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# Buenos Aires – Toward Comprehensive Development and Sustainable Mobility

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**Abstract.** This paper is introducing Buenos Aires' achievements and challenges in implementing comprehensive development and integrating efficient and sustainable transport system within its urban structure. There are several important steps in this process starting from urban regeneration of Puerto Madero, the introduction and then implementation of a strategic plan Modelo territorial (2010) and of Buenos Aires' Plan de Movilidad Sustentable (2013). The last one - Sustainable Mobility Plan helped Buenos Aires win several prestigious rewards for innovative approach to mobility and sustainable transport and leadership in combating climate change. Buenos Aires City government demonstrates strong leadership by implementing well-planned (Bus Rapid Transport) BRT solutions, stressing the importance of political will and support, flexibility and an open mind in listening to the points of view of all stakeholders involved. Buenos Aires has made a very important step toward sustainability by supporting development of more sustainable modes of transport, such as bicycle-sharing system and improving walkability of the city centre. The last initiative combined with strong focus on public spaces is adding to tourist attractiveness based on diversity of the capital of Argentina.

## 1. Introduction

Buenos Aires is the second largest city of South America with 2.9 million of inhabitants and an area of 203 km<sup>2</sup>, with a metro population of nearly 13 million and the area of 4580 km<sup>2</sup>. It is home to nearly one-third of Argentina's 41.4 million citizens. It is the nation's largest city and an economic, political and cultural centre of the country. It generates about a quarter of Argentina's entire economic output and is the most visited city in South America. Buenos Aires is a densely-populated area as well as an important business centre with numerous industrial activities.

The Río de la Plata and the river Matanza Riachuelo are the natural borders of the city to the east and south. The rest of the metropolitan perimeter is surrounded by the General Paz Avenue from north to west. This avenue provides a fast connection between the city and the metropolitan area [1].

## 2. Spatial development of metropolitan area of Buenos Aires

Buenos Aires is based on a rectangular, square grid pattern. As an on-shore city it extends over a flat plain in a half circle. The location of a port facility next to Buenos Aires downtown is a distinguishing feature causing commuter and cargo flows to overlap along highways all the way to the downtown. We can observe the concentration of freight traffic which superimposes with intra-metropolitan flows [2, 3].

Buenos Aires metropolitan area is composed of 28 municipalities: 27 provinces of Buenos Aires which surround the City of Buenos Aires, an autonomous municipality. The City itself is a federal



district and a seat of the Federal Government. Until 1995 the Mayor of Buenos Aires was appointed by the president, since then he is elected by citizens.

The city represents only 4.4 % of the total surface of the metropolitan area, while it is housing 24.4 % of the population and containing the main trip destination zone – The Buenos Aires city centre. Subway system in Buenos Aires is spatially associated with high residential densities and walking is an important mode of access to stations. Buenos Aires subway network, currently 54.5 km long, is still being extended. A significant feature of this network is that some stations are only 0.4 – 0.6 km apart. Four lines reach out radially from the city centre towards very high density, middle and high-income areas. Two other lines run transversely. The fact that all four radial lines encompass high-density residential areas and a downtown with high-density employment, results in a 260-million passenger annual ridership, of which over 75 % are intra-city trips going to and from stations [4]. In 1963, the former Buenos Aires' robust tram network of 875 km was closed. Several of those old lines are now partially used by the heritage tram network, opened in 1980.

The modern tram 'Premetro' opened in 1987 is serving the new development of Puerto Madero and is integrated with subway line E, but City transport priorities lay, as in the majority of Southern American mega cities, in the development of Bus Rapid Transport system [5].



