Green Politics of Transport in Latin American Cities

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Abstract:

The core objective of this research is to identify the political factors that determine variations in transport sustainability outcomes across Latin American cities. Aiming at contributing to the wider debate on sustainable transport in developing countries, this research deviates from previous studies that have focused on analyzing urban sustainability technically and in developed nations, and instead, concentrates on mapping political determinants of urban sustainability for the Latin American region. We base our analysis on an empirical characterization of the sustainability levels for several urban transport systems in this region, and then qualitatively contrast the levels of engagement towards transport sustainability of key cities.

Keywords: green transport, sustainable transport, sustainability index, transport policy, Latin America.

1. Introduction

They key to our sustainability might very well reside within cities. During the last six decades, global urban population enlarged almost five times (UN-HABITAT 2011). With 50% of this total population now living in cities, and expectations to reach 70% by 2050 (UNPD 2012), the service provision and urban planning challenges that cities face could determine the balance of our world before 2050.

Transport is a key element to analyze when engaging urban sustainability. It is responsible for a vast proportion of global energy consumption, and green house gas (GHG) emission generation. In terms of energy, for example, transport is responsible for approximately one quarter of the total global demand, with almost three-quarters of this, used solely for road passenger and goods movement (IEA 2012). While some regions have developed highly fossil fuel dependant transport systems, others are still on the verge of initiating vast motorization trends for the majority of their population. In the United States and Canada, for instance, two-thirds of oil consumed, is used for transportation (mainly cars), which accounts to a massive figure of approximately 850 million gallons of crude oil per day (Owen 2010). On the other hand, developing countries in Asia and Latin America, where individual motorized travel was kept at a low due to past economic conditions, are now in the midst of fast transitions from non-motorized and public transport modes, to the car (Banister et al. 2011; Figueroa MJ et al. 2013; Schafer 2011).

Moving towards sustainability requires solid urban governance. Apart from the obvious need for appropriate technology and funds, it is precisely sound governance, correct planning, and strong implementation capabilities that become crucial in attaining urban sustainability (UN-HABITAT 2002). With regards to transport, for instance, cities (and their governments) occupy a key position. They house large populations and businesses, generating a great deal of mobility, and are therefore major emitters of greenhouse gasses. This immediately implies that cities have unique opportunities to develop – and lead – appropriate policies that can significantly reduce the environmental impact of their transport systems (KPMG 2010).

There is sufficient academic agreement about the specific goals and policies necessary for transitioning into the low carbon, clean and safe mobility systems, that are necessary for sustainable development in developing countries (Figueroa et al. 2013).

Furthermore, there is growing consensus on the need for a proper mix of policies that generates a true a *paradigm shift* towards greater sustainability in transport planning (Litman 1999; Litman 2009; Banister 2008). These policies should target specific categorical goals within the sustainability dimensions of: economic development, urban development and equity, health and environmental protection, GHG emissions, and energy security[1]. However, various developing world cities often lack the financial resources and/or institutional capacity to design, implement, and enforce policies within highly dynamic sectors, such as urban transport. In Latin America, for instance, policy-making is often marked by a disconnection between political rhetoric and policy action; leading to notable plans and proposals that frequently do not materialize (IADB 2006).

This paper begins by presenting an overview of the role of transport in urban sustainability; we then introduce the results, based on the Green Transport Index (*GTI*) and the case study analysis, and finish with a brief discussion about the observed trends towards more sustainable transport, and political consequences. All

[1] For a detailed review of these goals, dimensions, and policies, please see: (Figueroa et al. 2013).

of our analyses are centred on the Latin American region, hoping to generate crucial debates about the needed government action, in a sector and region, not commonly included in global scenario studies.

2. Literature Review

Cities matter

This century has seen the consolidation of a global network of cities in becoming the primary scenario for crucial human interaction. Some people no longer accept parsimonious explanations about country-level behaviours, but prefer to understand the specific social and cultural conditions of each city. Global cities compete directly with each other to attract financial and scientific activity, while 'second'[2] and 'third' cities shift their focus away from their nation, to compete on a global scale. Of course, cities – like organisms – need vast resources to survive, generating dependencies to providers, and waste in different forms and quantities. These 'urban organisms' around the world, have grown into vastly complex structures, which trace their current situation to a chain of decisions previously taken by numerous actors; as such, the implementation of sustainability reaches its highest weight and success, precisely at the city-level. The empirical characterization we provide for Latin American cities, serves as an outline of the current situation in the region, hoping to mobilize decision-makers into producing better public policies.

An issue of great concern when studying urban sustainability deals with its definition. Although there is no consensus on how to define sustainability (Alberti 1996; Todd Litman 2007; Joumard & Gudmundsson 2010), its theoretical origins can be traced back to the United Nations Brundtland report. Sustainable development was introduced as a concept then, and defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (WCED 1987, p.5). Thus, urban sustainability can be defined in a number of ways, while framed under the idea of sustainable development. Richard Rogers summarizes sustainability proficiently, by arguing that the core of this concept is "the redefining of wealth to include natural capital: clean air, fresh water, an effective ozone layer, a clean sea, fertile land, and the abundant diversity of species […]. The ultimate aim of sustainable economic development, is to leave to future generations a stock of natural capital that equals or ideally exceeds our own inheritance" (Rogers 1997, p.5).

Structural conditions frame urban sustainability

Although no cities were planned to be unsustainable, some enjoy more sustainable trajectories than others. This could depend on seemingly cursory conditions such as average urban temperatures, or topography; yet, it could also be related to levels of economic development or population density. However, a key idea to consider when comparing sustainability trajectories refers simply to the 'timing'. To put it simply, the history of the city greatly influences its current level of sustainability, as the past is precisely the one aspect that, by definition, cannot be changed (KPMG 2010).

Current theory suggests that present urban policies are pre-determined by previous decisions, which implies high reversal costs for making major changes to the system (Schafer & Victor 2000; Mahoney 2000; Thelen 1999). Ignoring the fact that early choices in urban transport constrain possible future choices has limitations in understanding the context of decision-making. When high political and/or financial

[2] For an insight into characteristics of a 'second-city', see: (Newton 1976).

reversal costs 'lock-in' initial decisions, the choice of future transport modes becomes constrained by path-dependency (Scharpf 2000). Being a policy area that depends highly on building and capital expenditures, urban transport systems seem to be especially hard to reform, as major changes in the status quo pose lofty costs to various vested interests. Failing to consider this inter-temporal relation between past and present policies draws an inaccurate picture of urban governance, as Thelen reminds us: "once a path is taken, then it can become 'locked-in', as all the relevant actors adjust their strategies to accommodate the prevailing pattern" (Thelen 1999, p.385).

Urban transport paradigms

This path-dependent behaviour also seems to be valid for transport planning, where concrete paradigms have long ruled developments and institutions. From the days of personal mobility maximization, generating intense car-dependence (Cervero 2001), and going through demand side 'predict and provide' models, we now know that there is a contradictory relationship between road construction and congestion: "road construction generates induced demand for road travel" (Vigar 2001, p.427). Nevertheless, in many cases, it is now too late to ignore the obvious fact that families and companies have become dependent on consuming rapid and cheap mobility (Bertolini 2009). From the institutional perspective, the challenge is complex: providing the conditions to assure vital mobility needs, while guaranteeing a system that is socially, economically, and environmentally sustainable. However –as previously noted–, reverting previous patterns in transport planning is often hard, partly due to entrenched path dependencies (Levi 1997).

Institutional coordination plays a key role in reconciling these paths. Solid institutions are a prerequisite for the implementation of multi-objective, multi-actor and integrated policy interventions (May et al. 2012; Wittneben et al. 2009). Moreover, when considering conditions that facilitate strategic decisions to avoid lock-ins in terms of urban transport infrastructure, institutional coordination (both between public and private sectors) stands out as an important component (Figueroa MJ et al. 2013).

Transitioning towards a sustainable mobility paradigm implies changing the focus towards accessibility as the most important factor in urban mobility. (Pardo 2005), which of course produces important symbolic considerations: "Replacing auto-mobility planning with accessibility planning means that social considerations take precedence over individualistic ones. It also recognizes what cities are about – first and foremost people and places, not movement. Efficient, well-managed cities minimize the need to travel, enabling residents to spend time more productively than fighting traffic" (Cervero 2001, p.421). Accessibility, thus, starts replacing the principal assets of a good transport system: speed and reduced travel times (Bocarejo S. & Oviedo H. 2012). This becomes even more crucial in weak systems of developing world cities, where accessibility is the foremost weakness of the system. "The capacity of individuals to travel in the poorest segment of the population of cities such as Bogota, is reduced to less than 1.5 trips per day, while the corresponding percentage of their total income spent on transport exceeds 20%" (Bocarejo S. & Oviedo H. 2012, p.1)

Promoting sustainable mobility in some developing regions of our world ends up competing with economic growth. As income levels rise significantly in some of these regions, economic development continues to be the main priority for policy makers. As such, policies that promote public transport, while restraining private individual transport, often do not sell well (Banister et al. 2011).

As local governments in developing countries strive to provide affordable rapid and cheap mobility to their citizens, it is clear that "the increase of personal travel and mass motorization that results from regional economic development trends closely relates to the intensification of unsustainable environmental, climate and energy security trends" (Figueroa MJ & Ribeiro SK 2013, p.4)

Economic growth or sustainability? - The *homo sapiens aeiforos*[3]

Aged assertions about the sum-zero nature of economic growth and urban sustainability are no longer valid. In fact, the economic effects of transport are always two-fold: (1) increasing economic development causes more traffic, accidents and pollution, while (2) the mobility of people and goods is a precondition for greater productivity (Joumard & Gudmundsson 2010). Interestingly, recent studies suggest that green transport would in fact generate exceptional economic returns for cities (UNEP 2011). Thus, the potential of this novel paradigm of 'sustainable mobility', or 'green transport'[4]; it proposes a solution to the paradox between mobility and its negative effects[5], by emphasizing three basic lines of simultaneous action: (1) meeting the mobility requirements of economic players, (2) ensuring social equity, and (3) limiting consumption of resources. It places green transport as a powerful force of urban transformation that could hold the key to generating a true *homo sapiens aeiforos*, before it is too late.

In principle, this means cities would have to refurbish their urban transport structure, to the point that they can offer their citizens high quality systems, where as many trips as possible use low-carbon or non-carbon intensive modes. According to some estimates, such a change would bring about "seven million more green jobs in cities only on the operators' side of the supply chain, [if we assume] that public transport labour productivity keeps increasing by about 1% per year" (UITP 2011, pg. 1). Other scenarios show that there is no need for further investment in order to achieve this structural change. Studies by the UNEP demonstrate that "a reallocation of just 0.16 per cent of global GDP in support of public transport infrastructure and efficiency improvements to road vehicles would reduce the volume of road vehicles by around one-third by 2050. It would diminish the use of oil-based fuel by up to one-third and promote strong and sustainable employment in the sector" (UNEP, 2011 379). Finally, if we use conservative estimates to provide value for human lives, and price each of these at U$ 1.4 million, then savings from urban traffic fatalities could amount up to U$250 billion per year (UITP 2011).

