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Inefficiencies and opportunities of urban transport in Brazil: a case study of Balneário Camboriú

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Abstract: This research tries to identify the institutional and legal critical factors responsible for the inefficiencies in the urban mobility system in Brazil, suggesting later guidelines on how to overcome counterproductive conditions of the transport system. We reviewed the literature and legislation related to urban mobility applied to Brazilian cities using the city of Balneário Camboriú, Brazil, as a case study. The analysis allowed us to understand several factors that can generate negative externalities and reduce the urban mobility of the urban population. In conclusion, we identified that the inefficiencies, especially for public transportation, face several legal and institutional issues, where interventionist policies do not allow the best solutions to be employed.

Keyword: Transport policy, urban mobility, transit, public transport in developing countries, institutional, legal issues of transportation

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Ineficiências e oportunidades do transporte urbano no Brasil, um estudo de caso de Balneário Camboriú

Resumo: O objetivo dessa pesquisa é identificar os fatores institucionais e legais, responsáveis pelas ineficiências no sistema de mobilidade urbana no Brasil, sugerindo medidas para superar as condições contraproducentes do sistema de transporte. Revisamos a literatura e a legislação relacionadas com a mobilidade urbana, aplicadas às cidades brasileiras utilizando como caso de estudo a cidade de Balneário Camboriú, no Brasil. Essa análise permitiu compreender vários fatores que podem gerar externalidades negativas e reduzir a mobilidade urbana da população urbana. Dentre os resultados, identificamos que as ineficiências, especialmente no transporte público, enfrentam vários problemas legais e institucionais, em que suas políticas intervencionistas não permitem a adoção das melhores soluções.

Palavras-chave: política de transporte, mobilidade urbana, trânsito, transporte público em países em desenvolvimento, questões institucionais, legais do transporte

Ineficiencias y oportunidades del transporte urbano en Brasil, un estudio de caso de Balneario Camboriú

Resumen: El objetivo de esta investigación es identificar los factores críticos institucionales y legales responsables por las ineficiencias en el sistema de movilidad urbana en Brasil, para luego recomendar pautas sobre cómo superar las condiciones contraproducentes del sistema de transporte. Se revisó la literatura y la legislación relacionada con la movilidad urbana aplicada a las ciudades brasileñas utilizando como caso de estudio la ciudad de Balneario Camboriú, Brasil. El análisis permitió comprender varios factores que pueden generar externalidades negativas y reducción de la movilidad urbana de la población urbana. Como principales resultados, se identificó que las ineficiencias, especialmente para el transporte público, enfrentan varios problemas legales e institucionales, donde sus políticas intervencionistas no permiten que se empleen las mejores soluciones.

Palabras clave: política de transporte, movilidad urbana, tránsito, transporte público en países en desarrollo, cuestiones institucionales, legales del transporte

Introduction

The approach of urban mobility in the Brazilian academic context is sometimes superficial and attached to pre-conceived platitudes, suggesting solutions with little practical impact, precisely because it does not fully identify the real causes of the inefficiencies of the Transport and Urban Mobility System (TUMS) in the country. As a result, they fail to address precisely the problems. However, the inefficiencies are far more underlying and complex than commonly proclaimed: lack of urban planning; lack of inspection; dishonest companies or governments.

An inaccurate identification of the problem is a relevant matter since usually has been the basis for several public policies which delegate to the State the obligation to provide services in a centralized way, limiting private initiative action, and promotes functional economic monopolies of public transport operation. As a result, public transport occurs with competition distortions, with an outcome where transit system has low participation in ridership (compared to the automobile) reducing their use. That, associated with policies that foster the use of cars results in an imbalance between supply and demand between modes of transport.

Problems arise from this, whereby, initially, the central authority (through representatives and specialists/technicians) would have the competence to satisfactorily determine all component parameters of transport planning, in coordination with the other intersectoral policies of a city; and all this to be carried out efficiently and capable of making urban transport competitive with private cars.

Public transport services, however, are not effective, operating with low productivity and efficiency, uncomfortable, not convenient and with low competitiveness in relation to cars (SAMPAIO et al., 2006; BERTUSSY; ELLERY, 2012; PERO; STEFANELLI, 2015). As a result, there is a worsening in urban mobility quality, and the population has in the car the most suitable alternative to their needs.

This process contributes to the generation of severe externalities: increasing car traffic (ABDALA; PASQUALETTO, 2013), generating negative environmental and public health impacts (SILVA, 2013), such as noise (PISONI, 2019; WANN-MING, 2018) and air pollution (MRKAJÍC; ANGUELOVSKI, 2016; JIMENEZ-VACA, 2020), reduce the competitiveness of cities, and restricts the general accessibility of the population. Also, Litman (2008; 2014) points out that ineffective public transport, especially in emerging countries, also increases the risks of transport accidents, while there is a negative correlation being verified between the increase in public transport trips, with the lowest incidence of serious accidents. In Brazil, high rates in traffic accidents can be verified specially in more vulnerable users (pedestrians, cyclists, and motorcyclists) (MELLO; PORTUGAL, 2017).

As responses to these negative impacts, public policies for territorial ordering and urban mobility were implemented in Brazil: The Federal Urban Policy (Law 10.257/2001, in Brazil (2001)) and the Federal Urban Mobility Policy (Law 12.587/2012: Brazil (2012)). These policies, and its complementary laws, establishes guidelines in order to achieve constitutional guarantees: “right to efficient urban mobility” and “full development of the city’s social functions and to

guarantee the well-being of its inhabitants” (Art. 144 and Art. 182 of the Brazilian Constitution: Brazil (1988)). In addition to federal laws, municipal laws establish special conditions for local issues, such as urban legislation (City Master Plan, concession and regulation of local transport), besides regulations resulting from Municipal or State Governments (Table 1).

Table 1. Examples of the main current transport and urban mobility laws in Brazil

Legal sphere	Law	Subject
Federal	Federal Constitution/1988	The Constitution determines urban transport services as an instrument of urban policy and defines their provision as a competence of a municipal authority.
	8.987/1995	Law of the regime of concessions and provision of public services. It enables the concession of public services to the private sector.
	9.503/1997	Law that establishes the Brazilian Traffic Code - BTC. The BTC defines the attributions to the authorities and bodies linked to the traffic in Brazil, providing guidelines for traffic engineering. It also establishes rules of conduct, violations, and penalties for the various users of this system.
	10.257/2001	Federal Urban Policy law. Among its objectives is the provision of public transport and services suited to the interests and needs of the population and the local characteristics. It implemented the City Master Plan as the main instrument of city planning.
	11.079/2004	Law of Public-Private Partnerships – PPP. Law that established the bidding and contracting process of public-private partnership within the scope of public administration.
	12.587/2012	Federal Urban Mobility Policy. The law defines priorities to the use of non-motorized modes and public passenger transport, regulations for individual transport, need for urban and regional planning in transportation, incentives to employ quality parameters in the provision of services. Also establishes the prior setting of the tariffs to be charged by the transport provision with the revenue controlled by the granting authority.
	13.640/2018	Law that regulates the individual private remunerated transport of passengers. It establishes that regulatory responsibility is municipal.
	Regulations from Federal Transport Council (Ministry of Infrastructure)	Regulations of the Federal Transport Council (Establishes procedures about car licencing, safety rules, rules for vehicle driving standards and conditions (e.g., Contran 465/2013).
State	-	States Urban Mobility Policies - Set of unspecific guidelines that will guide the design of municipal plans.
	-	Regional and metropolitan urban mobility plans. Procedures from State Councils (e.g., health, environment, urban). Brings diverse organizations together to forge consensus and drive local-specific policies and procedures. These councils establish resolutions applicable to the State, that will be specified by municipality in a local scale.

