes: *“Sustainable transport must be seen as part of the process of urban renaissance”*

As the urban transport dominated by the unsustainable solutions forms a great challenge for planners and decision makers. There comes the obvious question: what kind of alternative transportation mode can successfully take over the travel demand? How can it be successfully implemented? It is generally accepted that all forms of integrated collective transportation systems are friendlier to sustainable development than the car or disorganized public transport provision (Banister, 2013). A good mass transit system can provide the alternative for car users and create an opportunity for more equality in terms of access to urban mobility for all citizens, without creating such negative and unsustainable result as the mass car ownership (Banister, 2013).

Therefore, the step towards more sustainable transportation in the city should involve some kind of input of public transportation system. There are many different technologies present, ranging from metro to urban light rail, bus systems to extended bicycle lane net, that were tried out in many cities with different result. The investment of this kind is an extraordinary challenge for the city, regarding the need of political will, technical knowledge, and the ability to include the interests of different parties and to deal with the

previous institutional inheritance. These are all serious barriers that have to be carefully taken into consideration in order to make the project possible and to achieve the desirable results.

BRT as the solution

As the aim of this report is to study such a public transportation system as a core of the transformation policy that aims achieving more sustainable transportation, it would be useful to define what the sustainable transport system is in a more concrete manner. The European Commission (UE) document defines Sustainable Urban Transportation (Commission, 2013):

- Is accessible for all users and meets their basic mobility needs
- Guides a balanced development and prevents sprawl
- Limits inequality in access to transportation for the poor
- Integrates other modes of transport into the network
- Optimises cost effectiveness and efficiency
- Enhances attractiveness of urban environment, quality of life and health
- Improves traffic safety
- Reduces pollution and energy consumption

Even though these characteristics were placed in the internal document of the European Union, the fact that the definition is so broad and general makes it applicable to any other place in the world as a reference point. The issues regarding sustainability of transport are similar all over the world, even if they obviously exist in different intensity varying from country to country and city to city.

The solution in basically every city across the world is the idea of the implementation of large scale underground metro. These kinds of systems are proven to provide extremely high efficiency in terms of passenger throughput per hour. Unfortunately, the overall cost of the construction and the fact that it takes years to open the metro system, places it beyond the means of the majority of municipalities (Gilbert, 2008).

The alternative technology that can be used as the core for public transportation system is Bus Rapid Transit (BRT). It is the form of mass transit system that is based on rubber-tired bus-like vehicles, combined with stations, service system, running ways and information technology (Lindau, et al., 2014). The idea of using buses as the carrying vehicle in more organized public transportation system and experimenting in giving them the right of way is now new. Similar concepts were studied even back in the 1930's in United States (Lindau, et al., 2014). Since that time, there were many projects in North America and Europe that tried to use the road space differently, usually focusing on restricting the usage of the right lane for public transport and taxi. The first large scale development that can be called as the real BRT was constructed in Brazilian city of Curitiba and opened in 1972 (Mejia-Dugand, et al., 2012). It was the first transit system

in the world that worked with the bus lanes completely segregated from the road traffic and introduced rail/metro-like stations instead of regular bus stops. The project was developed along main traffic corridors in the city and was considered successful. It was a financially feasible solution to deal with the congestion on the main artery of the city and its popularity among Curitiba's inhabitants was very high (Mercier, et al., 2015).

The idea has spread quickly in the region and many developing countries around the world. Initially exotic way of providing mass transit turned into a common component of integrated transport systems in more than 190 cities in almost 50 countries (Lindau, et al., 2014). Currently there are similar systems operating in 194 cities and there are 141 under construction (BRTDATA, 2015). Among most recent examples, there are: the huge 140km long network of BRT corridors in Rio de Janeiro in Brazil and the highest capacity project in Guangzhou in China that reportedly is capable of moving more people per direction per hour than most of the world metros. Very recently, there are also examples of experimentation with BRT –like solutions in Africa, mainly in South Africa (BRTDATA, 2015).

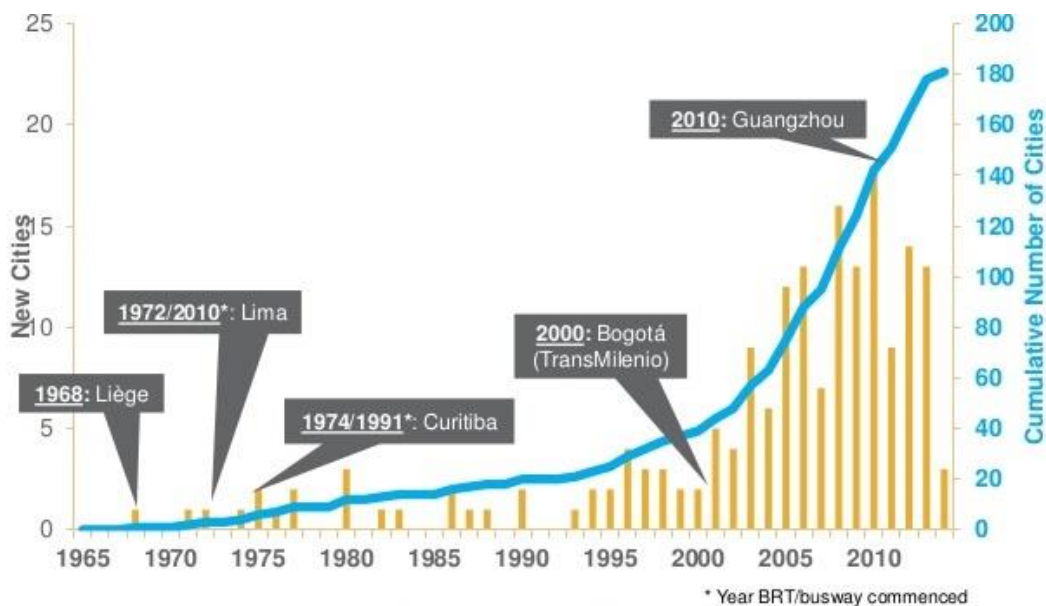


Figure 1. The growth of bus-priority systems around the world (BRTDATA, 2015)

As mentioned before, the most characteristic and visible feature of any true BRT system is the provision of fully or partially segregated road space, devoted for the system use only. However, there are many more attributes that appear in every functioning BRT. Most important to mention are:

- Integrated network that allows the bus lanes to coexist with the existing road infrastructure creating minimal disturbance.
- Large vehicles adjusted to high occupancy and standardized level of service.

- Stations that enable pre-boarding fare collection and liberate the bus drivers from taking that activity. This is especially important under heavy traffic when sale at the stop takes precious time.
- Platforms that increase accessibility to the bus for elderly and disabled. It also aims to speed up the loading and unloading procedure at the station.
- Centralized control that organizes the work of the system as a whole, tracking the vehicles and working in favour of performance optimization.
- Information technologies similar to metro. Is crucial to provide good level of service and travel planning for passengers.

(Wirasinghe, et al., 2013)

As Santiago Mejia-Dugand consciously notices, these characteristics do not seem very innovative, as we are used to relatively highest standards of urban transportation in the northern hemisphere. However, in many developing countries implementation of a fully integrated operative system of mass transit makes a difference in improving mobility conditions (Mejia-Dugand, et al., 2012).

BRT systems in many cities have proven to be able to provide similar performance to rail based ones, but at much lower cost (Gilbert, 2008). They can also play a significant role in easing the traffic congestion as it is measured that every full bus on the road causes the congestion level eleven times lower than the same number of people using private automobiles (Gilbert, 2008).

Despite its rapid expansion over the last decade, the BRT is still not a fully shaped concept, that means that in many cities, the idea of its implementation would face quite low both technological and institutional capacity (Lindau, et al., 2014). It is the role of good urban planning and governance that is central here in order to help the projects to be accepted, constructed and perceived as the investment in the city's future (Banister, 2013).

Research question

In this report, such a planning process of BRT system will be studied in detail, in order to learn how obstacles and barriers that such a project may face were dealt with and what kind of the impact did the project achieved. What had to be done, what issues were important on the way, how the technicalities of the project were solved and can the outcome be considered as a good step forward to achieving more sustainable future of the city's transportation? These are all the things that will be attempted to be discovered in this paper.

The chose case study is the capital of Colombia, Bogotá where the BRT project, called Transmilenio, was decided as a core city policy towards dealing with sustainability problems. It is especially interesting example of BRT being the major element of the city's strategy that aims tackling of the existing problems of transit system and the sufferings of the public transportation sector. The reasons that support this statement are the following:

The Scale of the Project

Bogotá's BRT system was at the time of its implementation (and still is) the biggest BRT project in the world. The fact that it was implemented in relatively short time (opened in 2001), and quickly expanded creates the unique opportunity to see what are the capabilities of BRT solutions.

The Scale of the Challenge

Apart from the fact that the project in Bogotá is so geographically expanded, an interesting factor is also the urban environment in which it was implemented. Colombia's capital is the biggest city in the country and one of the biggest in the world. The severity of the traffic related problems that the planners of the Transmilenio had to face, regarding the congestion, public transport demand and inefficiencies of the existing solution, makes it a fascinating object of study.

The Point in the Time & Space

Colombia is a quickly developing country. It went from 40% to 80% of urban population in just 30 years from 1960s to 1990s. The issues of unsustainability created by this rapid process are definitely considerable. Bogotá as a largest metropolis has suffered quickly growing congestion and pollution. The transportation issues were in the center of the political agenda at the moment when the project was decided, the city was very much in need of new solutions. It is interesting to see how a still emerging and relatively unknown public transport system was implemented with these challenging conditions.

All of these aspects constitute the justification for choosing the particular case and make Bogotá's Transmilenio a valuable object of study. The main research question that this paper attempts to answer in order to inquiry the details of the implementation process and the outcomes of the project is formulated as:

“Which lessons can be drawn from the process of the implementation of BRT project of Transmilenio about the barriers to planning for sustainable urban mobility?”

In order to support the main research question and direct data collection and analysis, the following secondary research questions are stated:

“What are the barriers to planning and implementation of sustainable urban transport solutions?”

“What were the reasons for sustainability problems in Bogotá?”

“What were the most important events during the planning and implementation process of Transmilenio in Bogotá?”

“What are the technicalities and results of the project of Transmilenio in terms of progressing towards more sustainable future for Bogotá?”

Report Structure

In order to answer the formulated question, the thesis is divided into 5 chapters that organize the research and create a coherent whole. In this section, the overall structure of chapters is presented with a synthesis of their contents.

1. Problem Formulation

In this part, there is described the relation between the transportation in urban environments and the sustainability of the development. The issue is about the role of public transportation in relation to unsustainable transport and its problems. The chapter also contains the basic explanation of the BRT technology including its features and advantages. The reasons for choosing the case study are given and the main research question formulated.

2. Methodology

The chapter describes how the chosen case can be used in order to learn about the phenomenon studied. It contains the information about the characteristics of the Bogotá's BRT and the process in which it is studied in the chapter 4.

3. Analytical Framework

The chapter focuses on the possible barriers and obstacles that can face an attempt to implement an innovative solution as the public transportation system. It aims to identify the barriers and obstacles for dealing with unsustainable systems in public transport. The goal is to create the framework of issues that can be later examined in the case. The identification of the difficulties will allow to uncover how they emerge in the story of the implementation strategies and how they were tackled.

4. Case Study

The case study is divided into 3 major parts:

4.1 The History of Transportation Problems in Bogotá

Contains the description and the characteristics of the problems that relates to the bus based public transport in Bogotá prior the realisation of Transmilenio. The special focus is on the nature of institutional arrangement of the system and the reasons why it continued to produce dysfunctional results.

4.2 The Process of Change

The timeline follows the events that form the process of transformation in Bogotá's transport policies. It includes the happenings that preceded the implementation of the BRT system connected to the preparation of the ground for the project. Later, the focus is placed at the implementation process of Transmilenio and the way in which the dysfunctions described in the previous part were dealt with and barriers overcome.

4.3 The Impacts

This chapter describes and evaluates the influences and results of the process described in the previous part. It is organized by different issues that the implementation of Transmilenio had an impact on until today.

5. Conclusions

Contains the summary of the lessons that can be drawn from the planning and implementation process, regarding the results achieved by the Transmilenio project.

2. Methodology

The main element of the work done in this paper is the case study of Bogota. The choice of the particular case was done based on its characteristics as the ‘critical case’, as defined by Bent Flyvbjerg. The ‘critical case’ is strategic from the point of view on the general problem of implementation of sustainable urban transport solutions, because it shows the particular circumstances where the especially important aspects of the problem were exceptionally exposed (Flyvbjerg, 2006). The studied case describes the project of particular size and expected impact. This, combined with the severity of the problems that the implementation of the studied transportation system was about to solve, makes it the critical case.

The methodological approach taken in order to answer the main research question formulated in the previous chapter is as following:

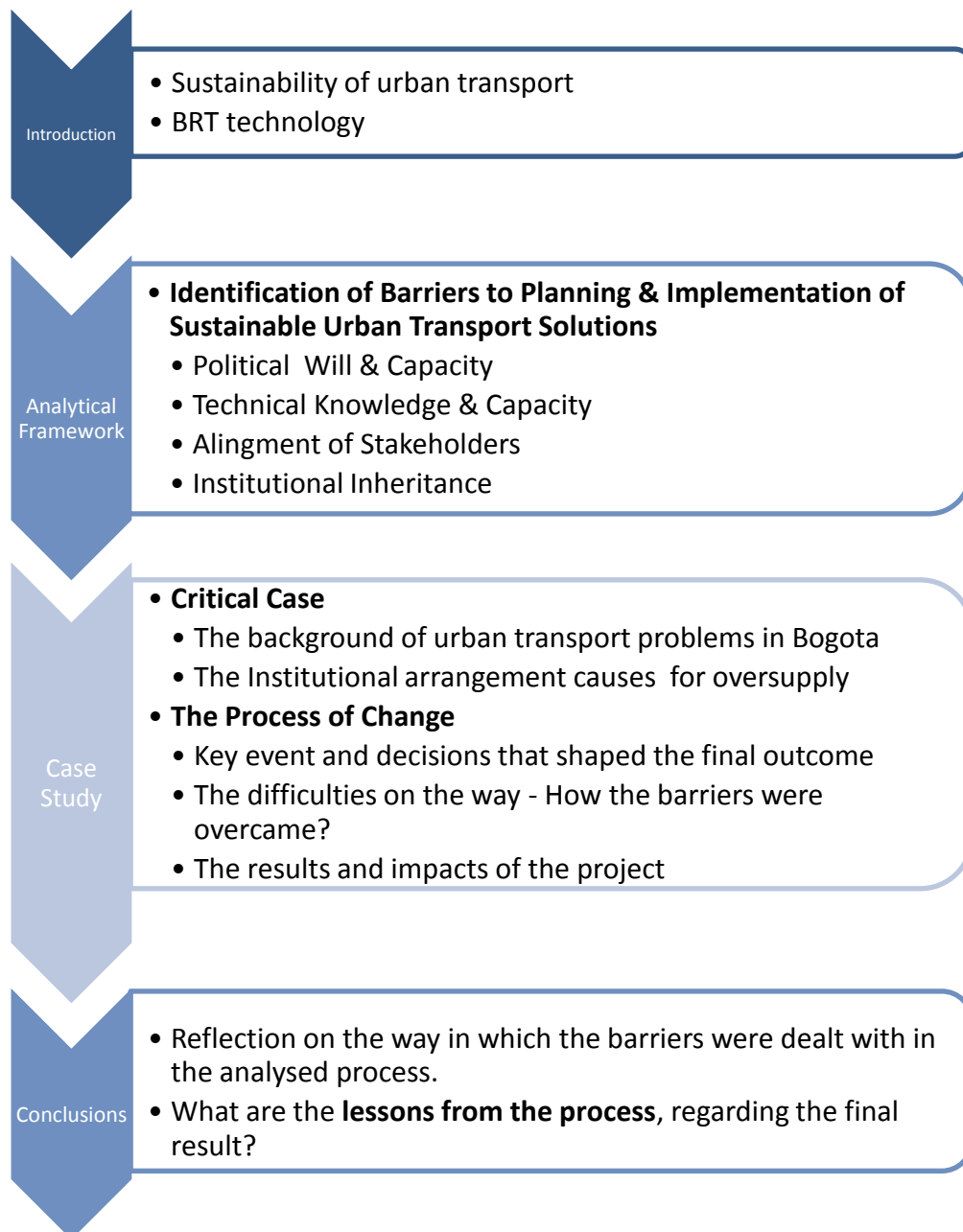
Firstly, the notice is pointed at the general issue of sustainability in urban transport as the challenge of modern times. The point is made that the innovative and integrated transportation system is crucially important in the policy package that aim to tackle the problem and contribute to changing ‘the course’ towards more sustainable future. The Bus Rapid Transit is presented as a potential solution, with its characteristics and advantages of low cost and fast implementation.