**Figure 1.** New tram line in Puerto Madero, Buenos Aires

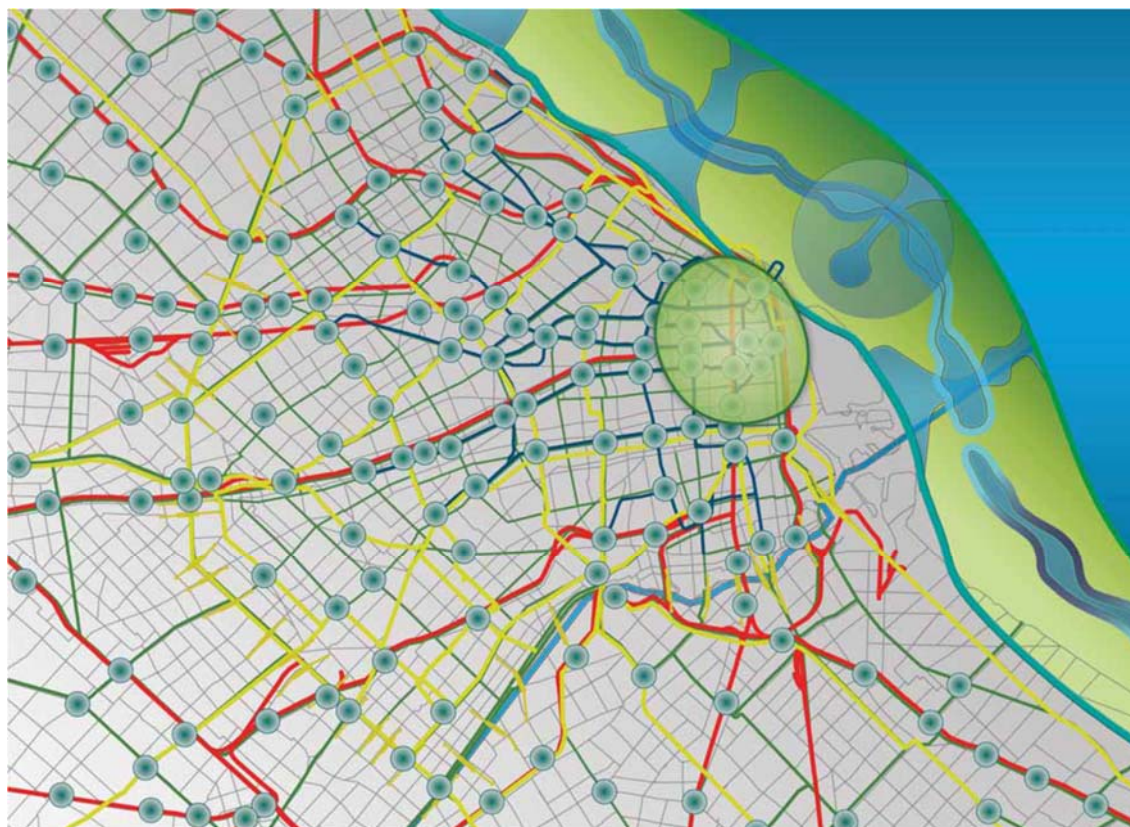
### **3. Challenges of implementation of spatial policies**

Buenos Aires, as most of the big cities, is facing development challenges such as: lack of affordable housing, fragmentation of urban structures, heterogeneous city patterns and gated communities [6]. However, Crot [7] is also stressing the significance of local institutional framework and endogenous potential as a counter balance for globalizing trends: 'globalizing pressures on cities are mediated by endogenous local institutional structures, social practices, and political decisions whose transformative power may be much more influential than globalization itself'.

In 2010, a strategic plan, with a fifty-year framework, Modelo territorial: Buenos Aires 2010 - 2060 [8], was introduced. It is a comprehensive strategy encompassing all areas of territorial development,



from city's transit expansion plans to favelas upgrading schemes. Strong emphasis is put on making the city more amenable to people. This plan, like the city of Buenos Aires, is inspired by cities like Barcelona and Paris, but it is not the adoption of 'foreign' planning models through institutional borrowing, but a more thoughtful process of institutionalization of these imported schemes in their host setting.



**Figure 2.** Desired development of transport system and mobility  
source: Modelo territorial: Buenos Aires 2010 - 2060

As in other big cities, cars have started to play a significant role in Buenos Aires in recent decades. Today, the city is making an effort to make the public space more democratic: all of the key players of traffic (pedestrians, cyclists, motorists and motorcyclists) are taken into account. To ensure that, a decision was made to implement the Sustainable Mobility Plan in 2010. The main purpose of the plan is to think of the public spaces in terms of mobility rather than transportation and to promote the use of bicycles and walking as means of getting about [9].

The city decided to take a more proactive role in solving problems connected with mobility issues. It has grappled with the problems of traffic congestion and transport-related air pollution and, as a bold solution, made the decision to increase urban mobility through the provision of safe and affordable public and non-motorized transport solutions (City climate leadership awards 2013) [10]. Buenos Aires' Plan de Movilidad Sustentable provides a comprehensive solution. It includes the ongoing expansion of Argentina's first Bus Rapid Transit (BRT), a system extension of subway, adoption of articulated buses. The plan also encompasses the launch of the nation's first bike sharing program, EcoBici, the extension of bike paths and the intersection treatments to improve safety for pedestrians.