Table 1. Cont.

Legal sphere	Law	Subject
Municipal	-	Master Plans and Urban Mobility Plans. Concession policies for urban transportation. Procedures for quality service provision. Individual transport regulations for on-demand services. Procedures from Local Councils (e.g., health, environment, urban) Brings diverse organizations together to forge consensus and drive local-specific policies and procedures.

Source: the author.

1. Brazil Reality

In Brazil, the provision of urban transport services is a competence of the municipal authority (BRAZIL, 1988). The Municipality (local authority) can perform direct provision or adjudicate to the private sector. In theory, this would allow for greater local autonomy; however, with the competition occurs only in the concession bidding process, and the market exploit is an exclusive entitled to the transportation company. Consequently, free-market competition is prevented.

Ida and Talit (2015) highlight problems in this process, such as the lack of information and transparency in the bidding process, in addition to the lack of autonomy for transport service providers (low participation of operators at the tacit level, e.g., determination of routes, tariffs, frequency) Due to the high degree of intervention, the productivity of public transportation is compromised, besides the increase in bureaucracy that makes the system more prone to shady political objectives (CURRIE, 2016).

That being so, the purpose of this research is to identify the institutional and legal neuralgic points responsible for the inefficiencies in the urban mobility system in Brazil, to later recommend propose guidelines on how to overcome counterproductive conditions, in order to reduce the externalities and improve urban mobility and the quality of life of the population. This research is not intended to characterize a desirable city, or ideal model (central planning) to be implemented through ad hoc rational evaluation. It has the scope to generate discussion about guidelines that can reduce transport inefficiencies of urban mobility in Brazil, based on tested actions, while fostering creativity and innovation due to particularities from each city or country.

The work structure has three main stages. In the first, the methodology of analysis is addressed, as well as the description of the case study city used to validate the research problem. The second stage refers to an institutional analysis of urban transportation in Brazil, considering legal and governance aspects and an example of these aspects for the municipal scale using the case study city. The final analysis stage sets measures aiming to overcome urban mobility issues, contextualizing measures implemented in other countries.

2. Material and Methods

Methodologically, this paper is based on a review of the literature, and research of current legislation in Brazil and exemplifying for municipal level case of study: Balneário Camboriú, Santa Catarina State, Brazil. The literature reviewed includes public documents such as legislation and research which investigate transport management, its inefficiencies, financial sustainability, contracts types, etc. These documents provide relevant knowledge of the situation in country-wise, allowing draw a legal-institutional diagnostic of the urban transportation in the country. Secondary, literature has been used to outline international schemes and models of transport management, transit funding, urban planning, and active transport.

In assessing whether different schemes and models can be used in different countries, there is initially an element of understanding regarding Brazilian institutional and legal framework. This analysis was permeated with comparisons of the legal application for the case study city, in order to understand the thread of practical consequences to users and its negative externalities.

The use of a municipal case study becomes essential to correlate legal and institutional aspects that are correlated, complement each other, and sometimes, occurs regulatory overlap on the ground that giving administrative agencies overlapping jurisdiction and leads to duplicative or conflicting regulation which is inefficient and unduly burdensome (AAGAARD, 2011). This appraisal allows to precisely identify the points of inefficiencies. In a final moment, it was listed alternatives solutions for the inefficiencies of the transportation system in Brazilian cities. These were obtained through general successful and recognized experiences in other countries using literature as guidance, as emphasises Buehler et al. (2017) about the patent success of urban mobility of cities that adopted successful policies from others cities. However, regarding necessary adaptations and different institutional and legislative characteristics.

2.1 Case study city: Balneário Camboriú, Brazil

The case study municipality, Balneário Camboriú, has 145.796 inhabitants (BRAZIL, 2020) located in southern Brazil. Historically, Balneário Camboriú has tourism as one of its main economic and social aspects, having a great seasonal variation of population, especially due to summer season. According to data from the Municipal Authority (PMBC, 2017), Balneário Camboriú receives more than 3 million tourists annually, reaching a peak of around 800.000 tourists in January. The city integrates an economic hub with a high tourist flow and related economy (BRAZIL, 2015; 2016).

Such factors associated with public transport that does not meet the demands of the population (PMBC, 2014; PMBC, 2018a) reduce the mobility of the population and enhance the manifestation of negative externalities (e.g., traffic congestion, pollution, accidents). In this aspect, it is worth mentioning that the participation of the public transit in the modal share is about 7%; been reported by the Municipal Authority as a poor condition of public transit services with low productivity (PMBC, 2014; 2018a).

Conversely, Balneário Camboriú has the highest demographic density in the Santa Catarina State, and, although this could be a decisive factor to make transit feasible and thrive. Buehler et al. (2017) emphasizes that compact cities with mixed-use development generate many trips short enough to walk and cycling and placing locations with easy walking distance for public transport. Although, it also can be a liability (as in the case study city) once transit modal share is very low (Figure 1). Moreover, the high motorization rate (1,29 vehicles registered per household; above the national average of 0,95 vehicles/household (IBGE, 2018b)), in addition to the incident tourist flow is incompatible with the current capacity of the road system. This leverages environmental and economic issues and affect the quality of life of the population. Also, the municipality suffers from an accelerated migration process and the disordered urban sprawling, pressure factors on urban mobility (POLLETTE; RAUCCI, 2003; TISCHER et al., 2013).

The availability of public transport itineraries in the municipality of Balneário Camboriú does not cover the entire urban area to provide good accessibility. As a result, services are limited in some regions (mainly peripheric areas of the urban perimeter), reducing the accessibility of potential public transport users. Also, the system is not integrated with the inter-municipal system, reducing the attractiveness of transport, and access to other municipalities is a crucial factor for conurbated regions (PMBC, 2018a). For these reasons, the problems of urban mobility in the city are considered a great challenge to the city and region, and with similar issues country-wise.

Figure 1. Registration of vehicle flow in Balneário Camboriú



Source: the author.

3. Results

3.1 Institutional Overview Of Urban Transport In Brazil

In order to understand the causes of the inefficiency of the TUMS, it is essential to investigate the political-legal institutional arrangement. The Brazilian population is currently experiencing a conceptual change regarding economic models and strategies, which could better achieve higher productivity on public provisions. State apparatus, historically inefficient, highly interventionist, and centrally planning, has imputed severe adverse effects to public services, including in the transport sector.

Urban problems are commonly associated with planning failures, a term widely used to diagnostics urban misfortunes in Brazil. A few times, however, it is conceptualized, and its cause-effect processes are in-deep analysed. Lack of planning is usually associated with the failure of the central public authority (city, state or federal) to execute an provide urban services; to achieve constitutional guarantees: *the right to efficient urban mobility and the full development of the city's social functions and to guarantee the well-being of its inhabitants* (Art. 144 and Art. 182 of the Brazilian Constitution (BRAZIL, 1988)).