Secondly, the analytical framework is created in order to list down and characterize the potential barriers that appear in the planning and implementation process of urban transportation systems. The barriers are divided into four groups and described together with the particularly important issues to be considered while designing the solutions to overcome them.

Thirdly, in the case study, the analytical framework is used in order to help to identify the importance of the events and struggles in the process that led to the construction of BRT system – Transmilenio in Bogota. The aim is to notice how the previously identified potential barriers shaped in the particular studied case. The process is described following the timeline of events starting from the beginning of transformative actions that finally resulted in the completion of the BRT system and facilitated impactful transformation in the city.

In the conclusion, the reflection is being made on the way in which the barriers were tackled and, regarding the results of the project, what lessons can be withdrawn for other potential cities that will attempt to undertake similar effort solving the issues of unsustainability through implementation of new urban transportation system.

The progress of the work is presented in the scheme on the next page.



3. Analytical Framework

The aim of this chapter is to draw the analytical framework of challenges that are inherently attached to the issue of planning and implementation of sustainable urban transport solutions, especially in developing countries. The notion of 'barriers' is used in order to shed a light on policy characteristics, complexity and difficulties (Vigar, 2000). The main purpose of barriers identification is to allow their recognition in the studied case with the aim to enable a reflection on the political and planning actions taken in order to overcome them.

In common understanding, a sustainable transport system should provide effective solutions exceeding the goal of mobility service provision alone (Curtis & Low, 2012). Other goals usually involve reduction of currently present dysfunctions in the sector, improvements in quality of life, traffic safety and environmental conditions. Others, such as betterment of social equity through improvement of the access to transportation services, are rarely measured, but increasingly important (Curtis & Low, 2012).

Integrated transportation system, as the core of the intervention in the urban transportation, constitutes the biggest challenge for planners (Curtis & Low, 2012). It is important to recognize that such a system is a part of the city as a socio-geographical cluster with all its social, economic and political relations (Valderrama Pineda, 2013). In other words, it means that the elements of the system, stakeholders, decision makers, political bodies and service providers have to find their place between the existing conditions. The transportation system is composed by a set of actors and interconnections between them. Very often these interconnections involve conflicting interest and different perceptions about the need and possibility of bringing change (Curtis & Low, 2012). Implementation of the technology does not stand for the transformation itself, but can be understood as the mere mean to achieve it (Mejia-Dugand, et al., 2012).

That is why it is not by only defining the goal (implementation of the system) but finding the effective solutions and designs of the elements of the system, in view of contributing to a sustainable transformation, what proven to be the most important task. The challenge is to be able to successfully implement the chosen technology so that it serves its role an improvement towards more sustainable city (Schwanen, et al., 2012). In particular, transportation systems have different characteristics and require different solutions for successful operation. The planning effort has to take into consideration the specific context in which the project is being implemented (Mejia-Dugand, et al., 2012). Any decision in the transformation process cannot neglect the features of the context. Mere relying on the rational action and working in separation to specifically local circumstances and lack of deep understanding of the problem generation mechanisms in the specific context often result in failure (Mejia-Dugand, et al., 2012). In developing countries, particular traits and historical features should be especially considered when developing any social or infrastructural plan (Mejia-Dugand, et al., 2012).

Certain ways of dealing with public transport provision are embedded in the institutional arrangements of existing systems, organizational structures and mechanisms of relations between different elements that constitute the system (Schwanen, et al., 2012). These complex networks of institutions strengthen themselves, usually into stable setting, which is the binder that makes it possible to maintain the existing situation and cause reluctance to change (Schwanen, et al., 2012). In literature, there are different conceptions of what institutions and their arrangement are. Central to all definitions, however, is the notion of rules. Rules of political and market game are where the institutions are embedded as formal legal constitutions (Curtis & Low, 2012). The challenge to change is to guide the political process in a way that these complexities are recognized but also reorganized according with the existing structures so that 'the rules of the game' are changed and justified to more sustainable model (Lindau, et al., 2014).

So what are then the aspects that slow or stop the implementation of sustainable transport system? From the literature that specialises on the issue, there can be distilled following barriers that have to be overcome in order to make such a transformation happen. For the purpose of more clarity they are here being organized in certain groups, where their characteristics are explained in relation to the search for possible solutions:

Political will and capacity

Political will is by far the most important ingredient in making institutional transformation possible (Wright, 2004). Transport systems are not only technical machines designed in order to resolve mobility problems. The political aspect is extremely important. The systems have to be built and decisions have to be constantly made in order to build them. This implies the need for political power and possibility to mobilize the financial resources of the state (Wright, 2004).

In most of the world's cities, already exist a variety of subjects responsible for planning and implementation of urban transportation systems (public transport authorities), the existing bodies usually have strongly defined mechanisms of doing things and certain view on favourable solutions (Schwanen, et al., 2012).

The debate about alternative solutions can be dominated by the ideas, coming from other contexts, that are generally considered as proven to work and it is not easy is to promote unconventional solutions. The engaged entity supposed to promote new solutions has to be able to communicate the advantages of the solution or find itself in the position within political power dynamics that would enable enforcement of certain solutions and decision making (Schwanen, et al., 2012). Strong leadership and the readiness to take political risks are needed.

Another, very important issue is the need for the continuation of policy and planning process. Reference to political motivations can illustrate how difficult the achievement of major institutional and infrastructural transformation can be (Vigar, 2000). The transportation system entails an investment, the complexity of elements that have to be taken under consideration and the amount of financial resources needed for project's

construction that make it almost impossible to complete the whole system within one political cycle (Curtis & Low, 2012). Even if the change is mobilised and the transformation of the transportation system begins, a long timeframe and continuous perseverance of driving forces is in need. Otherwise, the efforts and resources can be wasted (Finn & Walters, 2010). Events and changes in the local government can provide a structural challenge, as new political programs are often aimed at reversing the course taken by the opponents (Curtis & Low, 2012). Continuity and institutional memory is also very crucial as the ministers and political personnel can be changed by new coming political actors.. It is important to preserve the technical capacity and not be forced to start the planning from the scratch all over again (Curtis & Low, 2012). The political will is needed to create the agenda for continuity of already agreed programs and avoiding changes caused by tactical political actions (Finn & Walters, 2010).

Technical knowledge and capacity

In most world's cities, existing departments and agencies that create and regulate the public transport provision lack the level of expertise needed for being able to design a successful public transportation system. The common issue regarding their work is the overlap of competencies and the tendency to work in sectorial separation from another (Lindau, et al., 2014). The lack of information about innovative solutions and the knowledge needed in order to resolve technical and institutional challenges, often go together with the lack of human resource capacity (Wright, 2004). Transport departments in many big developing cities are assigned to work on a variety of issues with a limited staff. The insufficient institutional and technical capacity at the local level harms the capability of the agencies to consider and undertake solutions that go beyond the incumbent way of dealing with problems, even in the case when the awareness of opportunity to do so exists (Wright, 2004).

The knowledge that is necessary to get the capacity to successfully plan and implement the transportation system includes different areas: experts are needed in order to provide the design of a new system in technical terms. New vehicles, stations, routes, coordination system, route planning, system supervision and feedback are all important (Wright, 2004). Not less essential is the ability to analyse the dysfunctions of the institutional arrangement within the existing system that has to be changed in some parts or even replaced in order to bring more sustainable alternative. Changing the existing operational patterns can breach the interests of current participants that belong to it. Therefore, there is a need of new expert knowledge on how these settings can be reorganized so what the change has to consist about when accepted (Finn & Walters, 2010).

Alignment of stakeholders and securing support

The public transport sector in developing countries is in most cases dominated by the private sector, especially multiple separate small operators that own only few vehicles and are not able to support their service with more advanced technologies or integrated systems (Finn & Walters, 2010). It is almost the norm that the sector is subjected to the lack of clear and effective regulation and often left to individual responsibility of self-

regulation as well as often there is a part of the sector that operates outside of any legal framework (Finn & Walters, 2010). In these situations the operator sector consists of thousands of small participants. There is a wide spectrum of possible organizational arrangements, different forms of contracts and elements that make the system work. This creates major difficulties for the public authorities to deal with the problems and negotiate new solutions with a plurality of subjects (Finn & Walters, 2010).

The operators may be very sceptical towards any plan that would include changes in their current way of doing the business. Especially when the new solution creates competition, endangers their future income, position on the market or even the viability of their existence (Wright, 2004). Traditionally, the transport has been the policy sector that characterized with relative stability and incremental changes (Vigar, 2000). Making big changes in order to achieve powerful transformation is often considered as controversial move that aims to attack the interests of existing service providers (Vigar, 2000). The strategies should recognize that there are weaknesses in the institutions and organizational frameworks that have to be re-established. Change is not easy and can be difficult to mobilise even if it is clear to the majority of the stakeholders involved that the existing conditions are flawed and ineffective (Finn & Walters, 2010). Overcoming the resistance from special interest groups can appear to be a burning problem as the organized lobbies can persuade with very powerful political arguments. Political opponents can very often take advantage of arising conflict and try to capitalize on it (Wright, 2004).

That is why it is important to establish cooperation with the most of the relevant stakeholders. The subjects supporting the change have to be able to communicate the aims of the policy change in order to get for example: access to funding (Finn & Walters, 2010). The planning process therefore requires an effort of mediation for understanding the stakeholders' possible involvement and negotiations that can lead to possible solutions that are beneficial for diverse interests in order to deal with conflicts that could prevent the realization of the transformation (Finn & Walters, 2010). This mediation can be the task that requires a lot of effort and co-ordination, but the gains can also be significant. In particular, it can help to build the consensus about the need for the changes to be made and in the end, benefit the interests of both the public authorities and the participating stakeholders (Finn & Walters, 2010).

One thing that is especially worth of paying attention is the focus on motivations and incentives that create the basic condition for the changing behaviour of stakeholders (Finn & Walters, 2010). Proposals that include the concern of the diverse interests prove to be inclusive and beneficial for their economic interest that is usually a desirable one (Finn & Walters, 2010). Collaboration with the existing participants of the sector forming new institutional arrangements deserve also of special attention. It is important to analyse the internal dynamics of their operation and their perception of what can be done in order to improve it (Finn & Walters, 2010).

Institutional inheritance

The interactive processes between the different actors who constitute the institutional arrangement for the urban transportation system are shaped by their institutional inheritance (Healy, 2007). That means that the old institutions are hard to remove and the creation of the brand new setting will always have to co-exist and interact with the previously ingrained one. The transformation from one dominant system of institutions to a new one does not only include the re-configuring of the legal ramifications of the system by the actors with leadership qualities (Healy, 2007). It also means the generation of change of behaviour among all participants of the system whose perception of desirable way of functioning should align with the new system of institutions (Healy, 2007).

From the perspective of planning urban transportation systems, it means that the existing institutional setting in which the providers and regulators used to function, shapes their perception and ability to accept change. It can be a major challenge to get rid of the accustomed way of dealing with problems and 'doing business' because it is deeply ingrained in their day-to-day practises (Healy, 2007). It can be the challenge for the newly constructed institutional setting to be accepted, and its functioning can be hampered by the competition from the side of the older setting. The co-existence, of the two is an issue that has to be taken into consideration by planners and the effort should be made at making the participants of the system to perceive the change towards the new setting as something that serves their interest.

4. Case Study

The chapter describes the case of Bogotá, Colombia that hosts one of the biggest bus-based public transport systems in the world. The city's municipality used BRT as a crucial part in their strategy to overcome traffic related problems that had grown to alarming scale in 1990's. The structure of the sections is crafted in the following; it firstly shows the background information about the place, its political and economic context. Secondly, the history of the public transportation in the city is briefly mentioned in order to understand how the problems were created and to uncover the complex mechanisms behind them. The third section focuses then on the timeline of the reform attempts. Important events, actors and their roles in shaping the final outcome of BRT system are highlighted. Finally the results of the efforts are shown and evaluated in order to see what kind of change the project (and the surrounding initiatives) brought to the city in terms of sustainable mobility.

Information about the city

Bogotá is the biggest and most populated city of Colombia and one of the biggest in South America. The city covers 1637km² and around 360 of them are heavily urbanized. In 2010 there were 7,3 million inhabitants and the density was over 20.500 people on square kilometre. That means that as far as density is concerned, Bogotá is one of the mostly dense metropolitan regions, comparing to other cities all over the world (Bocarejo, et al., 2012). Over the last decade, the number of people living in the city grew with the rate higher than 2% yearly. This trend is expected to continue in the future and the total number of inhabitants in the urban region is predicted to surpass 12,5 million by 2040 (DANE, 2015). The city is a political and financial capital of the country, accounting for more than 25% Colombia's GDP. Bogotá is definitely the most important city in the country (Turner, et al., 2012).

Spatial distribution of population and functions can be observed throughout the city. Low income households are condensed in the southern and western part areas, very often on higher, less accessible grounds and steep slopes (Bocarejo, et al., 2012). These regions are characterized with highest formal unemployment and highest densities in the city. It is a worth noticing fact that the density usually comes from overcrowding rather than high raising developments as the buildings are mostly low (Bocarejo, et al., 2012). Public transport access in these areas is not very good and it can be said that this situation plays a role in strengthening the isolation of the poorer districts, and inequality regarding access to city's facilities. Northern and central neighbourhoods on the other hand, show the existence of much stronger transport network. There are also more high buildings and concentration of workplaces is greater. It is also on the northern side of the city where the wealthier citizens traditionally live.