These costs to society also are significant if we were to continue along un-sustainable paths. For instance, similar studies show that societal costs related to pollution, traffic accidents and congestion, can add up to more than 10 per cent of a country's GDP,

[3] We introduce the concept '*homo sapiens aeiforos'*, inspired in the Latin name for the human species (*homo sapiens*), and the Greek idea of "*AEIFORIA*"; a reflection of what we now understand as 'sustainability'. We thus propose "aeiforos" (*Αειφόρος*) as a combination of two words: *AEI* (relating to 'for ever'), and *FOROS* (relating to 'the carrier').

*Special thanks to Dr. Theodoros Papadopoulos for providing the stimulus and assistance in generating this idea.

[4] The 'green transport' concept was coined by the United Nations Environment Programme, referring explicitly to an urban system that supports (1) environmental sustainability through the protection of the global climate, ecosystems, public health and natural resources; (2) economic sustainability through an affordable, fair and efficient transport that promotes a sustainable competitive economy as well as balanced regional development and the creation of decent jobs, and; (3) social sustainability by allowing the basic access and development needs of individuals, companies and society to be met safely and in a manner consistent with human and ecosystem health, while promoting poverty reduction and equity within and between successive generations (UNEP 2011).

[5] For further details on the prescriptions for advancing towards sustainable transport, see the key works of: (Banister 2008; B. Lefèvre 2010; Whitelegg 2007; T. Litman 1999).

and are likely to grow, primarily because of the expected growth of the global vehicle fleet (UNEP 2011).

The scientific interest in sustainable transport developments in Latin America has been growing steadily. As is the case of other growing economies, in Latin America rapid urbanization and mass motorization generate even harsher challenges to the region's weak institutions and available infrastructure (Figueroa MJ & Ribeiro SK 2013). The interest in the region is partly due to the well-known successes of Curitiba, Bogotá, and others during previous decades, in breaking vicious mobility cycles and embracing sustainable transport components. If, in fact, most of the growth in the global vehicle fleet by 2030 happens in the countries of the South (according to Wright (2004) the global car fleet will grow from 1 billion in 2007 to 2.6 billion in 2030), then clearly the situation in Latin America must be analyzed with great detail.

Metropolitan Governance

Urban transportation is an issue that increasingly needs to be tackled from a metropolitan perspective due to high levels of urbanization. Cities now require adjusting their governance, i.e. "the process by which citizens collectively solve their problems and meet society's needs" (OECD 2000), to ensure satisfactory metropolitan public service delivery. Based on this definition, governance involves all social actors beyond public authorities and two components: the process of decision-making and the process by which decisions are implemented (or not implemented) (UN-ESCAP 2005). Good governance means optimal decision-making and implementation processes in a territory within a democratic system. Thus, according to the UN, these processes characterised themselves for having certain qualities. They are participatory, consensus oriented, accountable, transparent, responsive, effective and efficient, equitable and inclusive and follow the rule of law (UN-ESCAP 2005).

In light of the above, good metropolitan governance translates into sound capacity of all social actors to make adequate public decisions, which could be assessed according to its legitimacy from a three-fold dimension (Lefévre 2005). First, the political legitimacy consists on the power and legal support given to metropolitan decisions. It involves planning and systematic decision-making on relevant responsibilities aligning the functional territory with the administrative territory. Therefore, cities join efforts creating metropolitan structures in some cases managed by elected officials. The functional legitimacy evokes the amount of resources permitting decisions implementation. Commonly, functional legitimacy requires technical, personal and financial resources. Third, the social legitimacy refers to the level of identity, ownership and interactions of social actors within the metropolitan territory. Social legitimacy could be promoted for instance by mobility systems, cultural or sport events, civil society, labour and businessmen unions action. The level of legitimacy of the metropolitan governance becomes a political factor, which determines transport sustainability.

3. Methods

This study is based on an index of sustainable transport previously developed by the authors, which is later complemented by a comparative case study. The initial empirical characterization ranks the level of sustainability in transport for sixteen cities through a set of indicators along three dimensions: economic, social, and environmental. Ultimately, the political determinants of these implemented policies are mapped and contrasted across the studied cities. Three cities have been chosen on the basis of their transport sustainability outcome and the broader theoretical context.

The comparative case-study design is used to (a) seek explanations for the variation in outcomes; (b) identify the causal mechanisms of these outcomes, and; (c) determine if the empirical facts meet the theoretical expectations.

Our *Green Transport Index (GTI)*[6] scores sixteen cities from nine different Latin American countries, across three broad baskets – environmental sustainability, social sustainability, and economic sustainability – using 16 indicators. It provides a quantitative snapshot of the performance of each city, showing cities' performance relative to each other, not in absolute terms. Thus, the foremost conclusion for all cities in the region is clear: all of them are still far away from reaching advanced levels of sustainability in their urban transport systems.

This initial empirical characterization of the trends in the studied cities – via the *GTI* – provides us with valuable input for informing a case selection process. As we intend to further delve into the causal mechanisms of sustainable transport, we understand the need for additional qualitative work allowing for the understanding of the political determinants of those policies associated with the levels of transport sustainability exhibited in this ranking. Via the comparative case study, we intend to map the complexities of the political factors behind their transport sustainability outcomes.

To select the cases we have considered both, the transport sustainability outcomes from the *GTI*, and the broader theoretical context; thus guaranteeing theoretical relevance. In order to represent "the full range of values characterizing X, Y, or some particular X/Y relationship" (Seawright 2008, p.300), we have decided to choose one city from each of the overall performance bands in the *GTI*; top, average and poor. Conversely, in order to minimize variation for the set of structural variables discussed above, and guarantee that the chosen cities in fact share similar structural characteristics, we aim at selecting three cities with similar population, area, GDP per capita, and population density. Hence, we believe the best set of cases comprises: Curitiba, Medellín, and Guadalajara (see Table 2 for a comparison of their characteristics). Medellín and Guadalajara are the prototypical second-city cases, always in the shadow of the principal mega-cities in their countries, São Paulo, Bogotá and Ciudad de México, correspondingly. Curitiba, the top scorer in our ranking and eternal urban sustainability leader in the region, does not necessarily fit as the *de jure* second-city of Brazil, but considering the enormity of this country's large cities, it certainly enjoys "second-city status" being the capital city of the powerful state of Paraná. The ultimate goal with this approach has been to compare and contrast the levels of engagement towards sustainability in transport for these cities during the last decade.

Table 2 – The Three Chosen Case Studies

City	Total Population	Area of city (km2)	GDP per capita (2009US$)	Population Density (inh/km2)	GTI
Curitiba	2,815,036	425	10,797	6,624	7.00
Medellín	3,500,000	382	5,548	9,162	4.83
Guadalajara	4,298,715	544	9,409	7,896	3.62
Average for the sixteen studied cities	6,818,664	943	10,400	8,396	4.91

Own construction with data from: EIU, 2010.

[6] For a detailed description of this index and its results, see: Cadena Gaitan, Carlos, 2012, Political determinants of sustainable transport in Latin American cities, UNU-MERIT Working Paper 2012-072.

The collection of the necessary data for the case study analysis took place via field work in the three chosen metropolitan areas. Semi-structured interviews with 58 key informants compose the backbone of the framework; these include high level former and active public servants, members of the city councils, owners and managers of the private transport providing companies, leaders of advocacy organizations in the urban transport field, business leaders, and crucially, impartial observers to the policy process, such as academics, who seldom have political legacies to defend. Stakeholders were mapped ex-ante, so as to target the administrative positions that were most relevant, and to have appropriate back-ups for interviewees that become unavailable at the last minute. The data compiled through these interviews was complemented with an analysis of pertinent legislation, records from city council sessions, local budget proposals and forecasts, strategic development plans, and other relevant documents describing the social, economic and political context of the moments in time when specific events took place, affecting the status quo of the urban transport sector.

A strategy enthused by framework analysis was used for analyzing the collected data during the interviews. We followed five interconnected stages, as such: 1) Familiarization with the collected data, 2) Identification of the thematic framework, 3) Indexing or coding, 4) Creating charts for the data, and finally 5) Mapping and interpreting the data (Lacey 2001). The common patterns and deviating concepts found across key stakeholders were conceptualized using qualitative matrices that allow a visualization of the various stakeholder interactions simultaneously.

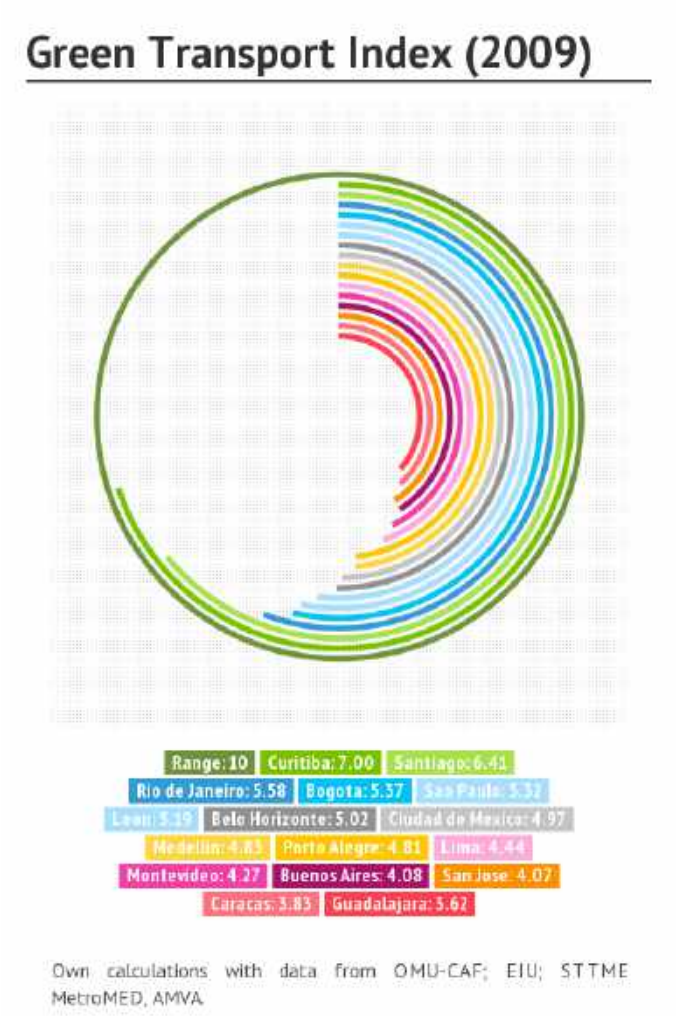
Lastly, we must note that our study carries some limitations that must be optimized in later revisions of this same issue. The information systems and data collecting capacities of many cities in the region continue to be fragile. As such, some of our data points, (although official) might reflect altered version of the actual conditions in place. We have strived to verify the consistency and validity of our data, especially by triangulating it during our interviews, but are aware that some gaps might still be found. More importantly perhaps, we have not considered variables describing the historical vocation of each city. It is clear that different transport challenges arise for cities with large ports, cities housing national government branches, industrial cities, and hub cities enclaved in rough terrains. We are aware that all this structural historical conditions help characterize their present urban transport systems.