This planning should cover all spheres of urbanism, from urban masterplans, paving, and street furniture, building codes and transportation system planning, connections and intermodal, traffic planning and scheduling, resource allocation to priority areas, investments required works, pricing, route, itinerary, tariff composition; in addition to tendering process; resource allocation for funding, quality goals and fairness in services, balanced city occupation, and low user value (Art. 10 of Law 12.587/2012 in BRAZIL (2012)), etc.

Problems arise from this, whereby, initially, the central authority (through political representatives and specialists/technicians commission) would have the competence to satisfactorily determine all these parameters, in coordination with the other intersectoral policies of a city; and all this to be carried out efficiently and capable of making public transport competitive with private cars.

To enhance transit productivity and competitiveness and overcome the inequalities of urban transport mentioned above, it is necessary to understand the existence of intricate control system related to urban transport in Brazilian cities, which does not allow the best use of local knowledge (HAYEK, 1945) and of the mechanisms to attend the needs of users. This compromises the quality of public transit services, the infrastructure (saturated with automobiles), and generate burdens that are borne by private entities, natural or legal person.

In Brazil, the opening for private participation in the provision of public services was consolidated by the Law of the regime of concessions and provision of public services (Law 8.987/1995 in BRAZIL (1995)), and the Law of Public-Private Partnerships - PPP (Law 11.079/2004 in BRAZIL (2004)). On the one hand, they have provided better possibilities for the use of public resources; on the other hand, the need for a broad opening of competition is not yet solved, and the competition occurs only in the bidding process, with the operation being an

exclusive right of market exploitation by the winning operator company (functional monopoly). As pointed out by Jacobs (1984) this fact inhibits free enterprise mechanisms from acting and experimenting solutions to urban problems (due to market reserve), which prejudice cities by suppressing what their economy can achieve (JACOBS, 1984).

The legal framework (in all spheres of government) imposes a highly regulated transport management structure that is inefficient, and at the same time, limits competition. Associated with this, public mechanisms for quality control are insufficient, and place the burden on private enterprises to mitigate potential impacts on urban traffic, with exclusive counterparts from entrepreneurs (mitigating and pecuniary actions: in Balneário Camboriú (BC) this is required by Complementary Law-BC 24/2018 (PMBC, 2018b), and in the environmental sector by the State Environment Authority), as observed in instruments such as environmental licensing and Studies of Impacts on Neighborhood (SIN).

By limiting projects and the free initiative of individuals in society, the burden is shifted to the population while keeping the problem insoluble. The generally veiled cause lies in the complex Brazilian bureaucratic system, with excessive legislation and taxation issues, widespread political interference, and low capacity of public institutions.

As represented by Figure 2, these regulations fall on transport users, who do not always have their needs met (efficient services, comfort, safe, convenient, etc.) and therefore, having no option of exit (to choose a competitor), other than for private use cars or individual private transport on demand.

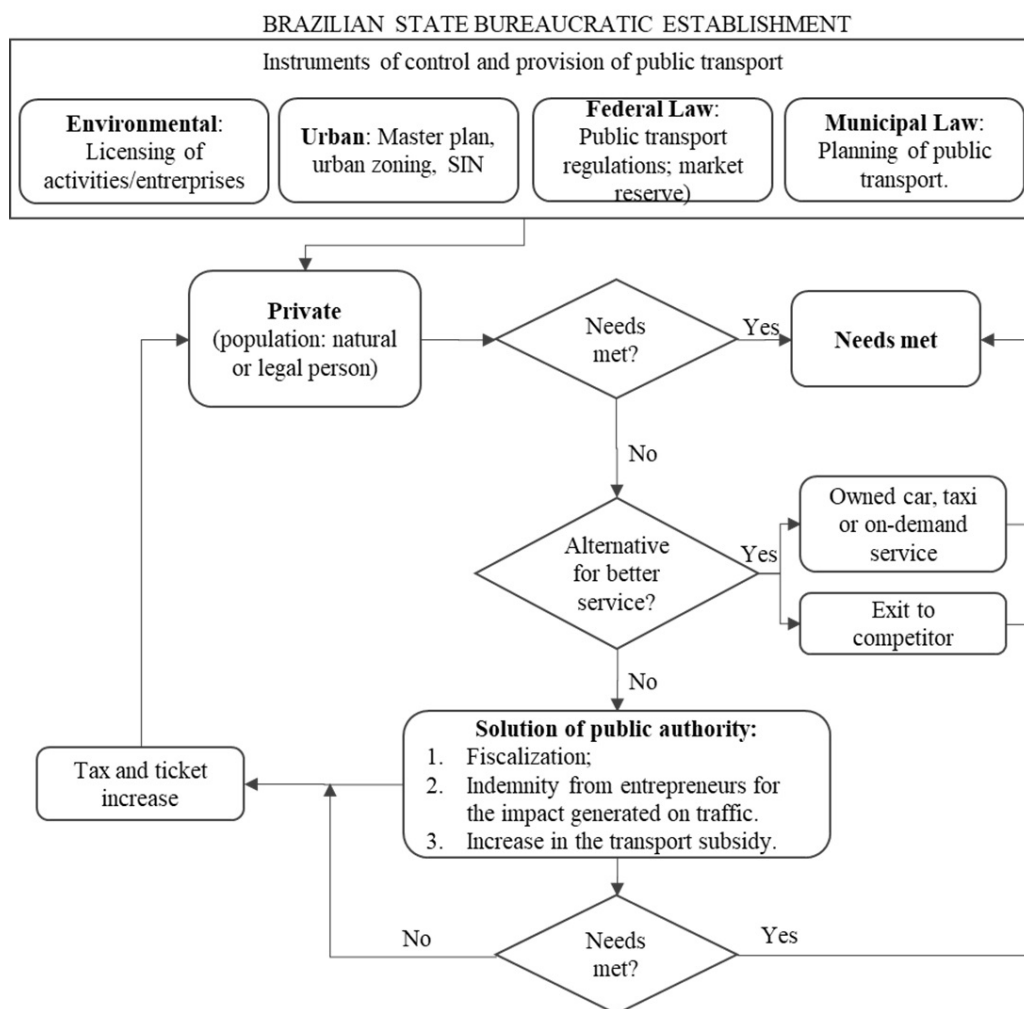
The mechanisms of quality control for the resolution of problems by the public authority are mainly the surveillance (compliance with contracts, tariffs, complaints from the population, etc.). Besides, commonly, necessary improvements (e.g., fleet, frequency) require public subsidies or increased value of the ticket to funding.

These consequences are observed throughout the Brazilian municipalities to a greater or lesser degree, with difficulties in advancing improvements, mainly due to legal obstacles that do not allow the use of the best solutions (laws that do not allow competition, low transport productivity, low institutional capacity, oligopoly service provider).

On the other hand, there is an increase in the use of cars, directly promoted by the master plan that subsidizes the support of an increasing number of cars and investments in road infrastructure; and indirectly, where the automobile is the more viable alternative to meet the needs of the population, in the face of the poor conditions of public transport. These factors will be further explored in the next topic.

3.2.1 Institutional and legal governance of urban transport in Brazil

The current legal situation in Brazil expresses that the management of urban transport is currently the responsibility of the municipal public authority, directly or indirectly (Art. 18 of Federal Policy for Urban Mobility – PNMU (BRAZIL, 2012). In this sense, besides the already evident limitations of public management of urban transport, a highly regulated system makes it difficult to improve productivity and make public transit more appealing.