This pattern described is characteristic for South American cities where the degree of social segregation and inequalities derived from it is usually very high. Better neighbourhoods are provided with better infrastructure, but in general up to 83% of all household classify in the low income category (Bocarejo, et al., 2012).

Figure 2. Employment Distribution

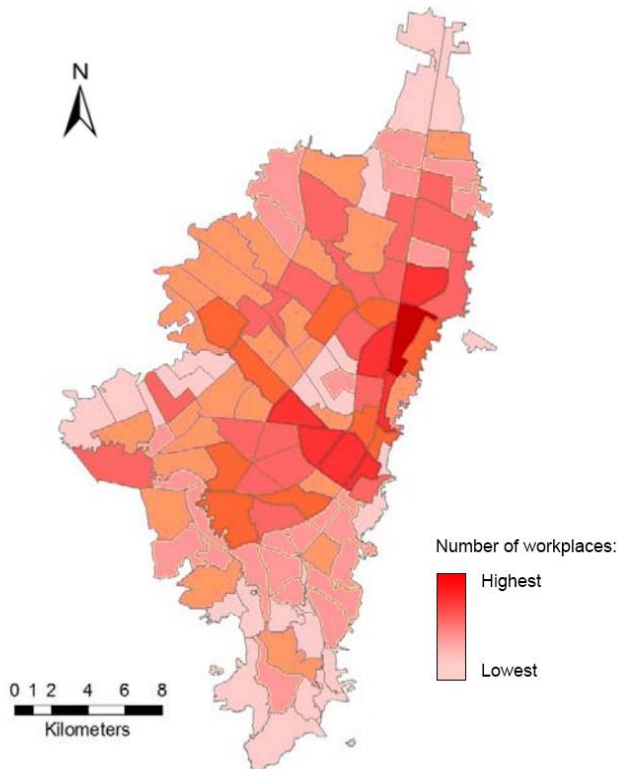
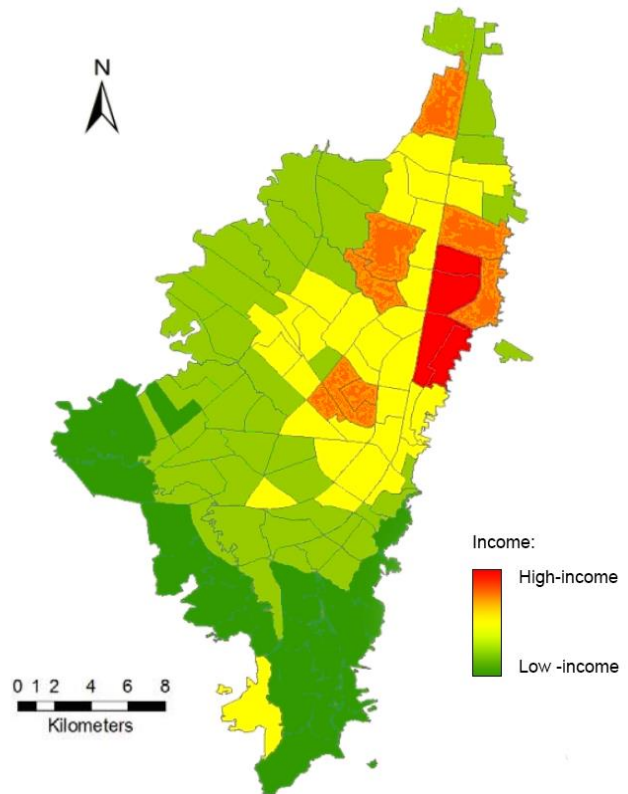


Figure 3. Spacial Distribution of Income Groups



Source: (Bocarejo & Tafur, 2013)

Political context

The state of Colombia is unitary republic, which means that the central government plays a key role in policy formulation in many areas, including urban transport (Ardila-Gomez, 2005). The decentralization of organizational structure divides the state into three levels where each of them includes separation of elective, legislative and executive bodies. The 3 levels are:

- Central – that is the national government in form of the President of the Republic and the Congress
- Departmental – in given case the most important actor is the Ministry of Transport.
- Municipality – The mayor and the city council.

It is important to notice here that the most powerful position on the local level, which is the mayor, is elected for only 4 years without the chance for immediate re-election. What is more, during the planning process of the Transmilenio project and before, that term was

even shorter and lasted 3 years. This is important information as the length of the term could play a role in behaviour and decision making for political actors (Ardila-Gomez, 2005).

The constitution assigns the responsibilities regarding urban transport provision in the following way:

- The role of the National Government is to set broad policies, long-term financial plans, safety standards and procedures related to market access. In addition, the government holds a specific fund in order to support infrastructure projects identified as crucial for the country.
- Municipality is responsible for urban transport planning and construction of transport infrastructure. It has to organize funding, regulate the provision of transport services and define their organizational structures. It is the role of the municipality to set fares and regulations about the maintenance of the traffic system.

Economic situation

Colombia is a developing country. Its economy is characterized with relatively fast growth over the last 25 years. However, the growing trend was not constant. The financial crisis of the year 1999 caused the economy to slow down and even enter recession. The recovery was slow and in the result, the GDP per capita numbers from 2003 were still lower than in 1995 (DANE, 2015).

The isolated data from Bogotá itself followed similar pattern. Poverty numbers were similar. In 1997 41,9% of citizens were classified as poor and in 1998 that percentage has risen to 54,8% which stands for over 3,4 million people (DANE, 2015). The information is important enough, because the financial situation in terms of resources available and the atmosphere had quite an impact of very selection of BRT over subway system (Ardila-Gomez, 2005).

4.1. History of the transportation problems in Bogotá

The history of public transportation in Bogotá has more than one hundred years. At the beginning of the 20th century there was the first electric tram operating in the old city center (Monir 2011). It was a private initiative, as well as other public transports at that time. It is interesting to mention because the history of transportation in the city is consisted of continues swaps between public and private sector as main provider and the ownership structure settings changed few times. Up to the 70s the sector became completely dominated by full public city's company as the only legal provider of bus services (Echeverry, et al., 2005). Later is witnessed slow transition back to the private provision due to lack of flexibility and productive inefficiencies that characterized public provision. There was a lot of corruption, too many drivers per vehicle and high waste of financial resources (Echeverry, et al., 2005). The result of the gradual changes was the system that is still dominant in the city and is trying to be replaced by the Transmilenio. The system is based on private service provision under the set of regulatory surroundings defined by the municipality's body. This relation between the regulators and service provisions will be described later in this chapter as it was a fundamental reason for many traffic problems.

Traffic related problems that were present in the city of Bogotá and grew to alarming point in mid 90s could be quickly summarized as following:

- Low level of the service in public transportation, the buses were poorly maintained and there was no reliable system.
- Extreme oversupply of buses. Combined with the growing number of private cars on the streets resulted in dangerously growing congestion, pollution, extended travel times and lack of safety.
- Decreasing ridership in the public transport due to its degenerating condition.
- Growing social inequalities in terms of transport access.
- No political capacity to change the situation

The problems will be discussed in more detail underneath, with the focus on their deeply rooted causes as well as specific traits.

Public transportation demand and car ownership

Demand for public transportation and ridership grew consistently in 70s and 80s (Echeverry, et al., 2005). It was caused by economic development of the city and fast urbanisation that increased the need for travel among citizen due to more opportunities of work and longer distances. At that city Colombia was a society with relatively low car-ownership. At that time there was only one car for each nine Bogotáns (Monir 2011). Any transportation activity was very dependent on public transport. Even now around 71% of all motorized trips in the city are made by bus (Monir 2011). However, with the

beginning of 90s the rideship in public transport started to go down (Echeverry, et al., 2005). The change of the trend can be associated with following reasons:

- The opening of Colombian economy that happened in the beginning of the 90s resulted in easing the restrictions regarding car import and taxes on it. In consequence, the cars became more affordable and their number in whole country and its capital city started to grow at much faster rate (Echeverry, et al., 2005).
- Increased congestion influenced the number of daily trips undertaken by many citizens because of the fact that they started to change their travel habits due to time loss. It was simply not worth it to loose hours to go back to the suburbs between morning and afternoon activities and many people started to cut their travel numbers (Echeverry, et al., 2005).
- The conditions in public transport were very poor it terms of safety, travel comfort and most important time travel. Average person would spend more than 2 hours daily in a bus which is an incredible number noting that average travel length was shorter than 10 km (Echeverry, et al., 2005). That caused many people to opt out to cars or cut their travels.

From 1991 to 1995 the total number of cars that were registered in Bogotá rose by 75% and that number meant that more than 40% of all cars of the country were circulating around the city (Echeverry, et al., 2005). That is a huge growth but it is worth mentioning that even though the car ownership grew at high pace, majority of the population still depended on buses as their main mode of transportation. The increased amount of car traffic added with the mentioned oversupply of buses created a situation where the traffic capacity of the city's infrastructure was exceeded. This resulted in even more congestion, even longer travel times and degradation of urban space that was dominated by cars. By 1998, 64% of all road space of the city was occupied by private vehicles but only 19% of population were motorized.

Although the private cars and public buses were part of the same traffic congestion, the travel times were different and much more in favour of the cars. The average trip time taken by car took less than 45 minutes comparing to over 1 hour by bus (Echeverry, et al., 2005). These inequalities in obvious way worked in favour of the further change towards more cars and growing problems in the city.

Institutional background of the problem

In order to understand the problem better, it is important to describe the system that produced the bad result and the role of each subject in the system. In Bogotá over the last 30 years the public transportation provision was almost entirely in hands of a large group of private entrepreneurs while the local authorities took the role of regulators of the system. This combination resulted in increasingly dysfunctional outcome. (Echeverry, et al., 2005)

As it will be shown on following pages, the institutional arrangement in the sector of public transport in Bogotá was full of incentives that evoked certain behaviour of the

actors in the network and therefore led to problematic situation when congestion, low quality of service and extreme oversupply of buses on the road had a chance to occur.

STT

The body of municipality, responsible for organizing structures in which transportation system works, is the Secretary of Transport and Transit (STT) (Ardila-Gomez, 2005). It is local governmental agency that establishes regulations specific for the city and is in charge of its enforcement. In relation to bus transport the role of STT was to set new routes, schedules, size of the bus fleet and frequency of service needed to meet demand (Ardila-Gomez, 2005). These are all theoretical responsibilities that do not relate to the real function of STT that was not strong enough and did not have the capacity to successfully fulfil those duties as regulator (Echeverry, et al., 2005).

Bus Companies

The Colombian law states that the public transport can be provided only by registered bus companies (Ardila-Gomez, 2005). In Bogotá, at the peak, there were 64 independent bus companies providing the service. In order to function, all the companies had to get the exclusive right to certain routes set by the STT. The procedure of acquiring the concessions in theory was based on the bid, where different companies had to compete against each other to get the route. The reality, however, occurred to be quite different because the STT did not have the capacity to carry out the research and to find the demand for new routes. The common practise was that the bus company provided the arguments for new route creation and therefore was normally 'winning the bid'. (Echeverry, et al., 2005) The importance of licenses awarded by the STT has led to widespread atmosphere of suspicion of corruption in the process of route rights allocation (Gilbert, 2008).

Characteristic feature of bus companies running in Bogotá was that they usually did not own the fleet of buses. Instead, they were renting the rights to operate on their routes to smaller bus owning companies (Ardila-Gomez, 2005). Normally the payment took the form of monthly fee called *cupo* that bus owners had to pay for each bus they wanted to operate on the route (Echeverry, et al., 2005).

This is very important arrangement that resulted in series of misalignment of incentives for the members of the system. The assets of bus companies were the rights to routes that they were buying from the STT. Their source of income depended solely on the number of operating rights sold to the bus owners. In this situation the number of passengers carried or the quality of service did not have impact on their financial situation as they were not the direct providers of the service. Bus companies therefore were in the position where in order to optimise their incomes they had to maximise the number of buses on the road and sell as many rights to routes as they could (Echeverry, et al., 2005). Even the fact that the buses could circulate empty, without taking passengers would not have impact on their situation. This has led to disastrous oversupply of buses on the streets of Bogotá as bus companies had a tendency to lure additional bus owners into the system.

Table 1. The excessive number of buses in Bogotá, in comparison to other cities in the region

City	Number of Buses per 1000 habitants
Bogotá, Colombia	3,6
Curitiba, Brazil	0,7
São Paulo, Brazil	0,6
Quito, Ecuador	1,0
Santiago, Chile	1,1

Source: Steer Davies Gleave 2000, as reported by Ardila-Gomez 2005

Bus companies in Bogotá belong to trade associations, which was the common practise to protect their interest and give power to effectively influence legislation (Ardila-Gomez, 2005). There are many such associations (the biggest are: Conltur, Fecoltran and Asotur) but in all the practise is that the CEO of the biggest affiliated bus company is the head of the association. The strength of bus companies combined with the weakness of the state resulted in disproportion of power and companies through their associations managed to effectively lobby for changes in law and STT decisions (Ardila-Gomez, 2005). This relates especially to two aspects. First is the lobby on STT to gradually raise the fares that helped bus companies to find additional investors in form of bus owners who were looking to make profit. From 1975 to 2004 the fares have risen by more than 400% adjusted for inflation (Echeverry, et al., 2005). The second is the ability to oppose changes that STT wanted to introduce in order to reform the system. Bus companies used their influence to complain to ministry of transport and convince it to defend their interests (Echeverry, et al., 2005).

Bus Owners

Finally, the direct providers of the bus service were the bus owners. They had to rent the right to operate on the routes from bus companies and earn on collected fares. In order to make profit they had to compete strongly for passengers. It was also their responsibility to take decisions about when and where to operate and to maintain the buses (Ardila-Gomez, 2005).

The nature of bus owner's sector was also very characteristic for the transportation system of Bogotá where it was quite disorganized and much atomized. Only 2% of bus owning subjects had more than 10 buses. Vast majority, that is 85% owned only one bus or less, that means that they hold shares in one bus (Ardila-Gomez, 2005). It was common that bus owners were single-person companies when the owner was the driver as well (Echeverry, et al., 2005).

Bus owners earned on the fares, that is on commissions from each customer that they managed to attract to ride their vehicle. The prices however, were arbitrary set by the STT influences by strong bargaining power of bus companies. That forced the bus drivers to

rely only on the ability to win the direct competition for the passenger waiting on the curb. This mechanism resulted in the phenomenon called ‘Guerra del Centavo’ that can be translated into ‘Penny War’ (Ardila-Gomez, 2005), where the drivers practised dangerous manoeuvres on the road in order to get more passengers. This was the example of extreme competition that, especially in the conditions of bus oversupply very often took physical form of frequent accidents and buses stopping rapidly without bus stops, in the middle of traffic in order to let people on-board. (Ardila-Gomez, 2005). The literature also describes cases when bus drivers decided to go off the route to take additional round along most crowded streets in order to look for more passengers (Ardila-Gomez, 2005). It is possible to say that the absence of price competition was a one of the factors that led to weak mechanism to regulate the number of buses.