4. Results

By contrasting the urban transport practices (and conditions leading to these) in Curitiba, Medellín and Guadalajara, we are able to understand the causal mechanisms determining the variation in outcomes, found during the initial empirical characterization. Our empirical findings place Curitiba as the regional leader in transport sustainability; thus confirming theoretical expectations (see Figure 1). However, this is only implied in relative terms, as our later qualitative analysis contributes, when analyzing the present situation in this city.

Previous findings provide valuable evidence about the role of institutional arrangements at the metropolitan level and political will, in the context of higher levels of transport sustainability (Cadena Gaitan 2012). As such, we specially emphasize the role of urban governance (rather than the availability of technology and funds), in the context of the specific institutional conditions in Latin America.

Figure 1 – Green Transport Index Results



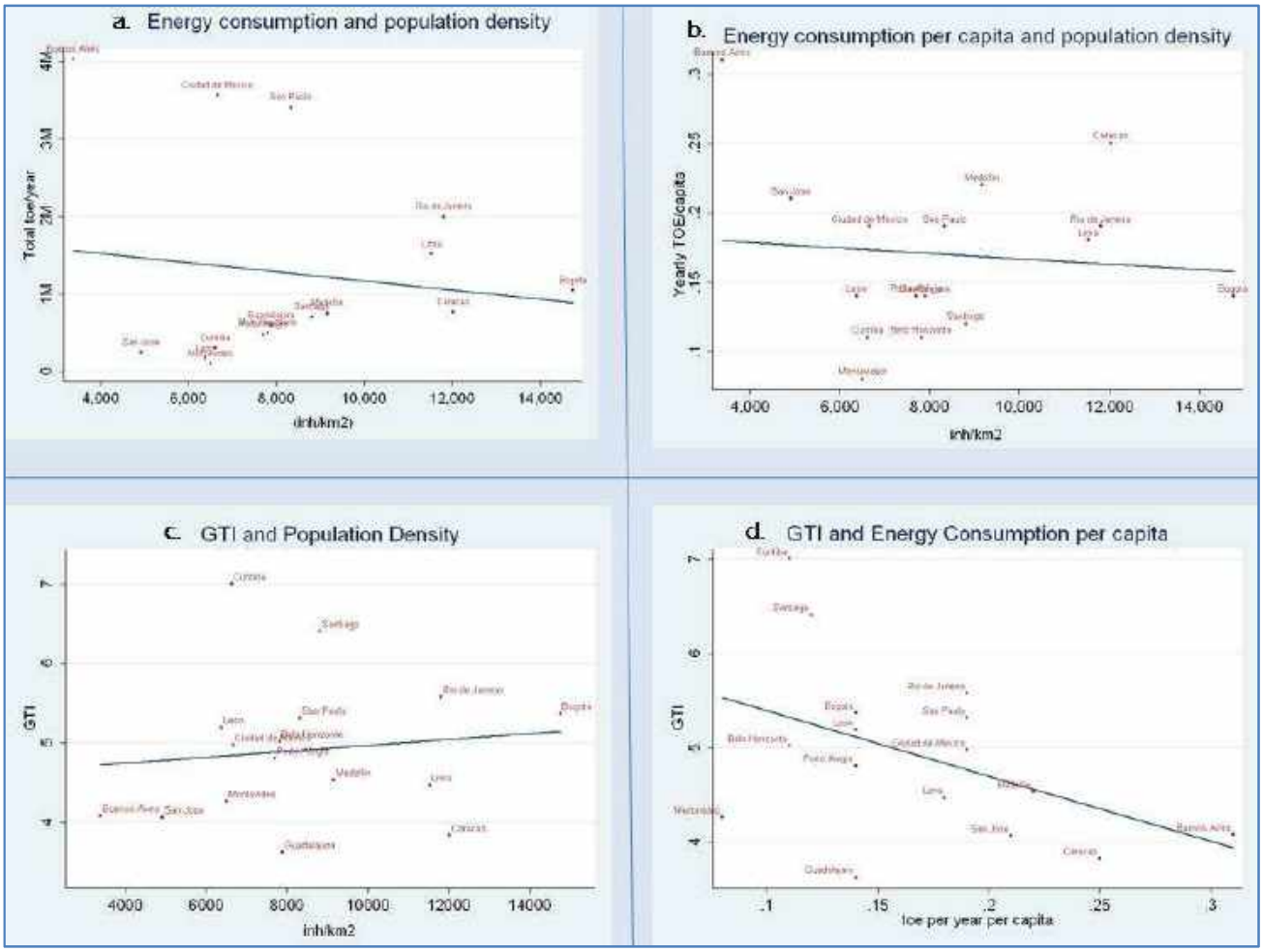
Transport Sustainability Trends

Clearly pointing our finger at specific conditions that could explain the variation in transport sustainability outcomes is a daunting task for the Latin American region. Some commonly referred structural variables, such as GDP per capita, size of the city, and size of the population, do not seem to explain why some cities are doing better than others.

However, we do inquire deeply, as to the possible explanatory power of population density. Its influence on transport sustainability could be found –*inter-alia*– via higher trends of energy consumption per capita, as the key studies by Newman and Kenworthy (1989)[7] describe. Thus, there seems to be evidence that population density influences urban sustainability, as low density urban areas often generate high car dependency, when appropriate mobility alternatives are not available (Bertaud, 2004; Breheny, 1992; Lefèvre, 2009). On the other hand, however, this does not necessarily imply that high-density urban areas always exhibit higher levels of transport sustainability, as we can see in our analyses for Latin American cities.

[7] See (P. W. G. Newman et al. 1989).

Figure 2 – The Impact of Population Density on Transport Sustainability



Own calculations with datafrom: EIU 2010, América Economía 2010.

For instance, although urban density does not seem to provide an explanation for overall transport-related energy consumption levels in our studied cities (see Figure 2.a), we do see an interesting negative slope, indicating that cities boasting higher urban densities seem to consume less transport-related energy per capita than those exhibiting lower urban densities (see Figure 2.b).

A similar set of relationships can be seen when substituting energy consumption for the results of our Green Transport Index. Higher urban densities seem to be correlated with better results in the GTI (see Figure 2. c). As a side note, energy consumption per capita is clearly lowest in those cities which rank better in our empirical characterizations, as theoretically expected (see Figure 2.d).

For our three case studies, the relationship between urban density and transport sustainability does not match any theoretical expectations. When asking transport experts from the region, about their perceptions on common city characteristics and their influence on transport, 86% of respondents said population density had a direct correlation with the sustainability level of urban transport in the region. While the three cities have a population density that does not stray more than one standard deviation from the average of all studied cities, their GTI ranking deviates greatly. Thus, throughout our case study, we contrast the city with the highest transport

sustainability, Curitiba, the city with the lowest, Guadalajara, and a city with a score less than one half standard deviation away from the average GTI, Medellín.

Political Interactions

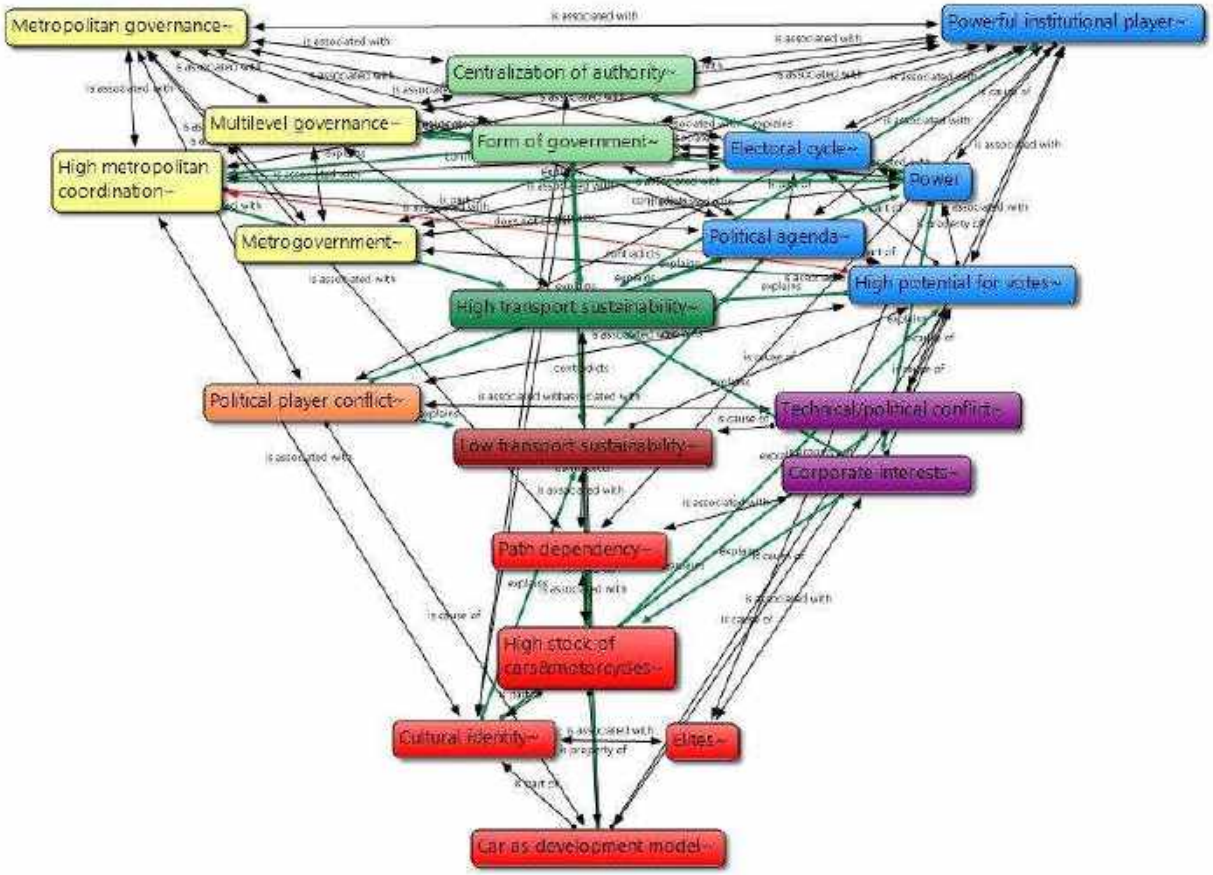
During our interviews, we identified three major thematic frameworks that were recurring throughout the three cities, as potential explanatory routes towards both high and low transport sustainability. These are: (1) the car as a development model, (2) the role of metropolitan governance, and (3) the role of powerful institutional players (see Figure 3). These major themes are mapped in code trees along with the most common explanatory factors mentioned by our key informants, aiming at visualizing the paths towards low and high transport sustainability identified in these three cities. As mentioned earlier, our theoretical construction values those transport policies and projects providing incentives against car-dependent models, in favour of clean collective transport, and in favour of non-motorized transport, as avenues towards higher transport sustainability. In order to highlight the key political interactions relating to the three thematic frameworks, we describe the principal conditions found in each city:

Curitiba:

A vital economic centre of southern Brazil, Curitiba was the "inventor" of the BRT (Bus Rapid Transit) system, which has become a global alternative to metro systems. In 2010 the city received the Globe Sustainable City Award, and has managed to maintain a city brand related to sustainability. As one of the key respondents says: "There is high awareness from the citizens that we have advanced much more in relation to other Latin American cities [here, everybody] knows that we won a prize as the most sustainable city on earth"[8]. Among academic circles, Curitiba is also regarded as the sustainable transport leader in Latin America. Due to a well known urban transformation process started in the 1970's, it has led numerous transport innovations that have been later implemented by other cities around the world.

[8] Personal communication, prof. Harry Bollmann. PUCPR, August 8, 2012.

Figure 3 – The Three Thematic Frameworks



Own construction

One such innovation is the BRT; its promoters tout it as the perfect substitute for mass metro systems in developing world cities, as it can carry similar numbers of passengers (per hour/direction) as those of an ordinary metro, yet, its construction costs a fraction of that for an average metro (EMBARQ 2010). Curitiba is also home to a famously extensive and disputed[9] pedestrian street, and to one of the most recognized city planning institutes of the region, the *Instituto de Pesquisa e Planejamento Urbano de Curitiba* (IPPUC), credited with drafting many of the master urban planning policies often connected with the high transport sustainability of the city.

Although most of those interviewed agreed with the historical urban planning achievements in the city, a vast majority of them expressed their worries about the most recent development in terms of urban transport; "Curitiba has been a global reference in sustainable mobility for 30 years, but has not contributed with any [sustainable transport] innovation during the last 10 years"[10].

Often quoted structural problems in the system include the lack of agreement between the high densities along the main corridor lines of the BRT, and the housing locations of the actual users of the system. Due to the lack of proper regulation, the high land prices next to the main BRT corridors have resulted in high real estate prices, which only the rich (who own a car) can afford. Thus, "it is not true that the people who live

[9] *Rua XV de Novembro* was converted from a car way, to a pedestrian-only street in 72 hours, during 1972. Although facing much public protests, it became the first major pedestrian street in the country.

[10] Personal communication, journalist Alexandre Costa Nascimento, Ir e Vir de Bike, August 2, 2012.

close to the main corridors use public transport, the people who actually use it, come all the way from the end points of the BRT lines [neighbouring municipalities], and mostly go towards the centre [of Curitiba]"[11]. If indeed, the existence of vast kilometres of bus-only lanes, is not correlated with high accessibility for its direct users (living in the neighbouring municipalities), then the social sustainability of this system would be harshly impacted. Similarly, our interviewees often criticized the weaknesses of the bicycle transport system. Although the city exhibits an above average number of bicycle lanes (120 kilometres) for the Latin American region, "these were designed to connect parks during the 1970's"[12], and thus, "were never designed for transport, but rather, only for leisure. Disconnected bicycle lanes that go outside of the city are not useful for day to day use"[13].

Nonetheless, our true purpose in this paper is not to controvert what the empirical characterizations have already portrayed, but rather, to discuss the political conditions explaining the level of transport sustainability in our case studies, as reflected by the GTI. As such, one key variable often quoted by our respondents refers to the form of government in Curitiba (and Brazil), during the times of the implementation of the crucial master plans, ultimately allowing for the development of the *Rede Integrada de Transporte* (RIT), the powerful integrated transport network of modern Curitiba. Brazil was ruled by a military dictatorship from March 1964 to March 1985. During this period, the horizontal interactions and power struggles between institutional stakeholders were changed for more top-down decision-making processes. Hence, "many of the decisions that we now find to be key, were taken within a dictatorial system, in which there is no participation from the civil society, [and in which] conflicts between technical staff and public servants are minimized"[14]. One of the key processes concerns the election and re-election of city mayors. During the dictatorship, several political leaders were chosen to serve what was popularly called a *cargo biônico*; "the military leadership selected the mayor of Curitiba, via the Governor of Paraná. Jaime Lerner[15] was selected by the military dictatorship to become mayor during his first two terms, without having to worry about votes"[16]. Another crucial matter pertains the usual conflicts between planners, policy-makers, and managers of the public budget; "the military dictatorship strongly favoured technical solutions. [At that time] the only city that had contracted [master city] plans was Curitiba. They selected it as the laboratory for that massive urban transformation project, and compromised the money needed; there was no opposition"[17].

The most powerful institutional player influencing the development of the well-planned city of Curitiba was the military dictatorship. During the 1950's and 1970's, when the key urban transport and urban planning innovations of Curitiba were implemented, the centralization of authority blocked the need for extraordinary institutional/metropolitan coordination, and funds were directly made available for promoting public transport; as Eduardo Vasconcellos states: "the only time in the history of Brazil when there was a massive investment on public transport made, was

[11] Personal communication, prof. Giselene Pereira UFPR, August 12, 2012.
[12] Personal communication, architect Liana Vallicelli, IPPUC, August 9, 2012.
[13] Personal communication, prof. Fabio Scatolin,advisor to Mayor Fruet August 6, 2012.
[14] Personal communication, prof. Mario Procopiuck PUCPR, August 17, 2012.
[15] Lerner, a globally renowned urban-planner, is often recognized as the father of the "Curitiba Model". After his first term in office from 1971 to 1974, he later served as mayor of Curitiba from 1979 to 1982, and was elected during democratic elections, to serve from 1989 to 1992. Moreover, he also served as Governor of Paraná from 1995 to 2002.
[16] Personal communication, prof. Fabio Scatolin, advisor to Mayor Fruet August 6, 2012.
[17] Personal communication, Prof. Magnus de Mello. UFPR, August 18, 2012.

during the dictatorship".[18] A crucial decision, as we know that investments in relatively low-cost BRT systems still have to compete with road and rail (Wright 2011; Allport 2011).

A clear contribution towards higher transport sustainability levels in two decades after the dictatorship was derived from this powerful central planning legacy. This long-term influence on the overall sustainability of the transport system of Curitiba is thus, partly due to the path dependent nature of many of the major public policy decisions in favour of the RIT system in the 1960's and 1970's.

An additional recurrent theme during our interviews concerns the role of metropolitan coordination. In Brazil, "by definition, all municipalities are much stronger than any metropolitan agency, [hence] the metropolitan scale is not a governmental scale"[19]. This municipal autonomy becomes a huge challenge when implementing metro-wide policies, such as those related to air quality and urban mobility. The case of Curitiba, is obviously a difficult one, as it is the hub for a metropolitan region accounting for 25 municipalities (CAF 2011). This situation, a common obstacle to metropolitan planning in Latin American cities was not a problem during the 1960's and 1970's. Back then, the IPPUC[20] "was charged with vast planning responsibilities in transport, transit, and land-uses, which had an influence over the core metropolitan region"[21]. This municipal autonomy, however, is often threatened by the enormous clout of the federal government. At the Federal level, "Brazil traditionally has supported car production industrial policies, low interest policies for car buying, and lowering gasoline prices"[22]. This portrays what many of the interviewees recognized as the wide push for a car-centred development model in Brazil. This push has been active since the 1903's, "when the elite was able to decide constitutionally, that the country would no longer push for trains, but rather, move completely to the 'road'. Thus, giving birth to a vast automotive industry […] the *rodoviario* model"[23]. Some decades later, the mythical president who led the construction of Brasilia, Juscelino Kubitschek, "often reminded Brazilians that governing meant 'opening roads'; that economic development started with building roads"[24].

If there is such vast support for the car industry from the federal government ("up until now, all federal governments have supported the car development model"[25]); if having a car nowadays is simply cheaper than the overcrowded buses ("today, in 5-6km trips, the car is cheaper than the bus"[26]); if the city of Curitiba is now the city with the highest number of cars per capita in Brazil: one for every 1.4 inhabitants (CAF 2009) ("they projected that by the year 2000, each family would have maximum, one car. Today, each family has 2"[27]); and if the particular culture of Brazil calls for owning cars as the ultimate social goal ("when you ask the average citizen in Brazil [and Curitiba] what their dream is, they answer: having a 0km [brand new] car"[28]), then, one must look back to the specific historical period, during which the strong IPPUC led the development of a mixed land-use and RIT moulded-after

[18] Personal communication, Dr. Eduardo Vasconcellos, ANTP, August 14, 2012.
[19] Personal communication, Prof. Fabio Duarte, PUCPR, August 15, 2012.
[20] Created in 1965.
[21] Personal communication, Liana Vallicelli, IPPUC, August 9, 2012
[22] Personal communication, transport specialist Pablo Guerrero, IADB, August 13, 2012
[23] Personal communication, Dr. Eduardo Vasconcellos, ANTP, August 14, 2012.
[24] Personal communication, transport specialist J Pedro Correa, Volvo, August 10, 2012
[25] Personal communication, Dr. Eduardo Vasconcellos, ANTP, August 14, 2012.
[26] Personal communication, Antonio Marchezetti. Logitrans, August 17, 2012
[27] Personal communication, Prof. Fabio Duarte, PUCPR, August 15, 2012.
[28] Personal communication, Leny Mary de Goes. Secretaria de Meio Ambiente de Curitiba. August 9, 2012

city; "the project led by the political elite of the 1930's [the car as development model] has been successful. It had interruptions during the dictatorship, and then during the oil crisis, but then it came back."[29]

Medellín:

Medellín is the second largest city in Colombia. An industrial powerhouse, capital of the Antioquia region, it is home to 3.5 million people in its metropolitan area, composed by 10 autonomous municipalities. The particularities of its geography (fully established within a natural valley), make it highly vulnerable to environmental threats. Even though it is the only Colombian city with a metro system and integrated cable cars, its weak ranking in our GTI is partly explained due to its historic neglect for pedestrians and cyclists, a traditionally chaotic bus scheme, and high levels of transport emissions, due principally to old transport technologies and low-quality fuels supplied by the national oil company, *Ecopetrol*.