Figure 2. Scheme of action of the institutional-legal process on the urban transport users

Source: the author.

Public management is not necessarily the problem. Several examples of high levels of productivity and efficiency by public transport management are evident in countries such as the United Kingdom, the Netherlands, Germany, etc.¹ However, they operate under market principles, inside competitive logical frameworks through operating goals and employee productivity.

This last factor, for instance, is one of the bottlenecks of the low levels of efficiency of public services in the country (in general), by the insertion of stability of function ([Federal Law of Civil Servants: 8.112/1990 in Brazil \(1990\)](#); and in municipal level by the [Law: BC 1.069/1991 in PMBC \(1991\)](#)). In this sense, the acting of public authorities is important, however, considering two caveats: the need for objective measurement of efficiency and competitiveness in the public services provision and, simultaneously, not preventing the entry of private competition and innovations.

¹Importantly, greater autonomy of states and municipalities in these countries allows for more freedom of experimentation and possibilities, which are limited in a centralized federative pact model such as that of Brazil.

As potential conflict resolution initiatives emerge the Brazilian bureaucratic establishment² acts to regulate and intervene, creating barriers that hinder access to better services, which preclude competition between operators, penalizing entrepreneurs and the development of innovations. Apart from public transport, this can be evidenced in the recent regulation throughout the country, on individual transportation (private on-demand transportation apps) and non-motorized (electric bicycle). In Balneário Camboriú this occurs by the law 4.040/2017 (PMBC, 2017) and decrees 9.444/2019 (PMBC, 2019a) and 9.413/2019 (PMBC, 2019b). For the first case, the creation of requirements imposed by the aforementioned municipal laws (Art. 6 of Law-BC 4.040/2017) demonstrates government intervention acting to increase the cost to drivers and users and reduce mobility, exemplifying the counterproductive deviation of functions of the municipal legislature.

For the second case, actions for inspection and regulation of the circulation of self-propelled bicycles (and the like) are already provided for in the Brazilian Traffic Code (Law 9.503/1997 in Brazil (1997)) and Contran Standard 465/2013 (BRAZIL, 2013); with no need for redundant regulations. Other examples are the requirements of environmental licensing and urban (e.g., Study of Impacts on Neighborhood – SIN), where they also consider overlapping and redundant aspects required in different institutions and laws, which make the process more expensive, increase the time for analysis and do not properly address the cause of the problem. This non-inaugural phenomenon has been pointed out by authors such as Banister and Button (1991) where regulation generates a tendency to generate more regulation, starting simply and becoming more complex as it creates a chain of missed points that need more regulation. Also, consists of one entrance to corruption (CHIODELLI; MORONI, 2015).

Also noteworthy are the urban instruments at the municipal level, the master plan, and the urban zoning. The master plan expresses important guidelines for urban growth, while zoning establishes differences in building patterns and uses in different city locations, separated by density control zones (high, medium and low-density zones), and by uses (commercial activities, services, entertainment, governmental, non-governmental and industrial), as well as encouraging uses (e.g., gastronomy, vocational uses).

The Balneário Camboriú zoning guidelines (Law-BC 2.794/2008 in PMBC (2008)) involve, for example, clearance height for areas located in the first two blocks near the sea (ZACC zones) and tighter height control for other areas, acting as a density control. Eerdmans et al. (2010) points out that the lack of coordination between public transport development and spatial planning leads to a situation where spatial density varies greatly, with areas where effective public transport is only viable to the tangential limit of dense areas, reducing the quality of service and the potential market for public transport. The Master Plan also establishes controls for basement, parking spaces, minimum lot, etc.

Moreover, the different rules created for different areas of the city are often discretionary, which quickly makes the law obsolete due to urban dynamics. This requires, in addition to special amendments, costly revisions (in time and financial resources) pursuing social

²Concept envisioned by Faoro (1979), defining bureaucratic establishment as development of centralized institutional and political structures, in a constant adaptation to the mechanisms of continuity and permanence in the political structures of a society.

participation and unsolvable and highly questionable consensus. This process generates incredibility among the population, and, not infrequently, particular groups of society dominate the decision-making process for their interests.

In the Government Management Report ([Brazilian Federal Court of Accounts: Brazil \(2018c\)](#)) it was pointed out that many municipalities reproduce identical texts of master plans from other ones, completely disregarding local specificities. There is a tendency for the literal repetition of the instruments as described by the Federal Urban Policy law. And most of the master plans are merely authoritative, lacking on local specification, which also demonstrates the low technical capacity verified in most local public authorities.

Balneário Camboriú's master plan, for example, has been for over a decade without revision³, generating significant conflicts in attempts to update. Public resources could be better directed at efforts to promote a more robust urban code that only aims to regulate factors of discomfort (negative externalities), with equal rules for all, not specified nor directed rules.

Thus, public planning should act less as an omniscient city planner (especially as regulators), but instead, devote efforts to maintaining good market practices and enforcing property rights and free enterprise ([MORONI, 2015](#)). Thus, according to the analogy of Jacobs (2000), people demand healthy standards for sewage treatment, but it would be unwise to standardize methods to achieve this result, and which by definition, would limit better methods to be developed. Nevertheless, the public authorities should provide services in specific cases that cannot be met by the private sector or, when necessary, by infrastructure (e.g., railway, highways, waterways, maintenance).

Klein et al. (1997) exemplify that as long as transport operators do not exceed the property rights of others, they should be allowed to operate unimpeded. With the rights restriction system reasonable implemented, the market process starts to operate, generating real competition and the discovery of new opportunities (entrepreneurial and innovation) applied to the particularities of local conditions.

In this sense, the inefficiencies of urban transport are less a problem of lack of investments than of creating the legal and institutional conditions for solutions to be tested, proposals presented and, in turn, resources to be invested, either privately or with public counterparts. Bringing again to the example of Balneário Camboriú, just as the municipality makes concessions proposals, mainly for tourism area (e.g., nautical and real estate developments, leisure and waterfront complex, etc.), it could make calls for investments in mobility, especially for large-scale projects.

Such financing strategies may be extended to other forms of investment (despite the limits of competition)⁴, such as the various categories of concessions (especially PPP), mechanisms for capturing the increasing price of land/properties resulting from investments. These can

³ Current Director Plan was promulgated in 2006 and the zoning in 2008. According to the City Statute Law, these plans have to be updated at least every 10 years.

⁴ The provision of public services by private entities are provided for in Art. 37/XXI (regulated by Law 8.666/1993: Brazil, 1993) and Art. 175 of the constitution (regulated by Law 8.987/1995: Brazil, 1995) and the Law 11.079/2004: Brazil, 2004 (Public-Private Partnership) and guarantees of payments given by the Budget Law 2016-2019 (Law 13.707/2018 in Brazil (2018d)).

also be combined, as proposed by Paranaíba (2015) to create a virtuous cycle of investments in urban mobility including shareholder financing (including property owners), bond issuance, etc. Also, the existence of financing from tax revenues such as bettermen taxes, congestion charges, parking fees, etc (more examples in Medda (2012); Litman (2014); Olsen and Fearnley (2014); Paranaíba (2015)).