Picture 1. ‘Guerra del Centavo’, the oversupply of buses on the street of Bogotá (Bogota - Change, 2009)

The ability of bus companies to effectively lobby for pushing the prices above the competitive equilibrium continued to make the sector profitable and caused overinvestment in form of many new small bus owners who were coming into business with their own buses (Echeverry, et al., 2005).

The fact that individual bus maintenance and its consolidated price did not include equipment depreciation led to existence of many aging and decaying vehicles in operative fleet. In other words, the fact that the drivers were not obliged to include the perspectives of buying new buses to replace the old in their financial calculations caused the situation where they used to take advantage of it and never replace their vehicles. It was commonly called ‘canibalizing’ the buses (Ardila-Gomez, 2005). Bus owners also were affiliated in trade association and used the department of transport as protector of their interests. The

good example here is the ability to halt the attempt to bring down the maximum age of vehicle allowed to function as public transport provider. The lobby managed to bring it up to 30 years when a norm is 15 (Ardila-Gomez, 2005). Huge atomization of the bus owners made it very difficult for the municipality to talk to them and effectively convince to their vision.

Another issue was that the bus owners usually were looking to rent only the right to operate on the routes that were passing through most crowded places, because that increased their chance to find more passengers. The demand for such routes made bus companies to take similar stance as well. The effect was that most of the routes were overlapping on several most important corridors creating huge congestion and competition in the city center (Ardila-Gomez, 2005). By the year 2000 there were 631 routes in the city with an absurd number of over 22.000 buses operating on them (Figure 4). At that point 70% of air pollution was caused by transport and average speeds were as low as 10 km/h, dropping to even 5 km/h in more congested areas in the city center (Echeverry, et al., 2005).

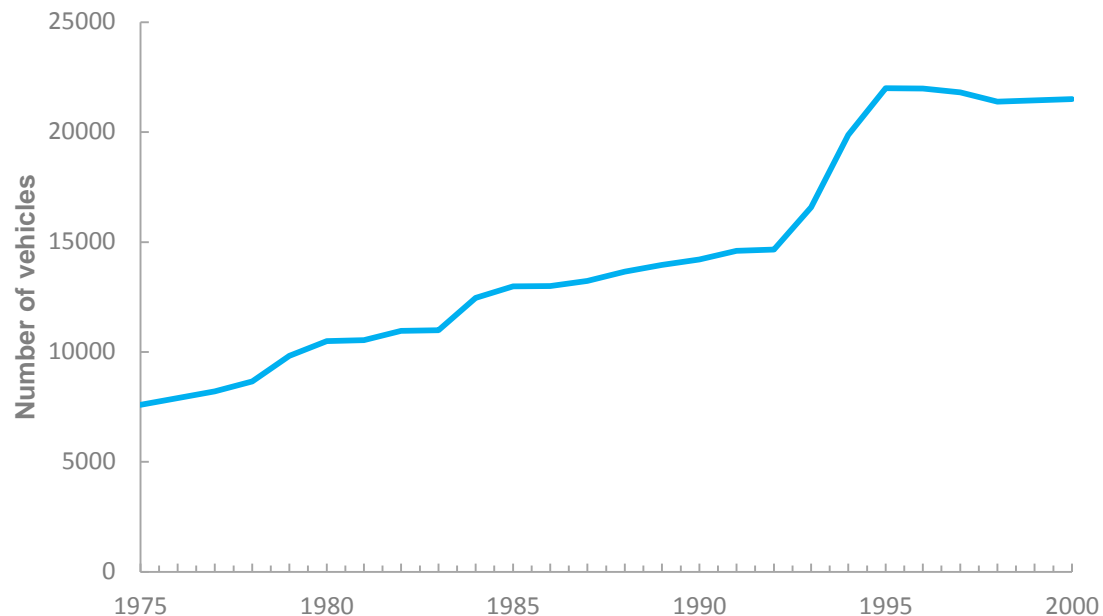


Figure 4 Public transit vehicles fleet in Bogotá before BRT system introduced

Pirate market

Apart from the official bus companies and affiliated bus owners, there is a part of transport market that is occupied by illegal services locally known as *'pirate'*. Operating on routes requires renting the right from bus companies and paying the *'cupo'* on monthly basis. In consequence, there is many buses that provide the service without being affiliated to any bus company. They very often look just like the “legal” buses or even have duplicated paperwork supporting their operation (Ardila-Gomez, 2005). It makes it quite difficult for authorities to distinguish which buses are actually registered. The result is the competitive pressure against legally functioning enterprises from the side of ‘pirates’ who due to not paying the fees can operate on lower cost. The actions taken by

STT against this informality were usually not successful and it is believed that up to 9000 'pirate' buses function in the city today (Ardila-Gomez, 2005).

Summing up this part it is possible to say that the low quality of bus services was due to inadequate, wrong institutional arrangements. That resulted in many further going consequences for the city and its inhabitants. As the efforts made by existing authorities were not effective and the problems were worsening, the tipping point was reached. That went along with significant political changes and total metamorphosis within the transportation system. The transformation was built around BRT system implementation that was about to replace the dysfunctional settings. However, the process is more complex than just the BRT and there is large number of important and interesting events and conditions that *'prepared the ground'* for the project and shaped the final outcome. They will be described in the upcoming section, following the timeframe of happening. The latter part will focus on the outcomes, impacts and existing challenges that still exist.

4.2. Process of change

In 1990 the problems of Bogotá were at their peak. They were related to all sorts of areas. Poverty, growing slums, overwhelming corruption, violence and crime connected to drug cartels. All this caused the urban decay and the city was often called as one of the worst on the planet (Bogota - Change, 2009).

Even though the Transmilenio project was not inaugurated before the year 2000, it is important to take a look at immediately preceding developments in city's politics. That will help the reader to better understand the background of decisions taken by city's leaders and the importance of other events that had initially little to do with infrastructure investments.

Electoral campaign 1994.

The real transformation process has begun in 1994 when the circumstances allowed new politicians with radically new methods to take power in Bogotá.

Enrique Peñalosa was a young candidate for the mayor office from the side of Liberal Party. He was strongly dedicated to western style of doing politics, which was very different from everything known in Colombia so far. He tended not to appear at official debates and instead took that time for meeting with citizens in order to build trust among them (Bogota - Change, 2009).

The main counter candidate of Peñalosa was controversial Antanas Mockus, at that time the dean at the National University in Bogotá. He got popularity after serious of scandalous events in that he was part of. It included obscene behaviour and physical violence during public meetings and resolution of tensions at the university (Bogota - Change, 2009). Mockus was an independent candidate. His main agenda was social transformation and behavioural change, tackling criminal culture and promoting peaceful healthy lifestyle.

That period of domestic politics in Colombia was very dynamic and emotional. Both candidates had to face situations that are not very familiar to modern western democracies. The public was set very much against political class that was considered as corrupt and fake. This is probably the reason why majority of the voters tended to support controversial candidature of Mockus who was 'unorthodox but authentic' (Bogota - Change, 2009).

Here it is important to mention that it was Peñalosa, not Mockus who insisted on the importance of changes in urban design and infrastructure. That topic, however seemed to be lost in the collision with all the controversies and Peñalosa as 'mainstream' politician did not gain sufficient popularity. Even Peñalosa later acknowledged that "Maybe sometimes there is a need for some kind of people" (Bogota - Change, 2009).

Mockus term 1995-1997

Antanas Mockus has won the election with biggest majority ever achieved in Bogotá's history and took office on 1st January 1995 (Bogota - Change, 2009). The city did not undergo many physical changes under his term, but undeniably, structural and institutional changes were significant. As a candidate without any political affiliation, Mockus put big focus on getting rid of corrupt and stagnant relations within the local government. His efforts to break nepotism resulted in heavy critique by opposition and members of the city council. The change was difficult because it interfered into friendly and often familial connections that were omnipresent in the government at that time. The mayor was accused of the abuse of power and attempts to govern the city without the council in neo-anarchist manner (Bogota - Change, 2009).

Apart from the battle against corruption, the most important thing about Mockus role in transformation of the city was his innovative, performance-like solutions to face the social problems of the city.

In the eye of Mockus, many of the problems that Bogotá's society suffered from could not have been overcome without cultural changes. The fact that people did not care about public spaces, environment and did not respect each other was due to the lack of social condemnation. This could be also related to traffic problems, the violent behaviour on the road and disrespect for the rules. All this behaviours, according to Mockus were present because they were morally acceptable and considered normal (Bogota - Change, 2009). There was a belief that if the people can be somehow encouraged to re-educate themselves and rethink their behaviours the cohesive atmosphere in the city would change and the more tangible improvements would follow.

The means through which Mockus' administration tried to change the city for the better were very unorthodox. Here I am going to present few of them to show what kind of actions they were.

There was organised a campaign with cards/stickers to be given to other drivers as a form of mutual rating of driving culture (Bogota - Change, 2009). Another example can be the famous action with mime artist who would regulate the traffic instead of ordinary policemen who had little authority. They were walking around the city center and doing various things, like stopping cars, pushing them if badly parked, making people cross the street in marked crossings etc. On the other occasion, Mayor Mockus dressed as the superman was walking around the city removing 'visual pollution' in form of posters and commercial banners. He was under strong critique again and his ideas were described as 'childish games' by his opponents.

Other undertakings, tried later in his term, such as forced closing hours for bars and discos or engaging in talks with local cartel's bosses about reduction of violence only strengthen his position as a controversial figure (Bogota - Change, 2009).

The results of this kind of politics were surprisingly positive. During his 3 years on the office, Mockus managed to achieve significant success in his fight against corruption and

violence. It is possible that the results were mostly branding ones, but the change of atmosphere and people's opinion was a good fundament for further transformation (Bogota - Change, 2009). For the achievements in decreasing corruption the Municipality was awarded the "International Finance Review Award" (Bogota - Change, 2009) and the access to big financial loans that were not without any meaning when it comes to upcoming investments (also in transportation system).

Enrique Peñalosa as the mayor - the beginning of Transmilenio

As mentioned before, at the time of the events the mayor of Bogotá was not allowed to seek re-election, therefore after Antanas Mockus there was another change at the office and whole cabinet. The next leader, who was to continue the changes and build on the legacy of predecessor, was Enrique Peñalosa who started in elections again, this time as an independent candidate as well (Bogota - Change, 2009).

In January 1998 he took the Mayor of Bogotá office. Hoping that this time the society was more receptive to his proposals Peñalosa proposed huge investments in city infrastructure in order to create something that he called "The democratic city" (Bogota - Change, 2009). The aim was to achieve equality by the use of urban desing, new parks, sidewalks, bikelanes and the brand new public transportation system. He had plans to completely transform the transportation in the city, and was determined to start his actions immediately (Ardila-Gomez, 2005).

In the first month of his term he has assembled a planning team designed just to the purpose of fulfilling his promises (Ardila-Gomez, 2005). The mayor elected as he claimed some of the best business executives in the whole country in order to have people with practical experience and proven skills, that could start to implement changes quickly (Bogota - Change, 2009).

The team was characterized with high technical and political capacity and was organized as a separate body independent from the council and responsible only in front of the mayor himself (Bogota - Change, 2009). It was a way in which the works on city's restructuring could roll outside of existing political bodies in the municipality. That move was considered controversial (Bogota - Change, 2009). Peñalosa's response was always that he was under time pressure and he wanted to have people ready to work on solutions to 'real problems' rather than organizing beaucocratic procedures in the local government.

He called this strategy: "*We need people to do, not think.*" (Bogota - Change, 2009)

Indeed, the team started to implement a broad variety of initiatives that all aimed to transform the city and to make it more pleasant place to live for its fast growing population; and do it as fast as possible (Bogota - Change, 2009). The changes touched different areas, in this paper the focus is placed mostly on the ones concerning transportation that was a huge problem in the city. The core of the change within this area was obviously the BRT system, Transmilenio, but it is also important to mention other

initiatives and projects in order to show that mayor's policies were very inclusive and touched other problems as well.

First spectacular project that Peñalosa's team started to implement in the first months of his term in the mayor's office was a clean-up of degraded slum in the close proximity of city center (Bogota - Change, 2009). The place called 'Cartucho' was located just next to the historical center and was considered as a police no-go zone dominated by drug trafficking and crime. Moreover its position was so unfortunate that it became a barrier between the city center and more residential areas. People were afraid to cross the slum and therefore there was growing discomfort for city life. According to the mayor it also contributed to class division within the city where the richer people tried to avoid living in the neighbourhood of the 'Cartucho' enforcing its debased character (Bogota - Change, 2009). As the main policy of Peñalosa was to 'democratize' the city and making it 'equal to everybody', he decided that the slum has to be demolished, people relocated and the area turned into public spaces (Bogota - Change, 2009).

As this example shows, the nature of actions taken by Peñalosa and his officials was very authoritarian. There was no public consultation whatsoever. Many people, especially those who lived and worked in the slum area were complaining that the government did not even notify them about the changes that took place (Bogota - Change, 2009). As it will appear in further examples, this was a common thing for Peñalosa, and almost all of his projects were implemented in this manner. This style of politics certainly did not work in favour of gaining popularity and was endangered by high protest probability, however enabled really quick changes (it was the goal). (Bogota - Change, 2009)

Peñalosa knew that the topic of urban mobility cannot be successfully addressed with only one project or policy. Instead, the more holistic approach would include complementary initiatives that would reinforce each other and work together to promote behavioural change. The adopted policies included goals: improvement of public transport, promoting its use, promoting the use of other means of transport alternative to private car, reclamation of public space. (Folmar, 2015)

The policies included projects like:

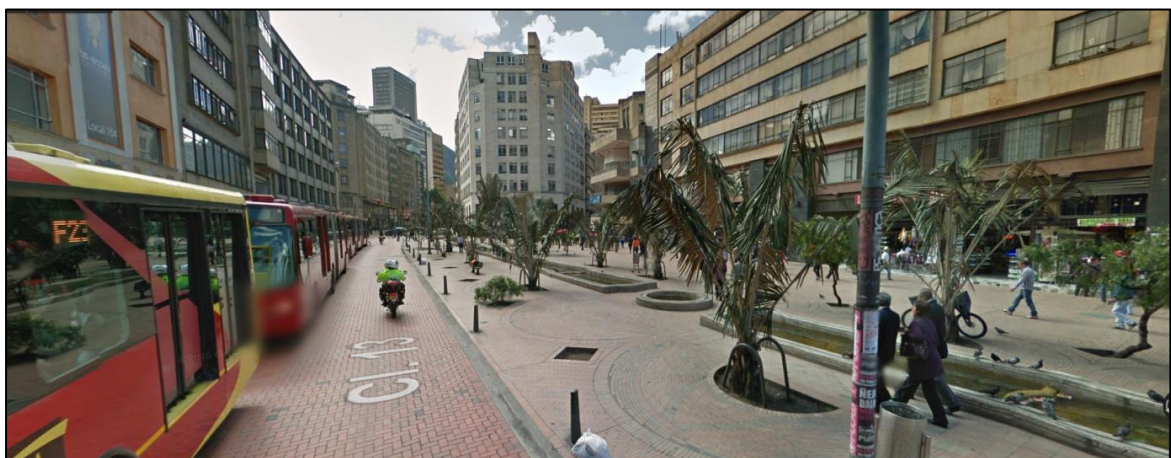
- Social housing plan called 'Metrovivienda' that covered land purchase, construction of roads, sidewalks and media provision before enabling developers to invest in affordable housing for low income families (WRI Ross Center for Sustainable Cities, 2015).
- 'Carrera 15 sidewalks' – Project that was inherited by Peñalosa from previous administration, focused on improvement of curb sides along one of the main avenues of Bogotá. The project has revitalized the sidewalks and most importantly eliminated the possibility to park the car on the curb of the road wherever possible. The aim was to make the space for pedestrian users of the road. Previously, almost all the space of the sidewalks functioned as an informal parking. This project fits into the strategy of car restriction and promotion of

alternative means of transportation. However, this move by the city administration was found as extremely controversial because there were no alternative parking places provided and business owners who had their stores and shops along the street disliked the fact that now they and their customers had limited access. The mayor argued that: the road space belong to everybody not only car users. The fact that a car takes more space than a pedestrian does not mean that the driver can have more space than the pedestrian or biker. The space should be divided equally between people, not vehicles they are in. In spite of this argumentation, the decision to carry out this project was one of the reasons for the attempt to impeach Peñalosa (more about it further in the text.) (WRI Ross Center for Sustainable Cities, 2015)