Respondents were not surprised by the average ranking of the city within the GTI. A clear trend amongst those interviewed concerns the lack of a clear institutional definition of what sustainable mobility means, or a holistic programme to increase the level of sustainability of the transport system in the city; "we did not promote a formal definition of this [sustainable mobility]. What we promoted was a tacit agreement about the crucial social and economic role of mobility […] about the importance of an urban transport system. That was, however, not the top problem on the agenda"[30].

There are a number of crucial institutions that have influenced the current set-up of the transport system in metropolitan Medellín. However, "the only two institutions that could actually lead sustainable transport for the full metropolitan area are the Medellín Metro and the AMVA[31]"[32]. The top institution, as far as the pertinent legislation goes, is the Metropolitan Area of the Aburrá Valley (AMVA), a public administrative entity that associates 9[33] out of the 10 municipalities that make up the metropolitan area of the Aburrá Valley (*Medellín*, *Barbosa*, *Girardota*, *Copacabana*, *Bello*, *Itagüí*, *La Estrella*, *Sabaneta* and *Caldas*). Its main objective is to promote joint territorial planning. Amongst its responsibilities (as decreed by the national government) is acting as the sole environmental and mass transport authority for the metropolitan region. In practice, however, we find this is not entirely the case, as "there exists a constitutional order principle, guaranteeing the autonomy of municipalities, and thus, the ultimate planning and regulation of public transport is done directly by them"[34].

A crucial institution to consider is the Medellín Metro. Founded in 1979, it is a semi-private entity[35], with outstanding reputation across a wide variety of societal segments; likewise, it is frequently rated as the most admired organization by Medellín citizens[36]. The Medellín Metro administers an important transport network, composed by various transport modes (high capacity metro, BRT, and cable-cars), which is fully integrated (physically and in fares) across 6 municipalities of the

[29] Personal communication, Dr. Eduardo Vasconcellos, ANTP, August 14, 2012.

[30] Personal communication, David Escobar, Chief of Staff to Mayor Sergio Fajardo. September 20, 2011.

[31] *Área Metropolitana del Valle de Aburrá.*

[32] Personal communication, Rodrigo Salazar. Former Medellín Secretary of Transport. September 20, 2011.

[33] Envigado is not part of the AMVA.

[34] Personal communication, Marta Suárez. Director for Mobility AMVA. September 20, 2011.

[35] Officially a "State-owned Commercial and Industrial Enterprise, at the municipal level".

[36] As measured by the annual citizen's perception survey, coordinated by Medellín Cómo Vamos (www.medellincomovamos.org)

metropolitan area. The mass influence, technical and financial capacity of this institution often raises calls for it to lead the overall development of the transport system for the metropolitan area, "…of course it should be the Metro leading the integrated [transport] system. Who else has the power and capacity to do it? […] this evolves while informal groups claim to be the true leaders of our urban transport system: the private bus companies. And yes, they have controlled the system for a long time [unfortunately]"[37]. Nonetheless, this is legally not possible. Formally, the Metro is only one (of many) transport companies, which must adhere to the mass transport authority of the AMVA, even if the latter is much weaker in that industry, and does not own nor operate mass transport modes. Furthermore, "the Medellín Metro cannot be a legal authority, if so, we would be the 'judge, jury, and executioner' […] How can you plan when there are 12 concomitant authorities? The Ministry [of Transport], 10 municipalities, and the AMVA?"[38]

Other powerful institutional players have influenced the current mix of transport policies defining the level of transport sustainability of the city. The national government has had a crucial influence on a number of funding decisions. As a matter of fact, during a recent process to receive international funding for a tramway project, the Medellín Metro was required to secure the green light by the national government, "but the unnecessary obstacles [from the National Planning Agency] were immense, even though it only meant a formal acceptance by the national government. It is unbelievable how our system allows for a middle-level public servant in Bogotá [the capital city], to block massive well structured projects, with superb technical staff behind them [like those in the Medellín Metro]"[39]. All interviewees were well aware of the political nature of those processes influencing the transport system in the city: "the discussion about the costs and benefits of this system cannot be only technical; it has to be political […] sitting on a political table, using technical arguments"[40].

Likewise, the Medellín City Council has often influenced the transport system of the city. One particular mobility project that was born out of the City Council concerns its public bike-sharing system, *EnCicla*. Against all odds, Medellín was the first city in Colombia to successfully design and implement a bike-sharing system between 2010 and 2011. Although "it started with a small-scale operation, targeted to university students during its initial fully functional experimental phase"[41], the system is currently undergoing its second major expansion. It was councilmen Federico Gutiérrez and Bernardo Guerra who pushed for a municipal accord that would promote the scheme. Ultimately, the project was led by the AMVA as part of an integral strategy to improve sustainable mobility within its jurisdiction, "we analyzed the project and decided to go all in; even without having technical studies. It is clear to us, that if we want to achieve that institutional jump, we must go all in"[42].

Car dependency also plays an important role for in this city. Although Medellín exhibits the lowest number of cars and motorcycles per capita[43] in our GTI, mayors have often found immense vote potential in proposing car-centred policies, "the city has been planned for the private car; the structural codes have been designed for

[37] Personal communication, Jose Fernando Angel. Former Medellín Secretary of Transport. September 6, 2011.
[38] Personal communication, Ramiro Márquez. CEO. Medellín Metro September 15, 2011.
[39] Personal communication, Felipe Targa. Former Vice-Minister for Transport. October 1, 2012.
[40] Personal communication, Mauricio Faciolince. Director. AMVA. October 26, 2011.
[41] Personal communication, Jesús Acero. Director. EnCicla. October 10, 2011.
[42] Personal communication, Alejandro González. Director of Environment. AMVA. October 20, 2011.
[43] 0.07 vehicles per capita.

major highways, vast car-only bridges…" [44]. Additionally, having a car is an important social symbol in a historically poor country, "we suffer from a devotion towards the car; it is a very important mode of social ascension"[45]. Just like many other cities in the region, non-motorized modes are not routinely considered within the budget for alternative modes to the car (Figueroa et al. 2013), in Medellín, "very little investments have been made for both cyclists and pedestrians historically […] the car is King. Furthermore, all efforts 'against the car' are highly unpopular. The media immediately jumps against this, with the excuse that this goes against sources of employment. Remember that they [writing the stories in the media] are not moving around in any other way than driving"[46].

The third key thematic framework was built around metropolitan governance. Surprisingly, cultural factors seem to provoke discussions about the feasibility of constructing metropolitan-wide entities. "Selfishness is a cultural trait in our society. The municipalities in the metropolitan area [of Medellín] behave as if they were islands, with complete selfishness. If we think about generating brotherhoods amongst these municipalities, these must be based on complementarities, via win-win metropolitan-level accords"[47]. Some even go as far as claiming that the lack of metropolitan coordination is precisely the reason for the low performance of Medellín, as compared to other cities in the region, "we are still behind because of that, the big reason is coordination [lack of thereof]"[48]. Other levels of government sometimes makes things worse, "although the city is responsible for its own development, you must remember that a few years ago, the Transport Minister used to come here every 3 months to force his opinions about the minor details of the route for the Metroplús [BRT]"[49]. This also has negative financial consequences, "the lack of interest in coordination is so pronounced, that they prefer to say no to funds, if this means requirements for coordination"[50]. This low level of coordination is not new and has been the traditional planning approach for Medellín and its neighbours; moreover "we have absolute clarity that, in the short run, there will not be one sole leader for the metropolitan region"[51].

When analyzing institutional conditions behind the transport system of the Medellín metropolitan area, Holuigue highlights that an administrative entity should have the power to coordinate and align all actors involved, in order to generate more sustainable transport programs (Holuigue 2011). However, all interviewees agree that there is not an easy way to achieve this. According to the books, the AMVA is the institution that should do it, "the AMVA is the institution, theoretically, charged with this [planning mobility for the metropolitan region], but it needs sharper teeth and greater capacity than what it has"[52]. Furthermore the Medellín Metro contends that leadership, "it is a super-powerful institution, which not only has the influence to manipulate policy, but also immense territorial power, and a great planning

[44] Personal communication, Juan Pablo Ospina. Transport Specialist. BIO 2030. October 14, 2011.

[45] Personal communication, Rafael Nanclares. Transport Secretary. October 25, 2011.

[46] Personal communication, Alvaro Restrepo. Transport Specialist. Independent consultant October 13, 2011.

[47] Interview Carlos H Jaramillo with Medellín Cómo Vamos. Former Planning Director of Medellín. July 4, 2013. http://medellincomovamos.org/revision-del-pot-carlos-h-jaramillo-pg-urbano

[48] Personal communication, Jose Fernando Angel. Former Medellín Secretary of Transport. September 6, 2011.

[49] Personal communication, David Escobar, Chief of Staff to Mayor Sergio Fajardo. September 20, 2011.

[50] Personal communication, Jose Muñoz. Intermediary between regional and local governments. October 20, 2011.

[51] Interview Carlos H Jaramillo with Medellín Cómo Vamos. Former Planning Director of Medellín. July 4, 2013. http://medellincomovamos.org/revision-del-pot-carlos-h-jaramillo-pg-urbano

[52] Interview Alejandro Echeverri with Medellín Cómo Vamos. Director. Urbam. July 4, 2013. http://medellincomovamos.org/revision-del-pot-alejandro-echeverri-urbam-eafit

capacity"[53]. With powerful forces behind the car, and a critical need for greater metropolitan cooperation, there does not seem to be a single powerful institutional player capable (or willing?) to break the status quo, "it is all political at the end: let us not forget that he director of the AMVA is selected directly by the Mayor of Medellín"[54].

Guadalajara:

The second largest metropolitan area in the country extends across the municipalities of *Guadalajara*, *Zapopan*, *Tlaquepaque*, *Tonalá*, *El Salto*, *Juanacatlán*, *Tlajomulco de Zúñiga* and *Ixtlahuacán de los Membrillos*. A number of key actors have been actively advocating for sustainable transport in the metropolitan area of Guadalajara, however, the city ranked last in our GTI, due to an unfortunate combination of political dynamics that have succeeded in generating entrenched path dependencies. "Although the key institutional players talk about building tramway lines, debate actively the BRT model, and commit to building X number of bicycle lanes, at the end the actual public policy continues promoting car-based mobility over and over"[55]. Today, the organized public transport system collides with a weakly regulated private bus system, a high rate of auto ownership, and a practically non-existent bicycle network.