Among the main criticisms of Balneário Camboriú's public transportation are the lack of efficient user communication system, real-time tracking, application, etc. According to technical analyses of the 2014 Municipal Director Plan (PMBC, 2014), and endorsed by the diagnosis of the Municipal Plan of Urban Mobility (BC, 2018), public transport in the municipality has been declining, underutilized by the population. This is due to problems such as inadequate itineraries; low productivity and inadequate vehicles in the face of demand; lack of user information; confusing routes; long travel times; lack of credibility among the population, etc.

From a temporal perspective, the transport concessionaire in Balneário Camboriú, although the recent changed in the operator concession (the contract was terminated by the concessionaire: Decree 10.123/2020), the transport company has been in operation since 2006. However, as the Municipal Authority adjudges the service for the provider, the concessionaire has to respond to his contractor. Thus, not directly to the user, which can hinder the quality of the services.. Data from recent years show that there has been a stabilization in the number of passenger's ridership, and more recently, a decrease in passengers ridership⁵.

For the European Union, long-term contracts can generate a market foreclosure for a longer period, thus diminishing the benefits of competitive pressure. To minimise distortions of competition, and protect the quality of services, public service contracts should be of limited duration, while the extension of such contracts could be subject to positive confirmation from users (JOUE, 2007).

Overall, the implementation of improvements to public transport in the municipality of Balneário Camboriú can be considered limited, restricting to the updating part of the fleet in recent years, and changing the concessionaire on emergency basis. However, following the restructuring of routes and frequencies, the concession of urban transport does not require a financial subsidy, which is a positive point.

Even so, the needs of the population are not completely met, with low levels of productivity, efficiency, comfort, and convenience of public transport. Public transit service is not enough to compete with cars. Also, public planning foster to accommodate increasing numbers of cars in the city creates a vicious circle where there is no opening or opportunities for improvement in crucial points of urban mobility. While regulatory instruments such as tariffs, itineraries and the impossibility of entry (competition) are used to provide alternatives to users (unsatisfied users may resort to competitor service).

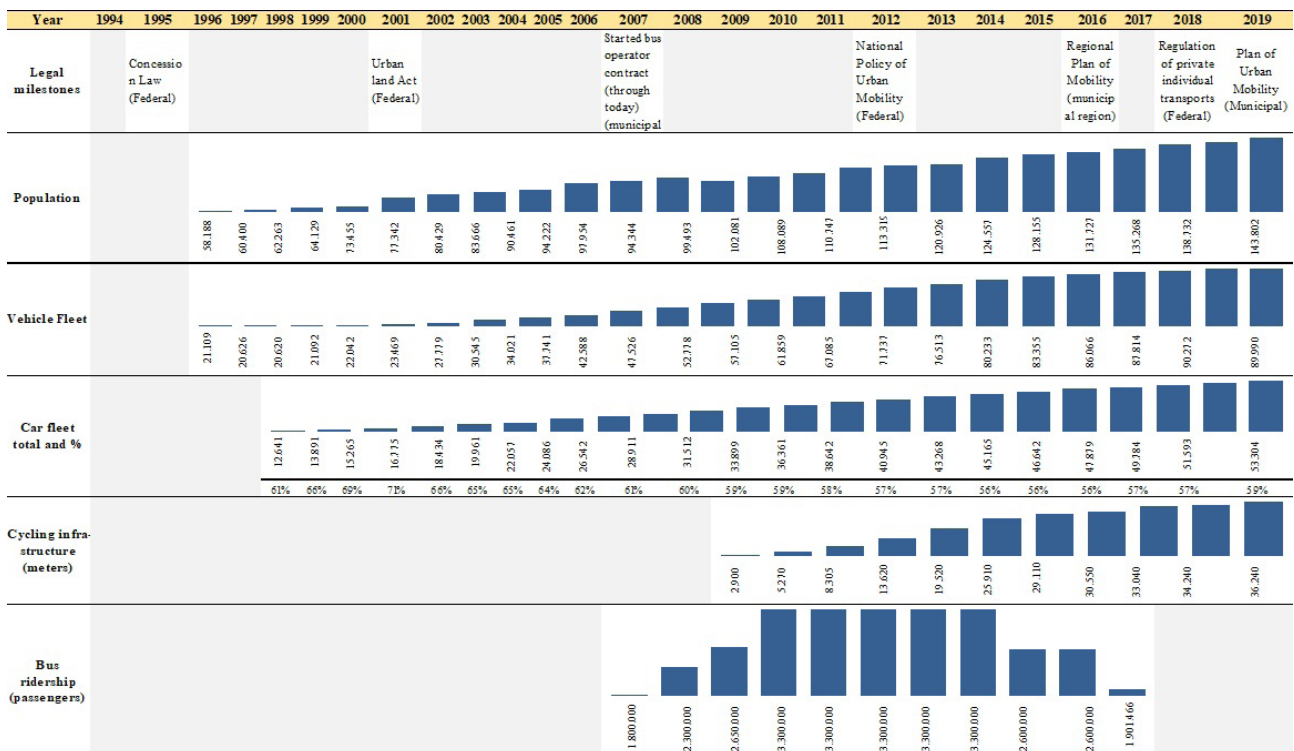
The evolution in the use of public transportation (users/trips) does not keep up with the rapid growth of the population and, consequently, of the vehicle fleet (Figure 3). The Urban Population Mobility Survey (NTU, 2017) identify that immediately after people have

⁵Tariffs prices are defined by the municipal government (law 9.211/2018c: PMBC, 2018).

the opportunity to leave public transport, they will own their private individual car, aiming more convenience, comfort and optimization of their time.

In Balneário Camboriú effects of car ownership are potentiated by the synergistic effects of the high tourist flow throughout the year. Notwithstanding, active transport in the municipality presents a more favourable scenario (investments in accessibility, cycling infrastructure, sidewalks, signalization, and public safety). The cycling system, for example, covers a representative part of urban main roads, trying to meet the growing demand of the population.

Figure 3. Timeline of regulatory milestones, demographics, transportation and impacts



Data Source: Fleet; Detran/SC (2018); Population (IBGE, 2018b); Cycling infrastructure: (TISCHER, 2017); Transit ridership (PMBC, 2017c).

Bicycle transport also has advantages in the municipality due to favourable topographic conditions and investments in lane coverage (Figure 4). Its use can be enhanced by expanding the extension of lanes strategically implemented on main roads, investments in safety, intermodal with public transport, secure parking, etc.

3.2.2 Strategic overview for Balneário Camboriú

While on the one hand the mobility conditions in the municipality (and region-wise) tend to worsen, considering the current mobility demographic trends in the municipality (density, exponential rates of migration to the region, mass tourism, growing fleet); on the other hand, the existing urban instruments in the municipality foster such a scenario, and in a way, ensure the maintenance of the current economic dynamism in the short and medium-term. However,

in the long-term, considering a hypothetical trend scenario, it can threaten this dynamism, increasing urban problems. This phenomenon has been recurrent in Brazil's transportation planning, where public authorities, attempting to solve issues, end up generating a new one (BERNARDES, 2019).

Figure 4. Bicycle flow record during peak hours in Balneário Camboriú



Source: the author.

The benchmark of successful urban mobility practices worldwide demonstrates that, regardless of modes of transport, urban characteristics, climate, and socio-cultural conditions, effective and attractive public transport is the *conditio sine qua non* for solving/mitigating urban mobility problems. Its efficient consists precisely in congregate a large group of people under a limited territorial unit, centres of generation and concentration of employment.