Picture 2. The changes in Carrera 15. Left 1998. Right 2001 (Peñalosa, 2013)

- ‘Alameda El Porvenir’ – Huge pedestrianization project that included a closeout of one street in the center of the city that was to be devoted only for pedestrian and bicycle transport. The buses were also allowed. It was a very ambitious undertaking that resulted in the creation of the longest pedestrian road in the world at the time of its opening. It was almost 17km long and went through the city center all the way to poorer neighbourhoods in order to provide better access for their inhabitants. (WRI Ross Center for Sustainable Cities, 2015)



Picture 3 “Alameda El Porvenir” in the central district of Bogotá (Google Streetview)

- “Pico y Placa” – Traffic congestion mitigation program that based on further parking stops removal from the center and restrictions on car usage in areas of the city where the traffic related problems were at their worst. The main feature of the program was the ban of cars that had their plate licenses ending with certain numbers and disallowing them to enter the most congested areas on certain days. The program was introduced in 1998, initially only during morning and afternoon rush hours from Monday to Friday, later expanded for a whole day except night hours. The aim was again to discourage people from using private vehicles on their travel to the city center and promote public transportation as the alternative. (WRI Ross Center for Sustainable Cities, 2015)
- “Ciclovía” – an event taking place every Sunday when in the morning hours from 8am to 2pm 76km of major city street are closed for car traffic and open for cyclist, pedestrians and social events. The goal is to create socially cohesive environment when people participate in sport classes, there is plenty of street vendors and music. The program was reported to be a great success and it contributed strongly to promotion of social capital development. (Folmar, 2015)



Picture 4 One of the streets in Bogotá during the “Ciclovía” (Cavemancycles.wordpress.com, 2014)

As the municipality stated, the overall goal of all these policies was not only to improve infrastructure but also to change the approach of people and their behaviour as citizens. Mayor Peñalosa called this an attempt to create a new ‘citizen hero’ that would rather be the law abiding person that uses public transportation or cycle, care about the

environment and public space, than as he put it “the guy with tattoos and jewels on the fancy motorbike who does drugdealing...” (Bogota - Change, 2009) Here one can see the attempt to continue the ideology of social change that was previously introduced by Antanas Mockus when he was the mayor.

As one can see, the city government was very dedicated to forcing changes to dysfunctional transportation system in the city and has taken many initiatives that could help to solve the problems especially in the city center where they were the worst. It is important to know that the mayor Peñalosa was fully aware that any real changes to transportation system could not happen without the provision of fully new, functional public transport system. That was his apple in the eye. (Peñalosa, 2013)

Why BRT?

The need for new public transport system was evident. It was a major point in Peñalosa’s electoral campaign; however it was not sure whether it would be possible to follow the plan to base the new system on BRT. The alternative was metro (Gilbert, 2008). It was Peñalosa’s intention as he stated that:

“Buses is the only possible way in which the quality public transport can be provided in fast growing cities” (Peñalosa, 2013)

In his opinion the BRT solution could be built for the fraction of the metro’s cost and therefore the system that could fit into Bogotá’s budget could cover much bigger part of the city (Bogota - Change, 2009). Another sensible argument was that due to the geographical conditions. Bogotá is not a city located in a deep valley (as Medellin for example where metro was constructed). It is more spread out, which means that one metro line would not be sufficient to cover all demand and it would be impossible to construct many metro lines. It would take decades and the city government was desperate to do something quickly (Gilbert, 2008).

This was a huge debate as it was known that it is possible to pick only one alternative of the two and that the city would have to follow with the choice made. In other words it was known that this was a long term decision (Gilbert, 2008). The Peñalosa’s idea of implementing BRT was initially not considered as the best possible solution. At that time, BRT systems were yet not as popular around the world as it is today. The vision seemed to many people as ‘unproven’ and ‘too innovative’ (Gilbert, 2008). The other obstacle was that Bogotá already had very bad associations with buses. It precisely the problem of dysfunctional bus system that stood behind the demand for new transport. It was a challenge for mayor Peñalosa to convince his opponents to support the choice of BRT over the metro.

Here the interesting fact is that the bus based improvements were not a new idea for resolving Bogotá’s transportation problems. In 1988 in order to bring changes in lowering quality of public transport the municipality has introduced a pilot project that involved

reorganizing traffic lanes on the city's main corridor. It was based on placing a bus-priority lane on the right curb in order to accelerate the bus flow on the road and limit congestion. The results were positive, both speed and throughput have increased. Despite that, the project was not followed and did not spread into other corridors. The explanation for that can be the fact that there was not sufficient governance capacity in the previous municipality that expected the traffic related problems to be solved by subway system. (Ardila-Gomez, 2005) The results of this project and convincing numbers, however, were used in the discussion as well.

The new transportation system was to be co-funded by the National Government of Colombia that agreed that it was absolutely necessary to improve transit conditions in the country's capital. (Gilbert, 2008). Initially the Government was opting towards the underground metro. There was even an agreement made with Peñalosa about its construction in the future (Gilbert, 2008). Later the mayor would say: "I had no choice but to follow with the metro agenda as there was no support for the BRT" (Peñalosa, 2013). It was only later when the first calculations were made and the cost of the metro appeared to be impossible to cover for neither the city nor the National Government when the latter was convinced towards bus-based system (Ardila-Gomez, 2005).

Therefore, the decision was made and the public transportation in Bogotá was to be revolutionized by the BRT scheme. Its goal was to provide mass transport, transform city's urban development, deal with increasing congestion problems and make all citizens equal in terms of access to mobility (Ardila-Gomez, 2005). The targets were very ambitious and indeed, the project was at that time the biggest BRT implementation in the world (Gilbert, 2008). It was also a huge branding project for the city undergoing positive transformation on the verge of the new millennium. The name of the system – Transmilenio was given so that it could represent this change. As Peñalosa said: "We called it transmilenio to make it sexier." (Peñalosa, 2013)

Securing the support for the project

In order to design and implement the project fast, Peñalosa established a new city agency called Transmilenio Co. that would be independent from the existing Secretary of Transport STT. Its goal was to organize the whole system. It covered route planning, construction coordination, contract negotiations, support guaranteeing to system management, maintenance, supervision etc. The Agency was equipped with decision making power and was responsible only in front of the mayor (Ardila-Gomez, 2005). This was similar move to the previous one that concerned the planning team that worked on other improvement projects. Here one can see a consistency in policy making of Peñalosa as a mayor that would prefer to create new legal entities that he could control rather than to use the existing structures that presumably were considered as not strong enough and not as easy to control.

Peñalosa was convinced that the system should operate without public subsidies and be owned by private sector (Gilbert, 2008). Therefore the Agency needed political capacity and negotiating power in order to convince the existing bus companies to join the Transmilenio project (Ardila-Gomez, 2005).

Municipality under Peñalosa decided that and solution they follow they had to include local transport providers (Ardila-Gomez, 2005). There were a lot of reasons for it. By doing so, it was easier to secure the support of the transport sector because the bus service providers could be promised to be beneficiaries as well. It was done in order to minimize possible public rejection of the idea and conflicts. Another interesting aspect is that the city transport already depended on buses so that the BRT project had better prognosis to be widely accepted among citizens who were already used to this kind of transport.

Authorities were worried about getting sufficient support from the existing transport sector that could feel threatened by the new project. They did not owe enough capital with that they could use to invest in BRT buses and were not very positively looking at the idea of centralized fare collection and overall dependence on the Agency as a regulator (Gilbert 2008). However, firms were also aware of the problems of congestion, pollution and oversupply. Their incomes continued to fall every year (Ardila-Gomez, 2005). They had to be convinced that the participation in the project would be worth taking the risk and future gains from the investment would return quickly (Gilbert, 2008).

In order to do it the Transmilenio Co. representatives were more likely to negotiate with the existing bus companies rather than small bus owners. It was easier to negotiate with them as they could potentially become BRT system operators and the potential contracts were used by the Agency as a reward for cooperation (Ardila 2005). The decision to include bus owners as shareholders as well was left up to the bus companies (*Here, for the convenience of the reader the author recommends to look into the chapter 4.1 where the institutional arrangement of the old system and role of each actor is explained*). As result very few bus owners were included as shareholders and therefore they would go out from the business if the bus company that they worked for decided to join Transmilenio (Gilbert, 2008).

This decision evoked strong opposition from the side of bus owners who organized huge strike that has blocked the city for 2-3 days and in the finally resulted in riots. Armed police forces were used to bring the situation under control and several people were injured (Bogota - Change, 2009). Peñalosa decided to wait through the protests and not engaged in any negotiations with the rioters. The lack of response was explained with having the political mandate after winning democratic elections, and determination to realize his promises from the campaign (Bogota - Change, 2009). At one point the mayor had also to deal with political pressure from the top, that is from the side of the President of the Republic who was greatly concerned with the developments in the city (Bogota - Change, 2009). No dialogue with the protesting citizen has caused many groups to turn their back on Peñalosa and his popularity plunged quickly.

“It was lower than the one of President Bush” claimed the mayor afterwards (Peñalosa, 2013)

Political opponents in the city council tried to use the atmosphere and public disapproval to impeach Peñalosa and remove him from the office (Bogota - Change, 2009). In spite of all this opposition, the mayor managed to keep the office and later when the changes introduced started to show results, he regained popularity (Gilbert, 2008). Here it can be said that the ability of the mayor to push through his ideas and his strong position as the head of city's government that was a very powerful position, was the necessary factor that enabled to realize his strategy. Many controversial solutions were able to be introduced without the support of all actors and the power of the ones who felt victims was not strong enough to undermine the position of the decisive body. In other words, it can be said that the project of Transmilenio was possible to be fully implemented partially due to the nature of institutional arrangement of politics in Colombia that guaranteed very strong position of the mayor.

There were several other protests concerning solely the Transmilenio project but all lost momentum quickly. Precisely between 1999 and 2000 there were 5 major incidents against the project which constitutes 20% of all demonstrations within the transport sector alone. (Ardila-Gomez, 2005)

After months of negotiations majority of bus companies decided to join Transmilenio (Ardila-Gomez, 2005) and therefore the private investors who would run their buses in the BRT system were found.

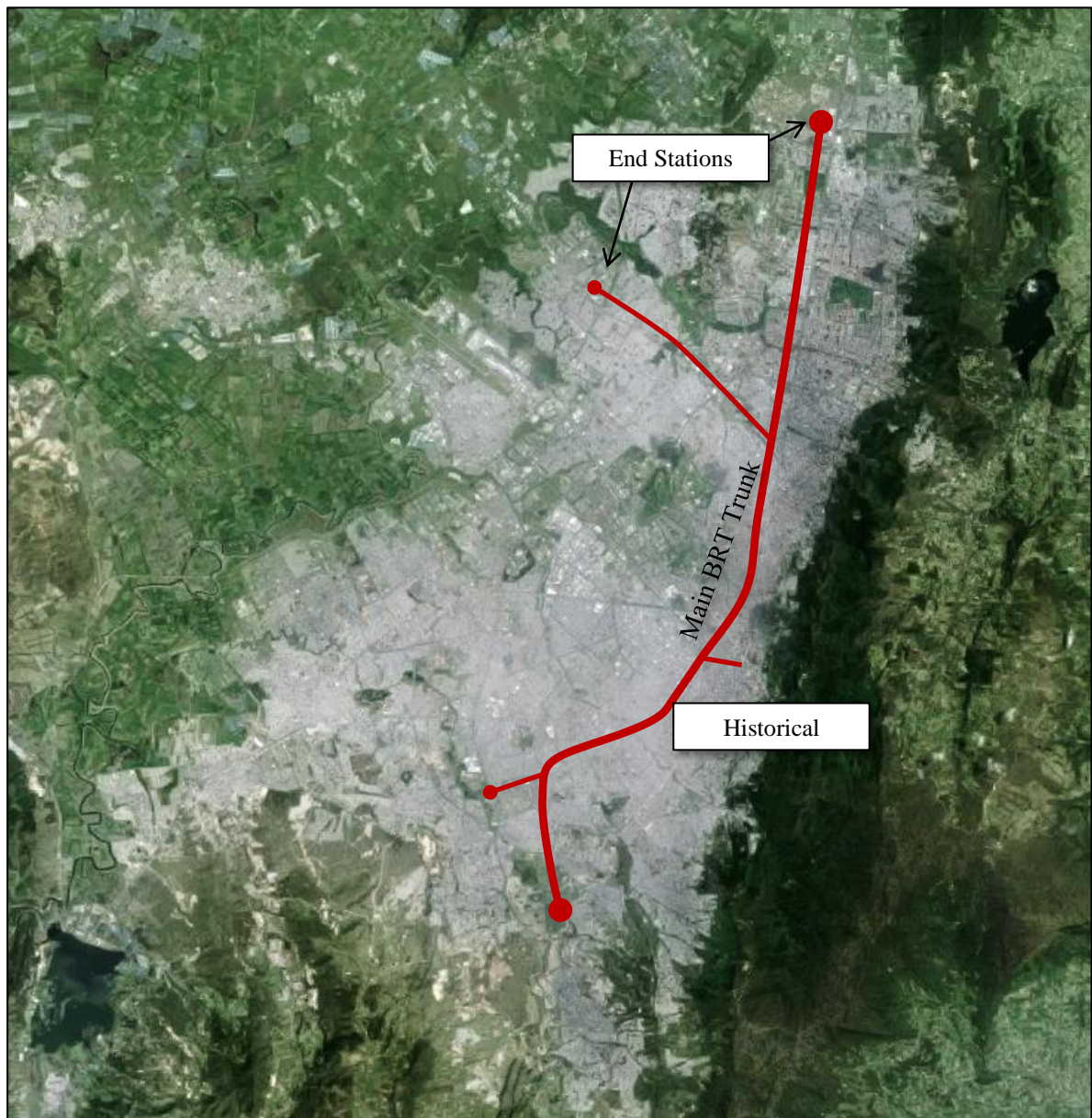
Funding

In order to fund Transmilenio and other mobility improvement strategy initiatives, Peñalosa imposed a significant hike in gas taxes in Bogotá. They were increased from 14% to 20%. Apart from serving as fund collection, this move had also a goal in discouraging people from extensive use of cars in the city (Folmar, 2015). Thanks to this move, Phase I of the Transmilenio was financed in 46% just from the fuel tax. 20% was the contribution of the national government, 6% was coming from the World Bank loan and the rest from other smaller sources. The price of all necessary infrastructure build during the Phase I was estimated for around \$ 240 Million, that makes \$9,4 Million per kilometre. (Folmar, 2015).