None of the interviewees reacted with great surprise about Guadalajara's low ranking in the GTI, insinuating a high awareness of the recent local crises in terms of sustainable mobility. In fact, while almost all of the interviewees were impressively informed about the technicalities of what the latest literature about sustainable mobility implies, this does not seem to be the case with many of the actual decision-makers, "it is hard to identify a metropolitan public policy aimed at improving the sustainability of our mobility. To start with, this is evident from the disproportionate public investment annually destined to vehicular infrastructure, and the very limited resources destined to sustainable modes"[56].

A variety of powerful institutional players have influenced the level of sustainability of the transport system in this city. Political parties account for an extraordinary weight when explaining the last decade's developments on transport. A country, with a protracted tradition of strong national parties[57], suffers from what some have called "a dictatorship controlled by the political parties" [58]. This dynamics are also entrenched at the regional level, "here [the State of Jalisco], we have had historically a duopoly, with then PAN[59] and the PRI"[60]. Thus, it is precisely via the action of the State governments, and the interaction with the Municipal governments that political parties end up having a huge effect on the local transport agenda. For all municipalities in the metropolitan area of Guadalajara, "the transport policy is defined by the State [of Jalisco]. Although it is often discussed with the municipal governments, the major financing comes from the State, and hence, is the one that can make the largest moves, be it [that these are] positive or negative"[61]. Unfortunately,

[53] Personal communication, Alejandro González. Director of Environment. AMVA. October 20, 2011.

[54] Personal communication, Rodrigo Salazar. Former Medellín Secretary of Transport. September 20, 2011.

[55] Personal communication, Maria de la Torre. Urban planner with the Zapopan government. Abril 20, 2013.

[56] Personal communication, Maria de la Torre. Urban planner with the Zapopan government. Abril 20, 2013.

[57] The *Partido Revolucionario Institucional (PRI)*, for instance, famously maintained hegemonic power in the country for the last 70 years in the 20th century.

[58] Personal communication, prof. Oscar Castro. ITESO. February 7, 2013.

[59] *Partido de Acción Nacional.*

[60] Personal communication, Alfredo Hidalgo. Strategic Projects Director. Zapopan. February 5, 2013.

[61] Personal communication, Hugo Luna. Director. Movimiento Ciudadano Political Party. February 10, 2013.

the broad transport agenda, dictated by the state government, and influenced by the municipal governments has become increasingly partisan, "in our land, it is easy to attack policies by making them partisan […] our people boast a high lack of technical understanding, and historical low levels of trust for official authorities"[62]. The best example of this harmful partisan politics dynamic is definitely the fiasco with the *Macrobús Línea 2* BRT project. While the National Government "had pledged U$100 million [for the BRT line 2], the local mayors [of Guadalajara, Zapopan and Tlaquepaque] rejected the money and killed the project. Guadalajara later got into a U$120 million to re-surface roads"[63]. Curiously, these three mayors, members of the PRI, opposed a project led by a PAN Governor[64], which had successfully implemented the first line of the BRT; thus communicating the idea that the BRT model was a "PAN project". On the other hand, and only 1 year and a half before, the BRT Line 1 "was successful only because the political conditions allowed the Governor [of Jalisco] to impose its conditions. All municipalities were being led by the PAN, and there was a majority of the PAN in the State Congress. The opposition from the PRI was important, but not sufficient to generate obstacles"[65]. Not just because of the magnitude of the BRT project (in its several future lines), but also due to the symbolic nature of mass transport being a priority of the PAN government, the second half of Governor Emilio González's six-year term in office did not see many advances in sustainable transport; "having blocked our BRT, they also managed to collapse the governability of our State to implement other projects"[66]. One additional variable adds greater complexity to the ordinary partisan politics in Mexico: "governors, mayors, and legislative bodies are elected at the same time, but go in at different times. Plus, the governor is elected for six years, while the mayors are elected for 3 with no re-election"[67]. This means that "municipalities en up reinventing themselves every three years, while the states do it every 6; that is fatal for long-term projects"[68]. This refers not only to the particularities of a spoil system, but also to the maintenance of long-term visions in urban planning, which are crucial for transport sustainability. Our system "does not allow us to plan in the long term. The municipal administration elected for the first three years [coinciding with the first three years of the State administration] will always have less time and fewer resources. The second one, is an administration contaminated with the particular interests of those politicians thinking about the next election"[69]. The preparations for elections were mentioned by most of the interviewees along with the power of political parties, as those key variables influencing the current level of transport sustainability in the city, "it is clear, the defeat of the BRT Line 2 project was only staged for electoral purposes, it was never for the benefit of the city"[70]. Three years later, as a matter of fact, the former mayor of Guadalajara, Aristóteles Sandoval, who led the opposition to the BRT line 2, was elected Governor of Jalisco. Moreover, the partisan politics dynamics exhibited along the Macrobús project discussions often are replicated at further local levels, and further national levels; "the political parties are practically the owners of

[62] Personal communication, Diego Monraz. Secretary of Transport. February 11, 2013.
[63] Personal communication, Mario Silva. Director. CEJ. February 6, 2013.
[64] Emilio González Márquez.
[65] Personal communication, prof. Oscar Castro. ITESO. February 7, 2013.
[66] Personal communication, Diego Monraz. Secretary of Transport. February 11, 2013.
[67] Personal communication, Alfredo Hidalgo. Strategic Projects Director. Zapopan. February 5, 2013.
[68] Personal communication, Carlos Romero. Director. Non-motorized mobility. OCOIT. February 5, 2013.
[69] Personal communication, Alfredo Hidalgo. Strategic Projects Director. Zapopan. February 5, 2013.
[70] Personal communication, José Comer. Director of Control. SITEUR. February 7, 2013.

all the public power [in Mexico]. If it is not through them, it is almost impossible to influence public policies in Mexico"[71].

As has been recurrently identified across all studied cities, a development model based on the car has also had an immense effect on Guadalajara. Even with the massive investments done during the last decade on infrastructure for the car, the city's traffic continues to be collapsed, "everybody knows it. We live in one of the cities with the highest number of cars per capita […] we have about 2.6 people per car, and more than 300 new cars are incorporated daily" [72]. Some of the interviewees claim it has become a pride of the city, "for example, the Matute Remus bridge cost enough to advance all the strategic actions stipulated in the Non-Motorized Mobility Plan […] the technology of that bridge is as if one would use it to cross the Hudson river; the only difference being that here, there is no river under it. If you were to make an opinion poll, it would certainly come out as the new *tapatío* [local] symbol"[73]. Of course, the actual numbers do support the theories of those that claim the car has been the official development model followed by the local governments here: the city has passed from having 750.00 cars in the year 2000, to more than 1.525.000 in 2009"[74]; "9 out of 10 pesos spent in infrastructure have been invested in the car, while 70% of the people wish it was spent in public transport"[75]. This protracted preference for car-centred investments finds horizontal and vertical institutional echoes. For example, the former president of the country, Felipe Calderón, showed his support for the car industry, "he even had as one of his term slogans, the 'infrastructure six-year term', which in reality meant the construction of highly visible and expensive infrastructure, like our urban bridges" [76]. This was probably worse in terms of the coordination between dependencies of the State government, while the Department of Transport claims to have been pushing for non-motorized transport, they also identify their colleagues at the Urban Development Department (SEDEUR) as the biggest enemies of it, "they could not care less about cyclist and pedestrians […] in fact, the State government, through them, has spent 95% on the car, and 5% on the others […] it should be minimum 50-50"[77].

Metropolitan coordination is the last thematic framework that we identified as vital. In principle, the fact that the State of Jalisco can plan transport for the whole metropolitan area of Guadalajara should be a major plus. However, this advantage rarely has resulted in higher levels of transport sustainability during the last decade. Confrontations between entities that share responsibilities are common, "apart from the Transport Department, we also have other decentralized entities like OCOIT, SITEUR and CEIT that often clash. Moreover, although the Transport Department is charged with regulating public transport in the State, there is not one single entity that can manage public transport entirely"[78]. Similar confrontations are also frequent amongst municipalities, who try their best to get more out of the State government, "in terms of mobility, it is the State that controls; but the municipalities can operate in issues of sidewalks and bicycle lanes"[79], which means that they have an incentive to

[71] Personal communication, prof. Oscar Castro. ITESO. February 7, 2013.
[72] Personal communication, Etienne von Bertrab. Founder Ciudad para Todos. February 4, 2013.
[73] Personal communication, Mario Delgado. Entrepreneur. BKT. February 8, 2013.
[74] Personal communication, Mario Silva. Director. CEJ. February 6, 2013.
[75] Personal communication, Carlos Romero. Director. Non-motorized mobility. OCOIT. February 5, 2013.
[76] Personal communication, Etienne von Bertrab. Founder Ciudad para Todos. February 4, 2013.
[77] Personal communication, Diego Monraz. Secretary of Transport. February 11, 2013.
[78] Personal communication, José Comer. Director of Control. SITEUR. February 7, 2013.
[79] Personal communication, Alfredo Hidalgo. Strategic Projects Director. Zapopan. February 5, 2013.

block certain initiatives that would directly affect their turfs. Additionally, coordination amongst them is not facilitated by the State, nor a supra-municipal entity, "the Mexican Federal Constitution states clearly that coordination amongst municipalities is not mandatory […] and here, with eight power asymmetries, it is impossible to leave the coordination under one hegemonic power" [80]. This is not to say that coordination amongst municipalities just does not happen in Guadalajara, "there are cases when it has been done informally, most of the times facilitated by the fact that the municipal governments were all members of the same political party" [81]. However, this rarely is significant enough to generate major changes to a highly path dependent system, "because these relationships are characterized by total subordination to the State decisions, and never suppose a dialogue amongst equals"[82]. The eternal discussions regarding the institution of a supra-municipal planning entity, have repetitively failed, "the parties involved are quite aware that such an institute would negatively impact their well established power turfs"[83]

The case of Guadalajara contributes to this research with an additional component: the role of organized interest groups. A lack of trust towards the political class has been a common phenomenon in some segments of this country and politicians are well aware of this, "Mexico is a country of disbelievers […] you cannot tell people that we will take their [gasoline] subsidy away, to invest it in better public transport. They won't believe it"[84]. Additionally, in Guadalajara, the poorest social strata have been ignored, "our political class is absolutely distanced from the citizens […] in terms of transport they only focus on what the rich people want: more roads, more tunnels, more avenues […] and what is worse, this recipe has been followed by all political parties"[85]. This lack of trust is magnified by perceptions of corruption, "up until now, we have only had politicians that provide evidence of their corruption, and their interest in pursuing policies that benefit them at the individual level" [86]. However, the aforementioned combination of negative factors has resulted in an above average social infrastructure. Guadalajara boasts highly active citizen groups, and dynamic economic unions actively participating in policy decisions. The stronger social groups were born at the beginning of Governor González's term, "a detonating factor was the State government's decision to build an urban highway along the López Mateos corridor. This happened right when many of us were studying about sustainable mobility"[87]. From that moment on, the well organized citizen groups faced the challenge of influencing policies, without bearing any type of decision-making power, "all these groups that aim at positioning sustainable mobility on the political agendas share a specific view of what sustainable mobility means. So deep, that they have transitioned into a metropolitan platform with specific demands to the different levels of government"[88]. One additional power player constitutes the vast network of renowned businessmen agglomerated under the Guadalajara 2020 group. Due to their economic power, their influence transcends that of the activist groups, as was seen during the *Vía Express* incident, "when the State government insisted that they would

[80] Personal communication, Mario Silva. Director. CEJ. February 6, 2013.