Well-structured public transport is an unequivocal foundation for action to reduce dependency and dominance of private cars, and to contribute to increased rates of active transport travel, improved economic competitiveness of the city, and well-being of the population, and therefore of a sustainable city, especially in large or dense cities.

Balneário Camboriú, being a very compact city (with relatively high demographic density and commercial decentralization) has the main factors in favour of an efficient and competitive urban public transport system. Moreover, this condition requires the adoption of

integrated strategies, considering systemic criteria into account as: inter-municipal solutions, and an institutional-political condition that allows the possibility of entrance of solutions and alternatives according to the user's needs.

Demographic density is a critical factor to the success of urban transport in Balneário Camboriú. However, it is important to reiterate that this urban condition also causes a geometric limitation on city's road system, possibly being the most critical challenge within spatial related, especially in central areas of the municipality. A reform of the urban transportation system would necessarily require a decision to choose between lane sharing (current use, which maintains flows bottlenecks); or priority for transit (it would be necessary to implement an exclusive lane for bus and/or Light Rail Vehicles).

Transport infrastructures should be designed as facilitators, to ensure sound spatial coordination of land uses and transport infrastructures to create a physical environment for low-income families to improve their economic condition. Thus, planners and policymakers can ensure that the development/extension of an urban transport line is better leveraged by supporting policies for mixed-use development and not fostering low-density urban uses (EWING et al., 2016).

Cycling infrastructure also should be improve, as it is has an important function for mobility. As evidenced by Tischer and Polette (2019), the bicycle is the third most used mode of displacement in the municipality, accounting for about 9.4% of vehicle flow and 5.9% of urban travel.

It is noteworthy that is no need for large volumes of reduction in vehicle flows to reduce environmental impacts and reduce traffic congestion (European Commission, 2004). From this, small gains in reducing dependency on private cars can result in significant time savings in traffic, reduced congestion peaks, reduced fuel consumption, pollution, noise, and so on. Thus, in sequence will be considered possible actions/guidelines aimed at making public transport more attractive and reduce dependence on cars.

3.2.3 Lessons from Other Countries

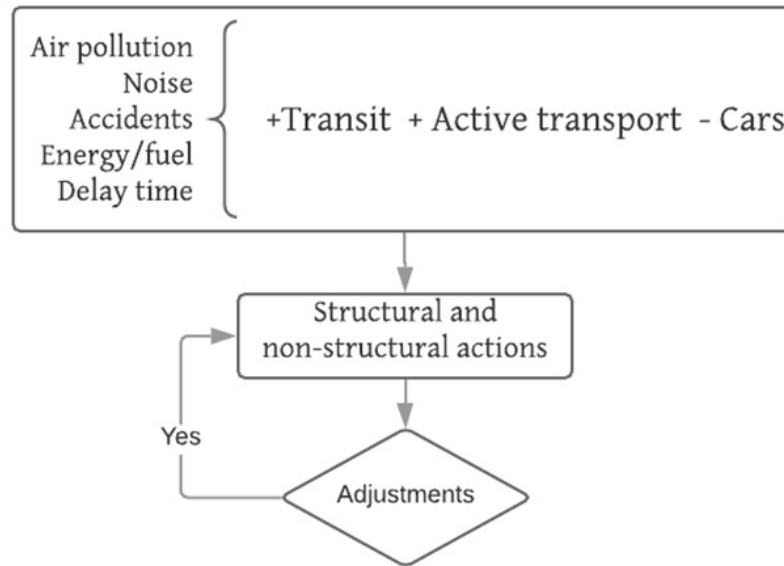
The main challenge to o improves urban mobility and reduce unwilling impacts (e.g., air pollution, noise, accidents, fuel consumption, delay time, etc.), is to enhance accessibility on urban transport services, in order to reduce dependence on private cars in favour of transit, as well as active transport.

From this, the implementation involves structural and non-structural actions. The former refers to transport infrastructure and urbanism; and the second involves policies (e.g., revision of legislation, eliminating discretionary regulations, encouraging inventiveness and participation of private entities, designing contracts with effective quality control mechanisms).

Government, in this sense, should be a partner of private activity, supporting and overseeing the implementation of actions that will impact the welfare of the population. However, it should act only in the provision of services in areas where provision costs cannot be recovered by market practices.

Experiences across countries that have implemented these measures have not been linear, and so, are constantly being adjusted. In this sense, this process is also about learning and validating different experiences. The implementation of measures should be progressive, in as many steps as necessary, however, regarding adjustments and permanent feedback of the process, starting from more basic actions to specific and correction of eventual problems (Figure 5).

Figure 5. Conceptual model of urban mobility improvement



Source: the author.

3.2.3 Actions for transit system

As society evolves, and the limits of government actions are controlled, the state should act only in the control of negative externalities and acts collaboratively to enhance positive outcomes, allowing free initiative, innovation and the use of local knowledge in society.

According to the European Bank (2019), the reform process of urban transport must go through a Reform Plan predicting the scale of it, phases of actions, speed of implementation, etc. This should enable the government to prepare budget, legislation, and raise popular and legislative support for the necessary changes. Initially, it should envisage route optimization through travel pattern (origin-destination surveys). Secondly, the integration of services between modes, between city and regions, as well as a differentiated tariff policy and other user attraction strategies, aiming at the convenience of users.

Considering public transport as central to the reforms, they may also increase competition for routes (segmented routes or in city zones) providing conditions for more participants in the tendering process. Secondly, competition on route may be tested, but considering the problems arising from a private operation on a public platform (streets) and strategies to avoid conflicts and loss of services (prior registration of interested companies, route plans, own stops, communication, etc.) (KLEIN, 2000; PAREDES, 1992).

The combination of planning and oversight of the transport authority and competition between independent operators shows a positive impact on the quality of services provided and the financial sustainability of operators. Therefore, the key to an efficient urban transport system is well-designed contracts, tailored to market possibilities, with well-defined responsibilities and performance control mechanisms (definition of risk and infrastructure regime, segmented or total area tendering, duration of the contract, communication and promotion, etc.). Another fact that proves to be efficient is the segmented tendering, by urban zones, with contracts differentiated by location, with risk division for areas with higher demand and with risks borne by the government in areas of low density or demand.

Transport operations may be performed by public, private or hybrid companies. It is fundamental, however, that public operations occur within competitive market conditions under the same circumstances as private companies (Figure 6). This guarantees certain exclusivity for operators who successfully congregate passengers: by the quality of the services, judged by the customer, the passenger.

Figure 6. Principal responsibilities of public and private sector for the transportation sector



Source: European Bank (2019).

In this sense, Gómez-Lobo and Briones (2014) reiterates that contracts should provide operators with incentives to meet demand and be evaluated by performance indicators, at least of operating variables (e.g., seat-kilometre), as observed in most of the countries of Europe, North America, Australia, and even Latin America as the case of Santiago. The service contract should be designed for the particularities of the city, providing incentives for enhance productivity and transit ridership.