Phase I

The Transmilenio BRT system went from plans to opening in just 3 years. This is an extraordinary achievement that one can, without doubt, call a phenomenon on the world scale, especially in a city where transport plans were seldom implemented as designed and even smaller changes normally took years to be finally executed (Gilbert, 2008).

The first phase was opened in 2000. It was inaugurated in December, counting days to the end of Peñalosa's term in the office of the mayor. The phase consisted of 3 corridors that had 42,4km combined and was had 470 brand new, bi-articulated buses in service at peak hours (Bocarejo, et al., 2012). The principal designer of the project was Ignacio de Guzman (Gilbert, 2008).



Picture 5 The first phase of Transmilenio (author's own scheme, inspired by materials from Transmilenio website)

The constructed project used complete BRT guidelines (Ardila-Gomez, 2005). Transmilenio Co. had adopted clear standards regarding service quality. All buses in the system were of the same kind, all the stops, banners, tickets were standardized and uniformed. This was in order to distinguish BRT system from all the disorganized little bus companies, give it prestige, establish the brand and above all, ensure the quality and reliability of service (Ardila-Gomez, 2005).

“It would be the system where buses are finally clean and organized.” (Bogota - Change, 2009)

The Transmilenio was designed to work as fully integrated system that would rather remind of metro solutions than traditional bus system. The core of the system was the BRT trunks that consisted of centrally positioned, fully separated bus lanes (Folmar, 2015). BRT buses had the exclusive access to these lanes and no other vehicle was allowed to use it. The lanes were provided with the right of way and allowed the buses to bypass the traffic. Complete separation of the system from road congestion and GPS based monitor solution that would enable the traffic lights alignment on bigger crossroads, aimed to guarantee faster travel times and no delays caused by city traffic. (Folmar, 2015).

The system included 2 kinds of routes, regular ones that would stop on every station and rapid ones that skipped less important ones in order to optimize travel time for the passengers moving on longer distances (Folmar, 2015). In order to avoid collision between the two speeds of the routes, each station was equipped with an additional lane that would allow the faster vehicle to bypass the boarding one (Martinez, 2013).

In the First phase, there were 57 stations located on average around 700m from each other, all equipped with paybooths, gates, register machines, camera surveillance, adjusted traffic lights and improved quality of urban space around (mostly sidewalks and crossings). (Ardila-Gomez, 2005)

The stations were quite originally located in between the bus lanes. This has proven to be a good idea because it helped to create closed station with limited access that would remind often metro solutions. It also saved space because there was only one platform in the middle instead of two separate in two directions. Access to the station was normally provided through pedestrian bridge over the road. The fares were collected at the entrance gates to each station and therefore it was possible to liberate the drivers from that responsibility (Folmar, 2015). Users were able to check into the system by entering the station and later they can change buses without leaving it (Ardila-Gomez, 2005). This is another metro-like solution where the customer can move freely inside of the system and one ticket covers one entrance to the system with unlimited number of switches inside. All the stations have the platform with the height adjusted to meet the floor level of each BRT bus and in this way make them more accessible for disabled and elderly (Martinez, 2013).



Picture 6. Transmilenio station located between two fast, separated bus lanes. (Martinez, 2013)

The system is operated by red bi-articulated buses that were designed for the exclusive use in Transmilenio. Each bus is capable of taking 160 passengers on-board and is especially adjusted to dedicate more space to standing travellers than a normal city bus (Folmar, 2015). This space saving solution seem to be right in place having in mind that the system was going to work presumably under heavy load. Moreover, each bus had 4 wide doors that enable large numbers of passengers to perform the boarding seamlessly and quickly (Folmar, 2015).

Apart from the main BRT system and routes there was also organized the feeding system that could enable the citizens from more distant areas to be transferred to BRT stations and then enter the system (Folmar, 2015). Feeding routes were especially important because many districts of Bogotá are located on steep slopes where providing of BRT fast lane is impossible. They do not have separate lane and operate on normal roads, however usually in the areas where there are no huge traffic problems. What is more, Transmilenio Co. is forced to calculate the fares in such a way that the feeding buses are accessed without any charge. This is the way it which people from poorer neighbourhoods could be easily transferred to use the fast buses as well. (Ardila-Gomez, 2005)

At the end of each BRT corridor there was constructed a transfer station where the customers can witch between feeding systems and actually Transmilenio buses (Ardila-Gomez, 2005). The stations serve also as a connection between BRT system and city network of cyclist routes. They are equipped with bike parkings where one can safely lock and leave his bicycle and enter the BRT system (Bocarejo & Tafur, 2013).

Apart from clear physical and functional improvements, the new system differs from the old one (non-BRT) also in organizational structure, contracts and incentives for its participants. This contract arrangement was crafted bearing in mind the problems that traditional system has suffered. The aim was to design the relations between regulatory body and service providers in such a way that would align their interests with the bigger goal of providing better transportation. As mentioned in the section (4.1), one of the problems identified in the non-BRT, traditional system was the warped incentive network. The result was that transport providers steered by their desire of profit acted in such a way that continued to produce unwanted results in form of oversupply, danger, pollution and horrific traffic conditions in the city. As described previously in this paper the system was so dysfunctional that it caused outcome that was undesirable also for the service providers in the long run as their incomes and ridership continued to fall.

Transmilenio contracts

Peñalosa had no intention of bringing back city owned bus company that could take over the market. The historical inefficiencies of this kind of solution were widely known. The new project therefore, had to work around inclusion of private sector as investors in the new system and as its operators. The organizational structure of the system requires the Transmilenio Co. to contract private entrepreneurships as operators who use their vehicles to run on BRT trunks. (Ardila-Gomez, 2005)

Transmilenio Co.

The agency is not allowed to own buses; it is illegal in the city law (Ardila-Gomez, 2005). Instead it was made responsible for developing the system, negotiating contracts with bus providers as well as run and monitor the whole system of trunks and feeder routes (Ardila-Gomez, 2005). Its income comes mainly from the commission on total fare revenue (the fares are collected by another, separate, private company). The Agency is able to show a net profit if it excludes the cost of providing infrastructure in a form of new bus lanes and stations (Ardila-Gomez, 2005). The funds for this cause are provided by the city that pays to build new routes and invests in the system through IDU Instituto de Desarrollo Urbano which is the agency that actually constructs the segments of the routes. The municipality considers the expenditure as a social investment. (Ardila-Gomez, 2005)

Transmilenio Co. is equipped with the electronic system that enables them to monitor the demand for transportation according to the daily schedule. This means that the number of buses that are present on the trunks at any given moment can be adjusted to peak-hours. The buses can be taken on and off the routes if needed, saving fuels and mileage (Ardila-Gomez, 2005). This is another tool of profit maximizing that was not and is not still available to any other provider in the city.

Operators

The buses are provided by the new entities called Transmilenio Operators (Ardila-Gomez, 2005). These are private companies that were required to have old, existing bus companies as shareholders. They need to own their own fleet of buses that meet requirements stated by the Transmilenio Co.

In order to get the right to run their buses on BRT trunks, potential operators have to win the bid organized by the Agency and sign a multiyear contract (Echeverry, et al., 2005). As it is the Transmilenio Co. who is responsible for fare collection, the income of the operators is based solely on the contract. Here there is an important distinction from the old system, because the operators are being paid for the kilometres driven by their vehicles. Therefore, from their point of view it does not matter how many passengers get on to each bus, it is no longer in their interest to perform 'guerra del centavo' driving practises (Ardila-Gomez, 2005). The municipality claims that this is the way in which they tried to eliminate the ruthless battle for each customer that was the weak point of bus transport in Bogotá (Peñalosa, 2013). Competition for the market was to replace the competition in the market that has taken distorted form on 'penny war' (Ardila-Gomez, 2005).

In order to prevent the abuse of this kind of system, and to discourage bus companies from running their buses empty, not stopping on the stations with a view to accumulating extra kilometres to be paid for it, the contracts include the limit of millage to be covered, after which the contract has to be renegotiated (Ardila-Gomez, 2005). There is also a limit for each vehicle that has to be replaced after reaching it (usually 5-10 years) (Echeverry, et al., 2005). What is more the BRT trunks are being constantly supervised by the Agency that is organizing the system. It makes it very difficult to abuse the system and indeed causes the Operators to focus on the provision of regular and quality service. It is in their interest to stick to the standards.

The kilometre logged rate height depends on the bid result, however, the contract stated that it can change in time according to changes in demand for the BRT system as a whole (Ardila-Gomez, 2005). In other words, the Operators can get additional bonuses if the average number of passengers carried in the entire Transmilenio system is higher than the number expected by the Transmilenio Co. This aimed, motivating the Operators to work hard on trying to bring more customers to the system. Accordingly, if the number of passengers would not reach the limit, the rates for BRT Operators would fall (Ardila-Gomez, 2005) (that was never in place) (Echeverry, et al., 2005). This arrangement was designed in order to connect the service providers to demand-risk, and limit the losses of the city's Agency if the project would not be a success reaching its estimations (Ardila-Gomez, 2005).

Bus number reduction

One of the motivations of Transmilenio's designers was to try to use the system to reduce the oversupply of old buses operating on the streets of Bogotá (Gilbert, 2008). In order to come closer to reaching this goal, the contract between Transmilenio Co. and participating Operators stated that for each new bus to be allowed to run on the BRT trunk the Operator has to buy and effectively scrap a certain number of old buses. During the first phase this number was set as 2,7 (Gilbert, 2008). The result was reasonable and the operators were able to meet the criteria. The municipality however was still not satisfied with the pace of bus number reduction and therefore during the second phase the ratio was raised to 7,7 scrapped buses for each new one allowed for BRT. This goal occurred to be too ambitious and therefore was never executed. (Gilbert, 2008). One of the reasons for this happening was that there was only one company with the license to scrap the buses. The process was long and heavily supervised in order to make sure that the vehicles were actually destroyed (Gilbert, 2008), in contrary to previously described examples when the money devoted to scrapping disappeared and the buses were still driving around the streets.

Another incentive that was implemented in order to ensure that the Operators would endeavour to keep the level of service was to force them to employ the bus drives full-time employees who would have nothing to do with fare collection and their wages would not depend on it (Ardila-Gomez, 2005). This is another example of how important the misbehaviour of bus drivers in the old system was for the creators of Transmilenio. It was their goal to break with the image of brutality and risky driving.

Feeder buses work on different contracts than the rest of the system. Their income depends partially on the number of passenger carried, so that to make sure that they will not abuse the system and opportunistically drive empty.

It seems that the new contract arrangement deals with the biggest problem of the old system that was the misalignment of incentives among service providers. New contracts put all the interests in place in such a way that it is finally in the best interest of bus owning companies and the drivers to actually provide better and more responsible service quality. The ways in which the contracts are designed in the BRT system seem to be a clever solution. What is more, even the fact that there had to be invented ways to protect the system from exploitation, teaches one about the complexity and fragility of the relations between all actors in the system. It is indeed really important to carefully study the possible interests of each group in order to foresee how the problems might be generated and how to design a proper solution. When it comes to Transmilenio, it appears that this work was done with success.

Continuing the development

Enrique Peñalosa was the person responsible for Transmilenio kickoff and forever remained the face of the project (Hutchison, 2013). However, after only 3 years in the office and no possibility to run for the reelection, he left the mayor position in 2001 with many on-going projects and most importantly, the BRT system just newly opened (Bogota - Change, 2009).

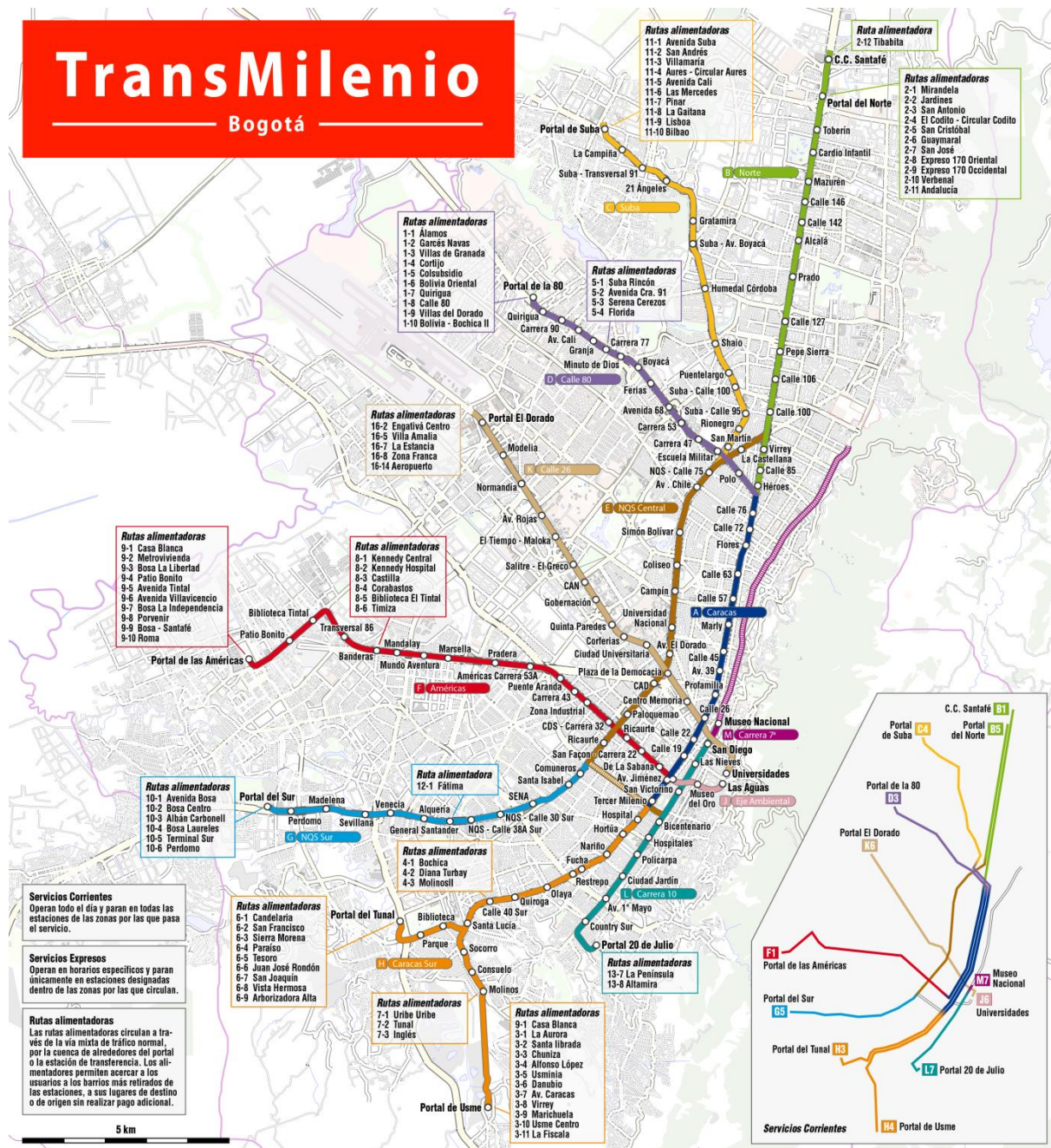
The next mayoral campaign was focused on securing the positive changes and guaranteeing their continuation. This was a big shift because historically the elections on all levels of Colombian politics usually concentrated of bringing ‘the change’ instead of ‘the continuity’ (Bogota - Change, 2009). As the new mayor, was elected again Antanas Mockus that received official support from the leaving Peñalosa in exchange for the promise to continue with the Transmilenio expansion. Mockus left more than a half on old administration and enabled the BRT system construction to accelerate. (Bogota - Change, 2009) During his second term one busway was finished and 2 more started construction (Ardila-Gomez, 2005).