[81] Personal communication, Eugenio Arriaga. Former Director Non-Motorized Transport. Guadalajara. April 5, 2013.

[82] Ibid.

[83] Personal communication, prof. Oscar Castro. ITESO. February 7, 2013.

[84] Personal communication, Senator Ninfa Salinas. Mexican Senate. January 29, 2013.

[85] Personal communication, Etienne von Bertrab. Founder Ciudad para Todos. February 4, 2013.

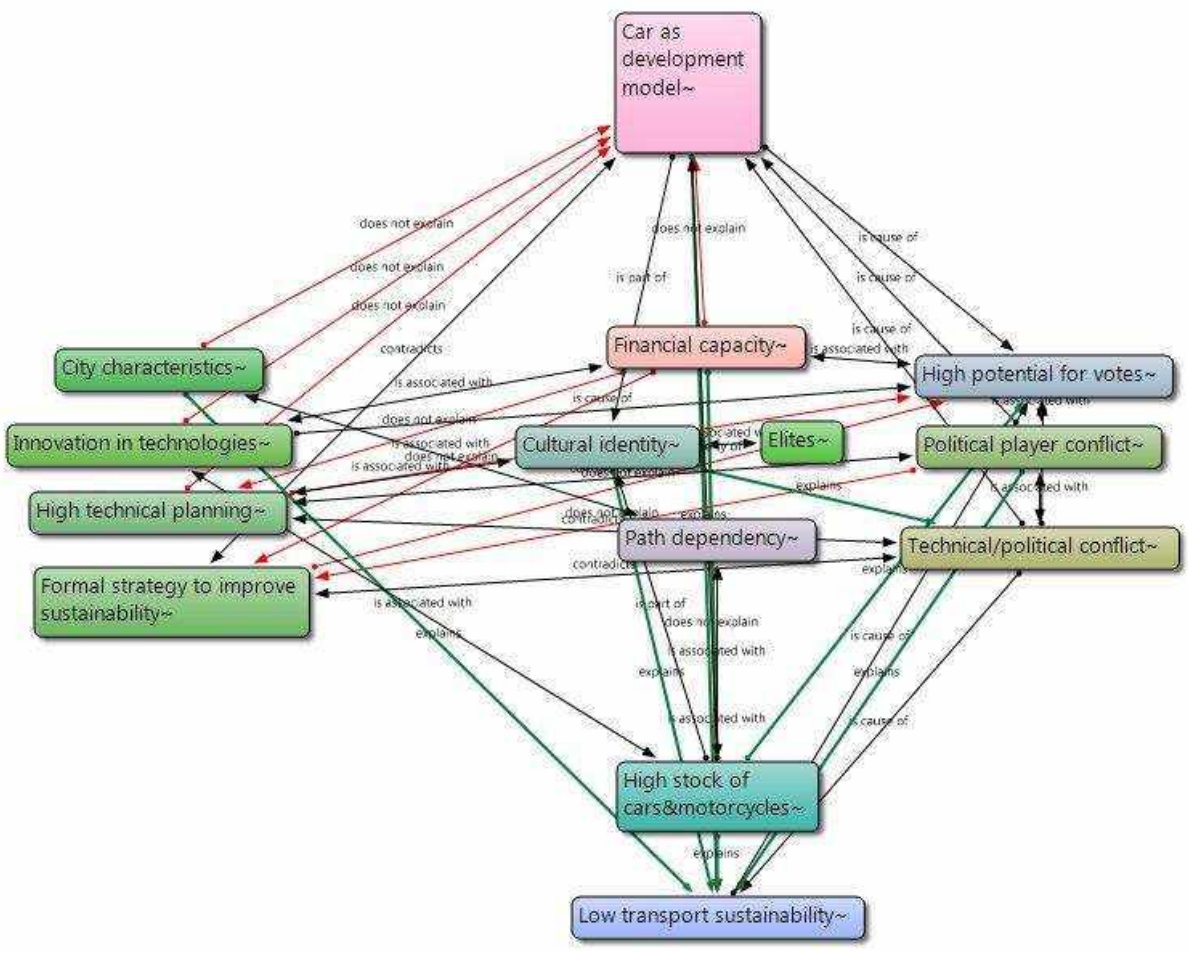
[86] Personal communication, Maria de la Torre. Urban planner with the Zapopan government. Abril 20, 2013.

[87] Personal communication, Héctor Castañón. Director. Plan V Vecinos en Red. February 6, 2013.

[88] Personal communication, Maria de la Torre. Urban planner with the Zapopan government. Abril 20, 2013.

build the second-level highway, we suddenly found powerful unexpected allies: the COPARMEX employer's association, and the industrial chambers of the State [89].
The powerful role of the political parties in Mexico, undoubtedly affects the transport agendas in Guadalajara. It is a political problem and not related to the availability of resources "the chaos is related to the political dysfunctionalities […] governments rotate, and processes are always terminated"[90]. Against the backdrop of a highly car addicted system, the role of some organized interest groups starts to have an effect on urban transport policies: "we have targeted a wide variety of politicians and decision makers, irrespective of their political party affiliation. What we want to show them is that sustainable mobility is not only a possibility for the developed countries, it is also possible and necessary here"[91]

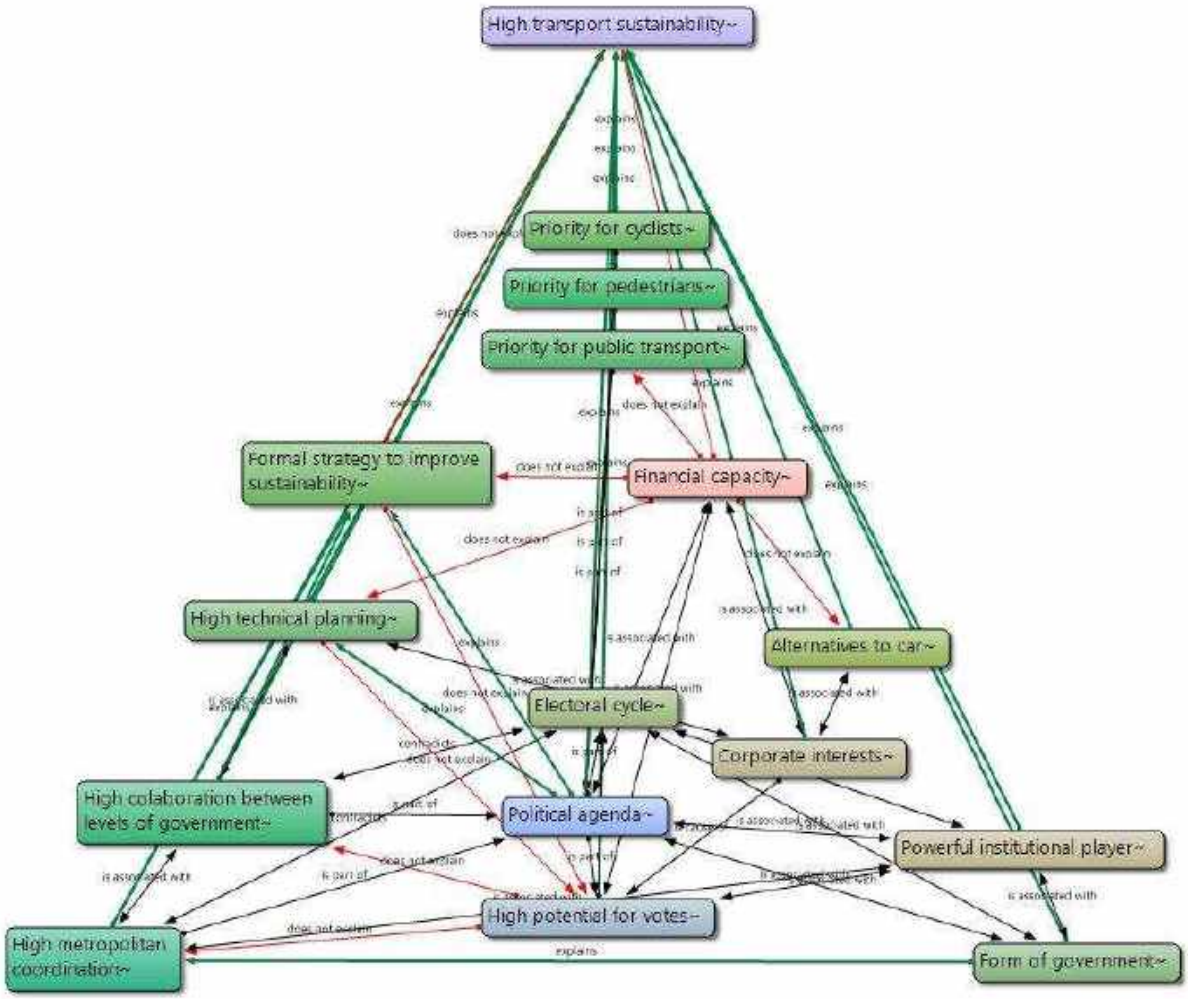
Figure 4 – Explanatory Factors to Low Transport Sustainability



Own construction

[89] Personal communication, Mario Silva. Director. CEJ. February 6, 2013.
[90] Personal communication, Patricia Martinez. Activist. GDL en Bici. February 7, 2013.
[91] Personal communication, Tomás López. Guadalajara 2020. February 11, 2013.

Figure 5 – Explanatory Factors to High Transport Sustainability



Own construction

5. Conclusion

Both the index and the case study results prove to be highly policy relevant for actors in the region. With the former, we aim at establishing a recurring exercise, ultimately serving as a benchmark, and concomitantly providing incentives for political actors in the region to pursue more sustainable transport policies. With the latter, we contribute in identifying cross-cutting conditions affecting the levels of transport sustainability in the studied cities.

The diversity in outcomes on transport sustainability for the studied regions cannot be explained by the availability of financial resources or technology. Although both of these factors are fundamental when building, for instance, modern and far-reaching public transport systems, their existence does not seem to guarantee higher levels of transport sustainability. Likewise, the lack of financial resources or technologies does not seem to explain the highly car dependent trajectories of the studied cities. Higher levels of transport sustainability in Latin American cities can be much easier explained via the minimization of political player conflicts, either through the direct

imposition by powerful institutional players, or through high levels of metropolitan coordination amongst key multilevel actors.