In addition to this, it was highlighted positive experiences that can provide valuable guidelines for augmentation productivity of public transportation in Brazil. The London case, for example, cites the following reference actions (more examples in Gómez-Lobo and Briones (2014); Preston and Almutairi (2013); Velde and Wallis (2013)):

- Government plans routes, frequencies, fares, and tariff zones, type of vehicles, advertising, infrastructure, intermodal and zoned crossings;
- The operator provides vehicles, stopping stations and garage;
- Operation network (routes) area divided into city zones (including the metropolitan area); The itineraries can be separated into blocks that can be tender separately or in groups, aiming at greater competitiveness of companies entering the market and also, allows the entry of small operators; More participants in the bidding process have been found to reduce the operating cost, and therefore it is important to make the transportation system efficient that there is a real market for contracts.
- Routes are tender individually or in route packages, but participants may bid for several/all; about 20% of the network is bid annually;
- Gross cost, public withholding contracts, and operators are not at risk for revenue but earn bonuses based on quality criteria.

Similar experiences are observed in the Scandinavian model, with the exception that the government holds the depot provision (but not the buses) and pay operators for kilometres operated plus incentive for the quality of the service.

In Lithuania, for example, problems with urban transport (similar to those in Brazil: poor quality, unreliable transport, pollutants, no ticket and integration zones, commercial lobbying, etc.) motivate a process of improvement in the country. This process involved surveys with the population (definition and optimization of routes), setting of contractual conditions suited to the demands of the population, competitiveness with public transport vehicles and implementation of integrated fare system (EUROPEAN BANK, 2019).

In developing countries, however, special consideration should be given to the political influence of companies that have a monopoly that limits the scale and speed of any reforms, such as broader changes in the hiring of bus services (as is the case in Brazil). In these countries, institutions often have low capacity, legal systems are slow, access to financial markets is limited, and budgetary resources for investments and subsidies are scarce.

Germany, for example, has reconciled the need for cost savings and improved attractiveness and quality of the transit service. These actions have given the country a very effective, competitive and financially sustainable urban transport. It was highlighted the following (BUEHLER; PUCHER, 2011):

- **Cost reduction:** administrative organization, outsourcing, increased worker productivity, cooperation agreements to share workers, infrastructure and inputs, research and organization of routes, reduction of entry cost of new companies (deregulation);
- **Increased earnings:** regional route coordination, regional fares, monthly and annual discounted tickets, group-specific tickets, full pedestrian and cyclist integration, urban development around transit, business competition, coordination with long-distance routes, group and specific day discounts, ticket automation, trip tracking and real-time itineraries (Real Time Information - RTI);

- **Complementary policies:** active transport, mixed and dense use, car-free zones, traffic calming, increasing the cost for cars; reduction of travel times, agreements between transit companies to buy at scale.

It is emphasized that communication is one of the key factors for the success and improvement of the competitiveness of public transport. The adoption of regional route coordination strategies, real-time travel monitoring, bus stop information, and full internet integration are key to attracting new users and making transit attractive and competitive with the car.

Equally important are actions aiming inter-municipal improvement of the transport sector, given that cities are not hermetic structures, and expressive flow of people and goods circulates regionally. Within strategic sector planning, urban transport must comprehend regional scale. Especially in large cities or conurbation urban areas, it is necessary to design consortium proposals. The non-commitment of one of the participating municipalities could generate severe problems for both municipalities: conflicts of jurisdiction, disproportionate regulation, a saturation of areas of the city by commuting, decreases the effectiveness of public transport and increases the motorization rate.

At the core of this equation invariably lie the strategic hubs for urban mobility (e.g., state capitals, large cities or companies, airports, heavy tourist or industrial cities). Regarding Balneário Camboriú city, it is important to highlight lack of competitive transit (precarious conditions of communication, predictability, comfort, competitive time) to these mesoregional or micro-regional destinations.

Rail (or even waterway) transportation between these destinations can contribute directly to reducing congestion, both by gaining passenger travel and reducing truck flow by cargo transportation. Although limited explored in Brazil, the rail mode has, in general, has highly environmental benefits when compared to road transport, such as: lower pollutant emission and noise, higher energy efficiency; inducing economic benefits such as real estate appreciation, revitalization of urban areas, high efficiency and high acceptance by the population, which contributes greatly to reducing dependence on cars (BOWES; ILANFELDT, 2001; CRAMPTON, 2003; LITMAN, 2013). Lanza (2020) emphasizes the importance of fostering the country's railway system in a system of free competition in the sector. Boquet (2014) points out that several cities have found that they can increase their attractiveness and the sustainability of transport by building a modern electric transport system, with emphasis on LRV in the urban area.

And finally, it is important to consider the peak-hours (also related to commuting of population), a period in which concentrates the largest volumes of traffic in a day. Therefore, in this period, there are a great concentration of transit users and in the same, lack of frequency of public transport. Reduce issues of public transit in peak-hours period has complex resolution, and usually entails high costs and offers lower returns, being a challenge for cities with high tourist flow, for example. For a company it is very costly to acquire assets compatible with the demands in this period, and most of the time, vehicles will be idle (CURRIE, 2016), and thus, deregulation (specifically opening up to competition) could substantially contribute to the improve the quality of the service in association with contractual arrangements for the entry of small competitors.

3.3.4 Considerations for active transportation

Public transport is enhanced and complemented by an robust active transport system. Measures involve increasing the infrastructure coverage, build high standard cycle paths and pedestrian areas, with an urban aesthetic that encourages these displacements. It is highlighted the following measures:

- Implementation of cycling infrastructure on main roads, suppressing parking lots when necessary;
- Implementation of safety signalization for cyclists and pedestrian;
- Urban safety enhancements for pedestrians by reducing exposure, having pedestrians and cyclists at the centre of urban planning;
- Implementation of pedestrian/cyclist walkways between buildings, blocks, under/over roadways, walkways, or skyways.
- Creation of inter-municipal pedestrian and cycling paths/routes;
- Expansion of off-street trails along rivers and green areas;
- Strategic planning of cycle routes in the city, assessing inefficiencies, based on cycling parameters of connectivity and fragmentation (α , β , γ) (TISCHER, 2017);
- Urban code fostering a compact city, focusing on controlling negative externalities rather than density controls, and problems such as city sprawl and the manifestation of other urban impacts related;
- Eliminate discretionary regulations;
- Emphasizes urban aesthetics with good infrastructure, street furniture, mixed-use, clear public-private property boundaries, street-facing building facades, distance between buildings, etc.

3.2.5 Considerations for cars

In addition, aiming to increase the competitiveness of other modes of transport against cars and achieve a balance between car use and other modes of transport, some specific actions may be adopted:

- Restriction on car traffic in central areas of the city;
- Measures to reduce maximum permitted speed in central residential areas (traffic calming): curb length, chicanes, roundabouts, etc.;
- Reduction of street parking in central areas in favour of cycling/pedestrian infrastructure on main roads;
- Encourage the use of underground parking in central areas, aiming not compromising aesthetics quality of the city. Implementation of rotating parking spaces with a system that adjusts the value by demand can increase available parking spaces up to 14%, according to Shoup (2017).
- Instead of compulsorily demanding the parking of projects, the municipality may charge a compatible fee, making parking facultative for buildings.

- Restrain above-ground parking for building without indent. The facade is critical. Large, blank facades facing the street should be avoided.
- Appraise the implementation of a congestion charge, automobile taxes, and fuel for a long-term scenario.