In April 2001 the Transmilenio expansion plan was approved and it covered the future development of the system in order to eventually cover 80% of urban transport needs of the city (Gilbert, 2008). The expansion plan was divided into 8 phases that would in total include 25 BRT corridors with the combined length of 383km. The plan was designed to be implemented gradually and take several decades to be finished. Moreover the tempo of the growth of the system would depend on changing political regimes and financial capability of the city to bear the burden of the construction (Folmar, 2015).

Figure 5. The plan of Transmilenio expansion (Folmar 2015)

Phase	Number of trunks	Length (km)	Estimated years of construction
I	3	42	1999-2002
II	3	42	2003-2004
III	3	61	2005-2009
IV	4	50	2012-2015
V	4	45	2016-2019
VI	3	40	2020-2023
VII	4	40	2024-2027
VIII	1	63	2028-2031
Total	25	383	

This was a long term, ambitious plan until today, only the first phase was finished on the deadline. The Second one had 2 year delay and was fully completed in 2006 (several station were opened in 2003).



Picture 7. Map of Transmilenio system in 2015 (Transmilenio.gov.co)

Further struggles with the old bus system

Although the Transmilenio is a huge image enhancement success, after the first phase was completed it was obvious that it still lacks the capacity to transform Bogotá's transportation patterns immediately. The first 3 busways in 2001 carried less than 15% of all motorized trips (Ardila 2005) even though they were seriously overcrowded. The demand for public transport in the city was just too high for the system to make a bigger

impact. As a defence, it can be supposed that the traffic situation in Bogotá was probably just too complicated for any immediate solution to have significantly better results.

The local politicians were aware of the situation and even though the works on Transmilenio expansion continued, they have decided to take additional measures especially focused at tackling the oversupply of vehicles that has spilled over to smaller streets surrounding the BRT trunks. The head of the STT in Antanas Mockus' office was Claudia Vasquez (Ardila 2005). She was determined to accelerate the pace of changes in the bus-based system and to provide legislation that would speed up the process of bus-scraping (Ardila 2005). The actions were targeted mainly at the existing non-Transmilenio bus-based system, bearing in mind that the acceleration of the BRT construction was financially unfeasible.

In 2003 (Mockus 2nd term) the STT issued a series of decrees seeking to restructure the non-Transmilenio system. The main features of the new law were:

- Sanctions and control of the bus companies. (Ardila 2005)
- Electronic license on the vehicles in order to be able to recognise the pirate buses easier. (Ardila 2005)
- The requirement for the bus companies to rent buses from the owners instead of previously only renting the right to the routes. This aimed to involve bus companies in actual provision of the service rather than only thinking about putting more vehicles on the roads. (Ardila 2005)
- Very ambitious goal of 29% of the buses to be removed from service and scrapped. At that moment the percentage represented an extraordinary number of around 5700 buses to be eliminated. (Ardila 2005) This again shows how desperate the Secretary was to get rid of the oversupply levels. In order to gather the funds for this undertaking, the STT required bus companies to put aside part of the gains in a special fund. That money was to be used to buy up the buses now rented by each respective company and scrapping them. After a legal intervention by bus companies' executives and the court decision, although the fund remained mandatory, it was managed by the bus companies themselves. As a result of this arrangement only 244 buses were finally scrapped, which quantifies for only 5% of the target (Ardila 2005). This number shows how weak the enforcement was. STT did not have the executive power and was not able to control the process of scrapping buses. In the meantime, the bus companies reportedly collected around 30-70US\$ in the mentioned fund and it can be only a matter of speculation what happened with that money (Ardila 2005).

After this failure and strong opposition, Vasquez was forced to resign. Her successor, Andres Hernandez did not continue with such ambitious goals, however some of the decrees remained in place (Ardila 2005).

By the end of Mockus time in the office (end of 2003), the bus companies and owners were much divided. There was a lot of dissatisfaction about the measures. Only few of the

companies supported the policies aimed at bus-scrapping. Majority did not accept them and felt like it was an attempt to push them out from the market (Ardila 2005). That was probably true; however the municipality framed the discussion around the possibility of switching to BRT operators. It was presented as a beneficial solution for both sides (Ardila 2005). The STT and the mayor paid the price for taking such a sharp course. In the next campaign, majority of the bus companies actively supported candidate Luis Garzon who promised to stop and even reverse the changes (Ardila 2005). It is just a curiosity that even though he had won the elections, the promised changes never took place and the changes slowly continued (Gilbert 2008). He did the same with the Transmilenio expansion plans and therefore, during his term, in 2005 the third phase of the project was contracted and opened (2007) (Folmar 2015).

After 2003 some groups of the bus companies that still functioned outside of the BRT system partially due to the regulations and partially probably because of the growing competition from the side of Transmilenio, modernized their way of functioning. They formed consortia associating several companies (Ardila 2005). The new scheme of functioning was as follows: Investors owned buses and they rented them to consortium that took responsibility of service provision. Therefore, the bus drivers worked on the regular post for the consortia (Ardila 2005). One can say that this arrangement is somehow similar to the Transmilenio's and probably could have been inspired by it. As result, the horrific conditions and the battle between drivers was slightly reduced (Ardila 2005). Another innovation was the introduction of the smart cards instead of buying tickets directly from the driver (Ardila 2005). It also helped to raise the quality of service and presumably improved boarding conditions however it is hard to look for the connection to tackling the oversupply problem.

In 2007 there were frequent protests against further expansion of the project and it was reported that number of passengers using the system started to slowly fall and some of the citizens switched back to the traditional buses as they appeared to be more affordable choice. The reason for criticism was mainly the rise of the fares for the users of BRT. The prices of tickets continued to rise in relation to wages and prices of traditional buses (Gilbert 2008).

In result, the following mayor, Samuel Moreno Rojas that begun his term in 2008 halted the project's expansion and started to develop underground metro plan (Folmar 2015). There was no progress in construction work until 2012 when as yet another mayor there was chosen Gustavo Petro after his campaign focused on his commitment to moving forward with the original expansion plans of Transmilenio (Folmar 2015).

In the current situation the works on the IV phase are under way and it is expected to be inaugurated next year (Folmar 2015).

4.3. Impacts

The impact of Transmilenio was profound. It was first such innovatory transit system in Colombia. Its success and the improvements it has brought to the city are vast and hard to deny (Turner 2012). It has contributed to raising quality of urban transportation, has influenced environmental pollution figures, affected inequality in access to transportation, improved service quality and travel times (Turner 2012).

Not all the changes, however, are equally positive. The footprint of such a big project on the city of Bogotá has its advantages and drawbacks. In this section, the impacts of Transmilenio will be divided into several categories in order to classify them and show where the results of the investment were mostly positive and where the challenges still remain.

Promotion of BRT

Enrique Peñalosa, as a person inherently associated with the project has gained international recognition. City of Bogotá in 2002 (A little more than a year after Transmilenio was open) was awarded the Stockholm Partnership for Sustainable Cities Award for the achievements in urban transformation (Gilbert 2008). Later, the ex-mayor visited many countries and cities, invited to give lectures and share his experiences with system's technicalities (Gilbert 2008). The National Government of Colombia was inspired with the positive opinions about the Bogotá's solution decided to fund similar projects in six other cities in the country (Folmar 2015). In 2002 there was adopted special legislation called Programa Nacional de Transporte Urbano (PNTU) that aimed to support for cities pursuing construction of integrated public transportation systems. They were provided with funds and management. Therefore the planning initiatives were institutionally strengthened (Turner 2012).

The Colombian cities that applied BRT system thank to the inspiration by Transmilenio are (in the brackets the name of the system):

- Barranquilla (Transmetro)
- Bucaramanga (Metrolinea)
- Cartagena (Transcribe)
- Pereira – Dosquebradas (Megabus)
- Santiago de Cali (MIO –Metrocali)

Traffic conditions

After its first launch in 2001 (the Transmilenio was officialy inaugurated in the end of December 2000), the project contributed to significant improvement in traveling conditions across the city. Within the corridors where BRT trunks were installed, traveling times dropped by 32%, pollution fell by 9% and the accident rate decreased by impressive 90% (Echeverry 2012). The criticism can be framed around the fact that the

positive changes regarding traffic conditions were limited mostly to the streets where Transmilenio was located. Outside of BRT corridors the problems regarding the oversupply of buses, pollution and general low quality of traffic conditions remained. In some places especially in the city center worsened, due to overspill of buses that were relocated there by traditional bus companies that were removed from operation on the roads that BRT occupied. The bus companies that previously held the right to routes that ran thorough corridors now strictly limited to BRT use were granted additional rights to new routes outside of the system (Echeverry, et al., 2005). This resulted in worsening of the traffic situation outside of Transmilenio but prevented possible opposition. That overspill of the problems to surrounding smaller roads while the biggest ones were dedicated to Transmilenio resulted in disaster and worsening of already extreme traffic conditions. The movement along BRT however was speeded up and it is possible that with the further expansion of the system the problems can be finally pushed out of the most vulnerable areas and eliminated. (Ardila-Gomez, 2005)

System's Performance

After its inauguration in December 2000, Transmilenio was quickly considered as a huge immediate success for Bogotá's ills connected to public transport (Folmar, 2015). In just 10 months, the impacts of time travel were very visible. On average the time of one typical mobility using public transport has decreased by 20 minutes in comparison to the situation preceding the BRT construction. This means that there was an impressive cut of 32% in travel time (Folmar, 2015).

BRT system in Bogotá has many features that constitute a turning point in public transport provision. Its maximum capacity reaches 40.000 passengers/hour, that is easily comparable to world's famous metros (Bocarejo & Tafur, 2013). It used to be the highest capacity measured among BRT systems around the globe until very recently when it fell second to Guangzhou in China (Bocarejo & Tafur, 2013).

The speed of Transmilenio bus was on average 27km/h which is considerably faster than the traditional buses that achieved average speeds of at best 16km/h (Folmar, 2015). This improvement meant that the average user would monthly save around 10 hours by choosing Transmilenio over the old buses. When we take a look at the total time savings for all BRT passengers, that number would grow to 136 750 hours per day! (Folmar, 2015) The advantages of such reduction in commuting time are hard to calculate, however the benefits are definitely huge, knowing that people would spend the saved time on productive activities or leisure instead of staying stuck in traffic for hours as it was imminent in Bogotá before.

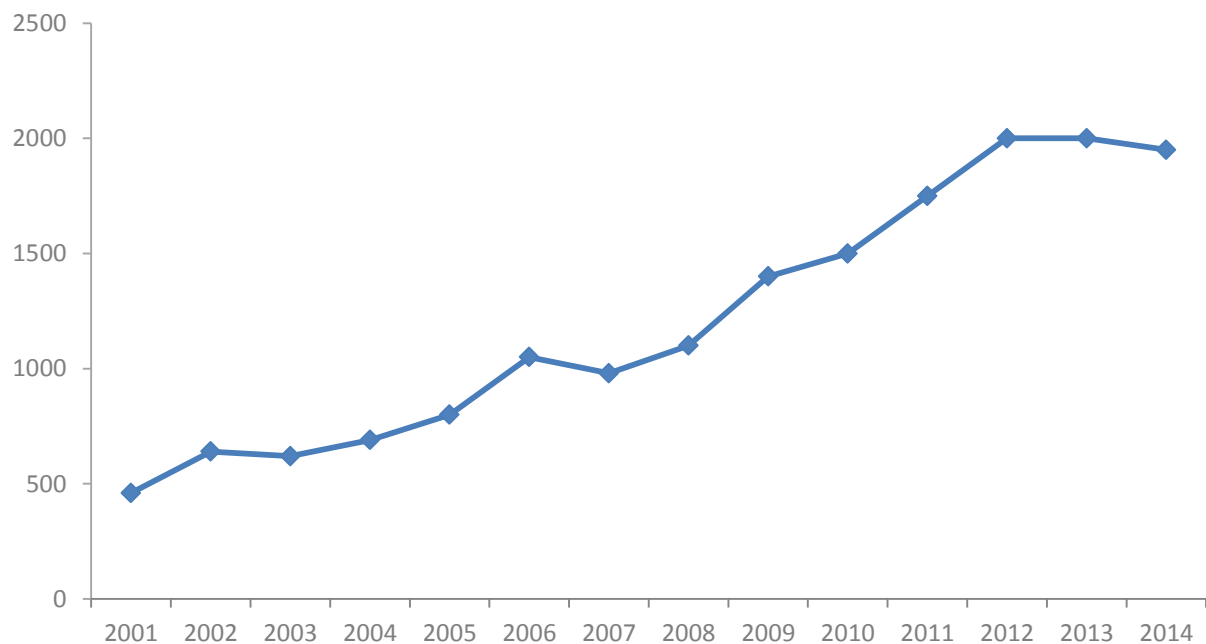
The findings are reflected in the public opinion. The poll conducted by the local newspaper 'Como Vamos' shows that majority of citizens find the Transmilenio as an important improvement to transportation system in Bogotá. 56% expressed an opinion that the project contributes to bettering of travel opportunities in the city, 28% said that conditions remained similar to the old system and 15% found the Transmilenio as inferior to traditional buses (Folmar, 2015). In the same poll, as the biggest advantages were

pointed the service quality and improvement of travel time, and as the main drawbacks, the overcrowding and fare levels (Folmar, 2015).

Ridership

Transmilenio continued to face almost constant increase in total number of passengers carried per day from its opening to current day as the next phases of the project were gradually completed. In 2001, the ridership amounted to 460 000 passengers daily although not even the first phase was completed. The system managed to attract new users and increase ridership every year for the first six years after the opening. The fall of popularity in 2007 was caused mainly by dissatisfaction with overcrowding and ticket prices, after the further phases were opened, the ridership rose again (Ardila-Gomez, 2005). Between 2006 and 2012, the number of passengers per day increased by almost 1 million (Folmar, 2015). In 2010, the system served daily to 1,5 million commuters that stands for 27% of city's public transport demand at that time (Folmar, 2015). Since then, the ridership advanced even more and in 2013 the barrier of 2 million/day was broken. The share in public transportation of Bogotá continues to stay around 30% (Flower, 2014).