Since dictatorial forms of government are out of the question in the modern Latin American region, we don't intend to highlight this as a necessary condition for greater transport sustainability. However, the particular form of government of both the country and the city seems to be of utmost importance. 43% of those interviewed in the three cities referred to this condition as the most crucial condition determining the level of sustainability of the transport system in their city. High level of institutional coordination, and conceivably, the existence of a unique metropolitan institution, with sufficient power and capacity to plan, implement, and regulate transport for the full metropolitan region was also identified as fundamental by the interviewees in the three case studies. However, previous studies offer evidence that in Latin American cities, this is often not the case (Holuigue 2011). As our cases show, the frequent autonomy of municipalities that compose a single metropolitan area, seriously hampers the integrated transport planning aimed at increasing sustainability. Furthermore, the legal competencies and responsibilities are often commissioned to other levels of government (national, regional, local), or even to private or semi-private entities. Thus, generating dynamics that usually end up benefiting the car development models so entrenched in this region's cities.

In sum, we have selected the cities of Curitiba, Medellín and Guadalajara, as a representative mix of all levels of transport sustainability in Latin American cities. In Curitiba, while the high level of transport sustainability often exhibited in similar studies is confirmed by our GTI, it was highly contested by the key informants we interviewed in the city. To many of them, the current situation deviates from the historical urban planning achievements, although the path dependencies generated from these previous decisions are still accounted for in basic empirical characterizations. In Medellín, most respondents agreed that sustainable transport has not been a priority, and as such has never been high on the public agenda. However, the main discussion concerned the lack of metropolitan coordination, and the high obstacles (and incentives) for this collaboration, deemed vital to achieve higher levels of transport sustainability. Finally, in Guadalajara, most respondents agreed with the low level of transport sustainability of the city. Surprisingly, the high awareness about sustainable mobility of citizens is not reflected amongst key decision-makers, but finds a crucial representation via the action of organized interest groups. For this city, the role of political parties was mentioned as the top variable influencing the current mix of transport alternatives, and thus, explaining the level of sustainability of this system.

Although our exercise lacks the potential to predict the trajectories that Latin American cities will follow, we intend to delineate a path for them to develop their own sustainability policies, without falling prey to the conditions that have entrenched car-dependent models in the region.

References

Alberti, M., 1996. Measuring urban sustainability. *Environmental Impact Assessment Review*, 16(4-6), pp.381–424.

Allport, R., 2011. Rail rapid transit advances. In *Urban Transport in the Developing World: A Handbook of Policy and Practice*. Edward Elgar Publishing, pp. 456–487.

Banister, D., 2008. The sustainable mobility paradigm. *Transport Policy*, 15(2), pp.73–80.

Banister, D. et al., 2011. Transportation and the Environment. *Annual Review of Environment and Resources*, 36(1), pp.247–270.

Bertaud, A., 2004. The Spatial Organization of Cities: Deliberate Outcome or Unforeseen Consequence?

Bertolini, L., 2009. The Planning of Mobility. *Inaugural Speech. Universiteit Van Amsterdam*.

Bocarejo S., J.P. & Oviedo H., D.R., 2012. Transport accessibility and social inequities: a tool for identification of mobility needs and evaluation of transport investments. *Journal of Transport Geography*. Available at: http://linkinghub.elsevier.com/retrieve/pii/S0966692311002286 [Accessed May 28, 2012].

Breheny, M., 1992. The contradictions of the compact city: A review. In *Sustainable Development and Urban Form*. London, pp. 138–159.

CAF, 2011. *Desarrollo urbano y movilidad en América Latina*,

CAF, 2009. *Observatorio de Movilidad Urbana para América Latina Información para mejores políticas y mejores ciudades*, Caracas: Corporación Andina de Fomento.

Cadena Gaitan, C., 2012. *Political determinants of sustainable transport in Latin American cities*, United Nations University, Maastricht Economic and social Research and training centre on Innovation and Technology. Available at: http://ideas.repec.org/p/dgr/unumer/2012072.html [Accessed August 2, 2013].

Cervero, R., 2001. Integration of Urban Transport and Urban Planning. In M. Freire, ed. *The Challenge of Urban Government: Policies and Practices*. Washington DC: The World Bank Institute, pp. 407–427.

EMBARQ, 2010. *Modernizing Public Transport: Lessons Learned from Major Bus Improvements in Latin America and Asia*, Washington, DC: World Resources Institute.

Figueroa, M.J., Fulton, L. & Tiwari, G., 2013. Avoiding, transforming, transitioning: pathways to sustainable low carbon passenger transport in developing countries. *Current Opinion in Environmental Sustainability*, 5(2), pp.184–190.

Figueroa, M.J. & Ribeiro, S.K., 2013. Energy for road passenger transport and sustainable development: assessing policies and goals interactions. *Current Opinion in Environmental Sustainability*, 5(2), pp.152–162.

Holuigue, C., 2011. Institucionalidad y transporte público urbano Santiago y Medellin.

IADB, 2006. *La política de las políticas públicas: progreso económico y social en América Latina* I.-A. D. B. (IADB) Harvard University, ed., Editorial Planeta.

IEA, 2012. *Energy Technology Perspectives*, Paris: International Energy Agency.

Joumard, R. & Gudmundsson, H., 2010. *Indicators of Environmental Sustainability in Transport*, Institut national de recherche sur les transports et leur sécurité – INRETS.

KPMG, 2010. *Sustainable Insight: City Typology as the Basis for Policy.*, Amsterdam.

Lacey, A. and L., 2001. Qualitative Data Analysis. *Accessed through: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.124.9899&rep=rep1&type=pdf*, (Trent Focus Group - University of Sheffield), pp.on January 4, 2009.

Lefèvre, B., 2010. Urban Transport Energy Consumption: Determinants and Strategies for its Reduction.. An analysis of the literature. *SAPIENS. Surveys and Perspectives Integrating Environment and Society*, (2.3).

Lefèvre, Benoit, 2009. Urban Transport Energy Consumption: Determinants and Strategies for its Reduction. *SAPIENS*, 2(3).

Lefévre, C., 2005. Gobernabilidad democrática de las áreas metropolitanas: Experiencias y lecciones internacionales para las ciudades latinoamericanas. In E. C.-R. Rojas, ed. *Gobernar las Metrópolis*. Washington D.C.: Universidad Alcalá de Henares, Inter-American Development Bank (IADB), pp. 195–261.

Levi, M., 1997. A model, a method and a map: rational choice in comparative and historical analysis. In *Comparative Politics: Rationality, Culture, and Structure*. Cambridge University Press.

Litman, T., 1999. Exploring the paradigm shifts needed to reconcile transportation and sustainability objectives. *Transportation Research Record: Journal of the Transportation Research Board*, 1670(-1), pp.8–12.

Litman, Todd, 2007. Developing Indicators for Comprehensive and Sustainable Transport Planning. *Transportation Research Record*, 2017(1), pp.10–15.

Litman, Todd, 2009. Sustainable Transportation Indicators: A Recommended Research Program For Developing Sustainable Transportation Indicators and Data.

Mahoney, J., 2000. Path dependence in historical sociology. *Theory and Society*, 29(4), pp.507–548.

May, A.D. et al., 2012. An option generation tool for potential urban transport policy packages. *Transport Policy*, 20, pp.162–173.

Newman, P.W.G., Newman, D.P. & Kenworthy, J.R., 1989. *Cities and automobile dependence: a sourcebook*, Gower Technical.

OECD, 2000. *The Reform of Metropolitan Governance*, Paris.

Owen, D., 2010. *Green Metropolis: Why Living Smaller, Living Closer, and Driving Less Are theKeys to Sustainability* Reprint ed., Riverhead Trade.

Pardo, C., 2005. Salida de Emergencia: Reflexiones Sociales sobre las Políticas del Transporte. *Universitas Psychologica*, 4(3), pp.271–284.

Rogers, R., 1997. *Cities for a Small Planet*, London: Faber and Faber.

Schafer, A., 2011. The future of energy for urban transport. In *Urban Transport in the Developing World: A Handbook of Policy and Practice*. Edward Elgar Publishing.

Schafer, A. & Victor, D.G., 2000. The future mobility of the world population. *Transportation Research Part A: Policy and Practice*, 34(3), pp.171–205.

Scharpf, F.W., 2000. Institutions in Comparative Policy Research. *Comparative Political Studies*, 33(6-7), pp.762–790.

Seawright, J., 2008. Case Selection Techniques in Case Study Research. *Political Research Quarterly*, 61(2), pp.294–308.

Thelen, K., 1999. Historical Institutionalism in Comparative Politics. *Annual Review of Political Science*, 2(1), pp.369–404.

UITP, 2011. Public transport: the smart green solution. In 59th UITP World Congress and Mobility & City Transport Exhibition Boosting public transport: Action! Dubai.

UN-ESCAP, 2005. *What is Good Governance?*, Social Commission for Asia and the Pacific (ESCAP).

UN-HABITAT, 2011. *Global Report Human Settlements 2011*, Nairobi.

UN-HABITAT, 2002. *Sustainable Urbanization Achieving Agenda 21*, Nairobi.

UNEP, 2011. *Towards a Green Economy - Transport: Investing in energy and resource efficiency*, Nairoboi.

UNPD, 2012. *World Urbanization Prospects, the 2011 Revision*, United Nations Department of Economic and Social Affairs, Population Division. Available

at: http://esa.un.org/unpd/wup/CD-ROM/Urban-Rural-Population.htm [Accessed April 6, 2012].

Vigar, G., 2001. Implementing Transport's "New Realism"? The Dissemination of Demand-management Policies in UK Transport Planning. *The Town Planning Review*, 72(4), pp.423–443.

WCED, 1987. *Our Common Future* T. W. C. on E. and Development, ed., Oxford: Oxford University Press - The World Commission on Environment and Development.

Whitelegg, J., 2007. Integrating sustainability into transport. In National Transport Conference. London. Available at: www.eco-logica.co.uk/pdf/Integrating_Sustainability_Transport.pdf.

Wittneben, B. et al., 2009. Integrating Sustainable Transport Measures into the Clean Development Mechanism. *Transport Reviews*, 29(1), pp.91–113.

Wright, L., 2011. Bus rapid transit:a review of recent advances. In *Urban Transport in the Developing World: A Handbook of Policy and Practice*. Edward Elgar Publishing, pp. 421–455.

Wright, L., 2004. The limits of technology: achieving transport efficiency in developing nations. Available at: http://eprints.ucl.ac.uk/108/ [Accessed January 17, 2012].