However, due to the socio-economic conditions of the population and the high disparity in taxes x service provision (in developing countries) it is important that car restraint by means of charging (direct or indirect) does not occur before of a processes of improvement in public transport (i.e., from the population having an efficient alternative, convenient to their needs), aiming to avoid a high social impact to the car users who do not have a quality public transport substitute, increasing the cost of living.

Reducing the convenience of private cars can advance progressively through simpler actions (paid rotative parking, restricted car circulation and reduced speed at strategic locations, replacement of on-street parking lanes for bike lanes) to even more complex actions (congestion charges, fuel and vehicle tax increases, etc.).

3.2.6 Transport policy and legislation

The investigation of the legal framework allowed to identify specific subjects that may contribute significantly to a balance in the demands and offers of the modes of transport in the case study municipality, which can be extended to other municipalities in a country-wise perspective, through specific local adjustments.

It was suggested alterations in the legislation (or institutional procedures for municipal issues), with the purpose on subtracting laws that demand excess requirements, repealing redundant laws, implementing laws unifying the understanding and regulating points not covered by the current legislation. The suggested changes are described below. Regarding the federal sphere, the following stand out:

The pacification of legal provisions by federal law regarding the legal possibility for competition in urban transport services, allowing autonomy for municipalities authorities experiment in terms of concession possibilities; Alteration of the tariff policy (Chapter II of the Federal Policy of Urban Mobility), providing more freedom for the service provider to use market knowledge, define ticket fares, explore other possibilities and use creativity to improve the quality of the services provided, etc.;

Autonomy of local authorities to implement specific concession schemes (e.g., greater or lesser deregulation, centralization or divide the city into districts). This includes the competence to form specific contracts with service providers (e.g., number of operators to provide the service, definition of contract length, type of cost contract, condition for registering on-street competitors, etc.);

Following the regulation of the European Commission ([EC-EU: 1370/2007](#)) the competent authority (or the group of competent authorities) that provide integrated public passenger transport services, collectively or through its members, should exercise the necessary control, however, guarantee a fair competition condition ([JOUE, 2007](#)).

Related to this, there is a need to enhance the competitiveness of the public sector, to improve the institutional capacity of public authorities. The initial step is the insertion of the work regime of public servants into a more competitive regime, eliminating the stability of the function given by Art. 21 of Law 8.112/1990 (BRAZIL, 1990).

Concerning legal/institutional changes in the scope of local authorities, the following actions are exemplified for the case study city Balneário Camboriú:

Master Plan: elimination of urban indexes and the compulsory need for parking spaces in developments; the regulations contained in the Master Plan should use negative law nature to guarantee equal rules for all, to reduce discretionary and political logrolling;

Elimination of municipal laws regarding the provision of alternative non-motorized transport (e.g., bicycles) and the provision of on-demand transportation services (app services). The regulations for these issues are already covered by the Brazilian Traffic Code, Ministry of Infrastructure Regulations, Civil Law and Criminal Code;

It is necessary to correct points regarding the overlap between state legislation (Environmental licensing studies) with municipal studies (Neighbourhood Impact Study - SIN). The converging points between these studies must be unified, aiming to reduce costs, bureaucracy and political interests. Using the SIN as a reference, it should be removed aspects already contemplated by environmental licensing procedures, in addition to making explicit the public counterpart, instead of demanding one-way counterparts from the entrepreneur.

Contracts of concession of public transport services: Establishment of specific contracts for each concession situation that best suits local issues; establish payment mechanisms linked to the quality of services; allow greater tacit freedom for operators to be defined in specific contracts; greater publicity for transparency in the bidding process; establish appropriate safeguards to concessions where the introduction of regulated competition between operators leads to more attractive and innovative services at lower cost and is not likely to obstruct the performance of the specific tasks assigned to public service operators (JOUÉ, 2007); Implement mechanisms to favour the turnover of service providers, eliminating requirements that only favour the entry of large companies; and avoid long-term contracts of concessions (the extension of long contracts could be subject to positive confirmation from users).

Conclusion

When Jane Jacobs (JACOBS, 1970) points out that externalities such as pollution, noise, and congestion do not come from society's progress but its stagnation. That is, in a dynamic society where free enterprise and local knowledge are actively acting, problems and discomforts are more quickly neutralized. Individuals can openly coordinate their actions to provide solutions and the innovation freely operates.

The transport system as an elementary system of the process of life organization in society will always be high interest of the population, as it is an elementary need for the performance of social and economic functions of individuals. The solution will derive from diffuse sources, probably from particular innovations, much more sensitive to the specific

needs of the population than central authorities. If these have a perspective of objective improvement in the population's quality of life, they should be supported by the government.

The results of the present study made it clear that the most fruitful way to contribute to the improvement of urban mobility is the assimilation, by both technicians/scientists and planners/governors, of the inexorable limitations imposed by the impracticability of public management to possess all information necessary for proper centralized/coordinated governance. Therefore, the various peculiarities cannot be brought together into one plan. On the contrary, experiments should be allowed, which may spontaneously elect the ones that best benefit the individual demands of a particular city.

In this sense, Pennington (2011) emphasizes that the best way for a country to emerge from poverty and prosperity is to develop a set of robust formal institutions followed by a gradual process of evolution of social norms and conventions (the so-called *informal institutions*: private property, free market, rule of law), with the best chance of respecting and correcting human imperfections that threaten to destabilize the system and lead to unfavourable outcomes.

Since it is not possible (and desirable) to paralyze productive activities and impose preferences of the means of transportation to be adopted by individuals, the role of public urban planning would be, so only, to foster the adoption of mobility solutions and competition and to ensure that they occur within the principles of ethics and transparency.

Legislative agents (Municipality, State or Federal), in turn, should place more emphasis on surveillance, ensuring access to the rights and freedom, instead of creating legal obstructions that hinder citizens' lives and possible solutions to urban problems. Public agents play a key role in inspection, verifying the proper use of public money and monitoring regional demands in the city.

Therefore, it follows that the scope of mobility studies and urban planning should not occur within a rigid central planning process, but rather to pursue the prosperity of cities as the final objective. It has to consider the complexity and diversity of uses, meeting the needs of users within a framework of efficiency, competitiveness and financial sustainability of transit system.

This should not necessarily exclude the car use. However, it is about balancing the offers and demands of different modes of transport able to provide effective alternatives for users. Therefore, as the emphasis of urban mobility shifts to transit and active transport, the urban mobility conflicts generated by private cars' dependence will be reduced, as well as the reduction of economic and socio-environmental impacts, which becomes a consequence of a more sustainable urban mobility process.

By the present investigation, it was identified points that can contribute to improve urban mobility and reduce urban externalities in the case study city, such as: driving the attention on public transport framework, improving the institutional capacity of the local authority in order to eliminate redundant regulations/ unnecessary requirements and the firmament of more specific and robust concession contracts.

However, the creation of conditions for improvement also depends on changes in federal laws, in particular, the pacification of legal provisions aiming at greater autonomy of local

authorities for experimentation. That is, granting more freedom for the service provider to use the knowledge of the transport market, defining tariffs, mechanisms for attracting new users, and at the same time, establish more effective regulations and based on quality criteria, etc.

Finally, the present work can contribute to transport and urban mobility improvement discussion in Brazil, subsidizing the decision-making process to allowing solutions to be implemented, using strategies the use the best knowledge available, and that the contract design and the mechanisms of quality control could be robust: accurate, specific and effective.

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