Figure 6. The changes in total ridership in Transmilenio system (source: Folmar 2015, Ardila 2005 and Transmilenio.gov.co)



Opening of the Transmilenio has led to net increase in total public transport ridership as well. It means that not only people decided to choose BRT over old buses but also there was a group that was successfully encouraged to use public transport instead of other means (private cars, walking, lack of mobility) (Echeverry, et al., 2005). However, this effect was not long lasting. In 2003, so only 3 years after the launch of Transmilenio, ridership in public transport started to fall again, even though the Transmilenio itself continued to add passengers (Echeverry, et al., 2005). This phenomenon should be

explainable by taking into consideration the further grow in car ownership that used to be rather low in Colombia before (Ardila-Gomez, 2005).

Overcrowding

Apart from the temporary complains about traffic congestion caused by the system construction, the main criticism towards Transmilenio is the overcrowding (Gilbert, 2008). The popularity of the new system combined with the lack of good alternative, have caused that even the relatively fast pace of construction was not able to deal with the number of people who tried to use it. The overcrowding became to be an important issue in 2004 (Gilbert, 2008) and was one of the reasons why the debate about the metro appeared again in the agenda of local politicians (see section 4.2). Crowded buses were the reason for public protests. Upset citizens started to call the system, sarcastically, ‘Transmilleno’ (Transmi-full) or ‘Transmuylleno’ (Trans-very-full) (Folmar, 2015).

The passengers had to face very difficult conditions and even though the BRT system was designed to serve many customers, its capacity was obviously exceeded. To visualize the situation it can be noted that during the peak hours travellers had to sometimes wait up to 15 minutes in order to enter the bus that was stopped at the station with the open door (Gilbert, 2008). Another example is that the Transmilenio Co. was forced to adopt a controversial rate of 7 passengers per square meter in order to calculate the number of vehicles to use (Ardila-Gomez, 2005). In the poll of ‘Como Vamos’, 91% of the respondents agreed with the opinion that Transmilenio has serious problems with its capacity (Gilbert, 2008).

Such conditions did not benefit also the safety of the system. In the crowded buses and stations even the fact that there were cameras installed, did not prevent many pickpockets from taking advantage of the circumstances. The same poll indicated that only 27% of people feel safe while travelling in BRT (Gilbert, 2008).



Picture 8. Boarding conditions on rush hours. (source: El Tiempo 23/08/2006)

Environmental impact

The environmental influence of Transmilenio is difficult to measure as it is placed in one of the biggest cities in Latin America, where different sources of pollution and gas emissions are present. Apart from the physical improvements connected to the clean-up of the public spaces closest to the stations, the environmental impact can be reflected in the international recognition among the organizations that evaluate emission levels.

Transmilenio was the first mass transit system in the world to be registered in the UNFCCC Clean Development Mechanism (Folmar, 2015). It managed to generate a significant surplus of carbon emission points that it could sell through Voluntary Emission Reduction program (Folmar, 2015). This move allowed organizing additional finances to fund project's expansion. Until the year 2012, \$25 Million was collected this way (Folmar, 2015).

City Development & Land Use

It can be argued that the implementation of the first phases of Transmilenio has brought little impact to city's directions of development. The existing shape of the urban structure and the land-use were consolidated and remained unchanged (Gilbert, 2008). It was largely due to the fact that the designers of Transmilenio tried to locate the system in the places where it was most needed. Enrique Peñalosa argued that it was important that the urban development remains in the center in order to avoid 'United States-like sprawl' (Bogota - Change, 2009). This is the object of criticism in some literature. The development of Bogotá concentrates under the feet of the mountain located on the east from the city (Gilbert, 2008). The transit system does not work as an impulse to create new residential areas or sub-centers. It rather targets to facilitate easier and faster travels to the central districts. In case of such a big city like Bogotá, this means long travel distances (Gilbert, 2008).

Another issue is the role that BRT trunks play in creating divisions in the city. Their design makes it impossible to move across two sides of the street with BRT corridor in other places than the designed crossings (Estrada & Duarte, 2005). This aspect acted in many places as a disruption of urban life. It was common to the businesses to move out from their locations next to BRT, especially if they were placed away from the stations. This situation was completely unforeseen (Estrada & Duarte, 2005).

Social impact

It is relevant for the theory of sustainable mobility that the benefits would be equally accessible for all social groups independently from their income or the geographical location of their households (Folmar, 2015). Enrique Peñalosa when formulating the goals of Transmilenio very often mentioned that in his opinion:

“The developed city is not the one where even the poor people have cars, but the one where even the rich use public transport.” (Peñalosa, 2013)

Transmilenio has been used to achieve social inclusion goals it has managed to touch the issue of the accessibility between employment areas (centrally located) and poorer peripheries. This impact is predicted to grow as the next phases of the system are completed (Folmar, 2015). Ex-mayor Mockus said that in his opinion the BRT system contributed greatly to the general improvement of public's feeling about the city. He claimed that Transmilenio has encouraged people to act in a more cohesive way in the public space and that the project made people believe, that the things can be changed for the better and the transformation of Bogotá's transportation system can be a source of pride for its citizens. (Gilbert, 2008)

The fare system was organized in such a way that the user of Transmilenio was paying the same, fixed price for one ride in the system. The length of the trip and the number of possible switched between lines did not have any impact on it (Gilbert, 2008). As a result, the system privileges longer travels and it is possible to say that the users who only ride a couple of stops subsidy the ones who travel on longer distances. The beneficiaries of this situation are mostly people coming from lower-income groups, as their household are often located in the peripheral districts, further away from the center.

The fare in Transmilenio is currently around 30% higher than in traditional buses (Folmar, 2015). The fact that it does not multiply due to changing line, makes it profitable for any users who would otherwise take at least two traditional buses to reach their destination. This is an important competitive advantage, and again works in favour of people who travel on more complicated tracks.

Indeed, the popularity of the system is larger among lower-income groups (see Table 2). People for lower and lower middle class constitute for more than 85% of all Transmilenio users. The ratio, however shows that not the poorest citizens use the system most. Their 38% share in Transmilenio users comes mostly from the fact that they represent almost half of all Bogotáns. The biggest beneficiaries are the people with average income who live within an accessible distance to the system. However, the small underrepresentation of the least privileged income groups can come from the fact that the BRT trunks do not yet reach to the more remote neighbourhoods (the situation is going to get better as the next phases of the system are completed). This situation can change as the final phases of Transmilenio will be completed in the future. (Gilbert, 2008)

Table 2. The usage of Transmilenio by income group (Gilbert 2008).

Income group	% of all citizens	% of Transmilenio users	Ratio (column 3 / column 2)
1 and 2	47	38	0.808
3	40	48	1.200
4	8	11	1.375
5 and 6	5	3	0.600

One of the obstacles, considered as the drawback of Transmilenio are the growing prices. The fare level was gradually raised by the directing agency – Transmilenio Co. (Gilbert, 2008) which has responsibility to conduct necessary evaluations and to set the ticket price so that the functioning of the system is financially feasible (Ardila-Gomez, 2005). There exist evidences indicating that the price is set above the competitive market height. One of them is the fact that the traditional bus system is still thriving (Gilbert, 2008).

5. Conclusions

The results of the project implementation so far, prove that Transmilenio is associated with the profound transformation of city's liveability. The complicated and dynamic process that include fascinating story of political transformation, gave birth to a world class transportation system that has completely changed the nature of public transport and the life of people in Bogotá. The dysfunctional old system of bus transport provision was full of disastrous incentives and its institutional organization continued to produce terrible results that made the life in the city a constant struggle with traffic congestion, high accident rate, environmental pollution, intolerable road conditions and for many social groups, the lack of equality in access to such a basic need for urban life as valid mobility possibility. The stagnant political system did not respond for growing problem for a long time, until the issue swelled to horrendous size.

The evolution of change in transport system in Bogotá offers a unique chance to study a large scale, revolutionary transformation that despite vast (and still persisting) challenges was made possible and successful. Even though some problems remain today as the policy makers and planners did not manage to, among other problems, get rid of flawed bus sector provides service of very low quality, but there is no doubt that implementation of Transmilenio can serve as a lesson for any city around the world. In fact it already does and many planners from different cities and regions inspired with the example of Bogotá, attempted to work with similar solutions in their professional practises. The makers of the system demonstrated determination, courage and profound abilities in order to construct the BRT that serves to millions of people every day. They managed to successfully recognize many potential barriers, stops and elements of the existing transport sector that could lead to disabling of slowing down of the change that was desperately needed.

The main lessons that can be drawn from the analysis of the planning and implementation of Transmilenio can be framed around the particular decisions, events and figures that constituted the barriers identified as obstacles to massive changes in urban transport.

The Political Will

Firstly, Bogotá and the project of Transmilenio were pursued by the work of 'good mayors' that facilitated the changes and had a vision of what had to be done. Both Antanas Mockus who laid the foundation for tackling problems troubling the city, and Enrique Peñalosa who was directly responsible for planning and implementation of the first phases of the BRT system, were extraordinary political figures. Their actions were controversial but without doubt, motivated with the honest will to improve the situation in their city, even if that meant putting their political reputation and personal future at stake. The fact that the project of completely new transportation went through all the phases in such a short period of time is an unprecedented achievement. From getting to the mayor position, all necessary research, organizing planning team, establishing new agency, doing all the necessary planning to constructing the infrastructure so that the project could

be successfully opened in only 3 years is truly impressive. It is obvious that the whole political career of Peñalosa was focused on urban transformation in Bogotá, however all his plans and visions had a short window to be realized. He had to be ready with his plans and act very fast after stepping into the role of the mayor. After taking a closer look at the process it is visible that such an achievement had a lot to do with the political power and the nature of political relations in Colombia. The mayor was in a powerful position where he could independently exercise the public authority was equipped with a variety of instruments. In the case of Bogotá, people who occupied this position were not afraid to use their power in order to exercise their authority to move on decisions in the public interest and their vision even against strong opposition of politicians and business representatives. Huge work was done in order to 'awake' the masses and get the consensus over the population of the city about the need and possibility of change. This way of doing politics leaves, of course some uncertainty about the inclusion of all stakeholders' interests as clearly the small bus owners in Bogotá were repressed by the regulations and the existence of Transmilenio that pushed them to difficult position or even out of the business. All the elements of the project were implemented without conducting comprehensive social consultation (especially during the slum removal) and clearly the price to pay for the speed in construction was strong opposition and resentment towards the mayors. The lesson here can be shaped around the thought that the manner in which BRT in Bogotá was implemented is risky and leaves very little space for mistakes. If the project did not turn out to be such a success, the political legacy left by Enrique Peñalosa would probably have been very negative as he evoked a lot of conflict.

Technical Knowledge and Capacity

Secondly, Transmilenio's story can teach ones a lot about the importance of having the technical capacity in order to solve institutional arrangements for the new public transport so that it achieves aforementioned goals. In the studied case, the crucial decision that has led to strengthening this capacity was the establishment of new, powerful city's agency that focused solely on resolving the issues connected to Transmilenio. The mayors decided to cooperate with the competent team of experts that could devote their efforts to carefully crafting the solutions to be used in the new system. By doing this, it was possible to spread competencies and responsibilities and liberate the new entity from responsibilities of the department of transport (STT). The planning team of Transmilenio Co. was equipped with enough technical knowledge to be able to not only design the physical and operational features of the transportation system but also with the regulating power to rearrange the institutional and contractual patterns that were responsible for many defects of the bus transport that existed before Transmilenio. Here, the most important element is the ability to design the contracts and relations between the agency and the operators so that there are incentives created that work in favour of service quality improvement. The new arrangement was set with having a special focus on the need to align the interests of all participants of the system with the mission of eliminating the traffic problems of the traditional buses. This work was done carefully and resulted with

considerable success. The new regulations secure high level of service and protect the system from being abused.

Alignment of Stakeholders

Thirdly, the institutional solutions implemented in Transmilenio, make it a desirable to invest in the system. It is a great success of the planners that the new transportation system is able to function without an operational subsidy from the city. The fact that it is self-sufficient could potentially play a major role in convincing the future governments to invest in further development of the infrastructure. Without this achievement (profitability), it could be hard to guarantee continuation as it is commonly known that the projects that operate under constant deficit and are using large governmental subsidies are always controversial especially if this situation lasts for years. The effort made in arranging contracts with BRT operators, makes the participation in the system attractive also for the old bus companies. This can be considered as a desirable solution because it creates incentive for pre-existing service providers to join the Transmilenio system because such a move can also result in the improvement of their financial situation and working conditions. This fact is also not without meaning, when it comes to resolving conflicts with the service providers that without being included in the project could constitute strong lobby against it. In the case of Transmilenio, this issue remained some doubts as the dysfunctional system was not erased and continues to co-exist together with the BRT system. This hinders the functioning of Transmilenio because forms a low quality and low cost competition to the integrated system. Moreover, the fact that many of bus providing entities remained outside of the implemented solution, results in the preservation of many issues remained from the city in the past. Here the most important issue is the inability of the public authorities to prevent the overspill of old buses and problems related to their operation to other areas and streets where the traffic conditions did not improve or even worsened. This is definitely the drawback of the transformation made in Bogotá.

Transmilenio offers useful lessons for future development of the public transportation systems. It teaches that the characteristics of the new system itself can be not enough to resolve the transportation issues in the city even if the project itself functions well. There is a need of even more comprehensive approach and possibly a long term plan that includes car restrictions and promotion of the alternative modes of using the public space, for securing the change in the entire urban area.

Institutional Inheritance

The remaining elements of the regulatory and operational system that preceded the creation of Transmilenio, constitute unsolved problems for the functionality of the system and, in particular, the traffic conditions in the city. As identified, the institutional setting was one of the major reasons that produced the dysfunctional result in the form of excessive oversupply of buses on the streets of Bogotá. In result, the traffic condition,

safety and environmental deterioration in the areas that are not covered by the new transportation system was not much changed after its implementation. The old arrangement is still in power and the authorities faced real trouble during the unsuccessful attempts to reduce the number of vehicles. The peculiar problem for BRT system can be found in the fact that the traditional bus sector, by using old vehicles and providing low service quality, can compete against Transmilenio with lower fare prices. These observations lead to the conclusion that the special effort has to be put to solve the issues of the old institutional setting, as the implementation of the new one does not necessarily mean that it will entirely replace it. In the case of Transmilenio the actions were taken, however apparently it was not enough. The weaknesses of old regulating agencies and the lack of enforcement led to little result in the process of bus scrapping. These are the areas for improvements that should form a lesson for next cities' authorities to take the similar challenge.

To sum up, the BRT system as similar to the one in Bogotá can be successfully used as a core strategy to transform urban transportation system in a city with the aim of moving towards more sustainable, environment and human friendly solutions. Combined with the other efforts and smaller policies and projects, the change can be done even in such extreme and challenging conditions as the ones faced in Colombian capital. The fascinating story of Transmilenio is a valuable source of information about the struggles, challenges and ways to overcome them and it is not surprising to see why it inspires so many people and is so often used as the elite example of BRT systems around the world.

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