#### 4. Proposed and implemented solutions

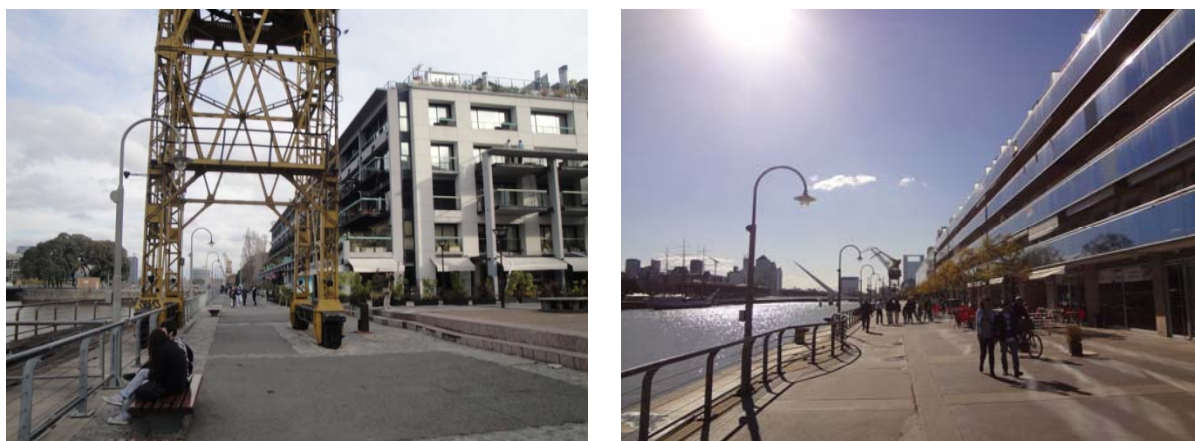
The most significant, large scale, development project which was completed within the last years is the urban regeneration of Puerto Madero. This development could be compared to other waterfront projects such as London Docks, Hafencity in Hamburg or Battery Park City in New York. At the same time, because of larger disparities in Buenos Aires than in other European and North American cities as well as because of its airy urban layout contrasting with Buenos Aires' dense city grid, this high-end development has even bigger impact on the city than it had in the case of London, Hamburg or New York [11].



**Figure 3.** Recent waterfront urban regeneration in Puerto Madero, Buenos Aires

After finishing Puerto Nuevo - new port in 1925, many ambitious plans for the redevelopment of Puerto Madero were proposed by a large number of investors and consultants, including Le Corbusier; but none was implemented, and the perfectly located site suffered from increasing decay. In 1989 Corporación Antiguo Puerto Madero SA was founded as a company of private law, with the National Government and the City of Buenos Aires as equal shareholders. Its aim was the development of the Puerto Madero site, and its only starting asset was the land itself. After a comprehensive analysis of several comparable schemes like Battery Park City and the London Docklands, and with the support of the planning office of the City of Barcelona (as a partner with experience in comprehensive urban regeneration), an ideas competition was organized in June 1991. Three winning offices established together final masterplan. Single winner was not nominated to keep long-term control of the design process and to achieve a greater degree of diversity and flexibility, which was necessary because of size of the estate, the estimated development time and the high political profile of the project.





**Figure 4.** Public spaces in Puerto Madero

The most important challenge was the development of investment momentum. Despite the extraordinary situation many of larger investors were reluctant to commit to an undertaking that they could not comprehensively control. In this time, the development structure with the corporation as central element was still uncommon. Finally, tendering process for the redevelopment project attracted more bids than expected and the corporation was able to choose the best programmes and architectural projects while still making considerable profits. The applicants were restricted in their ability to alter the existing facades, and the need to keep its character historic. Predominant uses in the project are residential and office with abundant retail stores, restaurants, hotels and a museum. Moreover today, Puerto Madero appears as the corporate heart of Buenos Aires, accommodating projects of several large players such as Repsol YPF, Tishman Speyer and the Faena Group [11].

Other types of large scale projects implemented in Buenos Aires are transport investments. So far, three Metrobus corridors, exclusive lanes for bus and taxi circulation (9 de Julio, Juan B. Justo, Metrobus Sur), have been created. Implemented project involves three routes with a total length of 38 km passing through some of the city's most congested streets. BRT system reaps the benefits of this form of transportation while addressing the issues that have traditionally undercut its effectiveness. Preferential lanes for public transportation and counter-flow lanes account for the reduction of journey time by 10 % to 35 %. BRT uses dedicated bus lanes, fewer stops, time-saving technologies and additional efficiency measures to make bus travel fast, reliable, and effective [1]. In the same time, Buenos Aires Metrobus' differs from the other cities BRT model in that it is based on existing bus routes. As such, there was no need to reorganize bus routes in order to simplify and make the public transport system more efficient, but it also limited possibilities to influence the transport system and its intermodal integration.

In 2013, Buenos Aires transformed its iconic 9 de Julio avenue (Figure 5), one of the widest avenues in the world with 20 lanes of car traffic, into an efficient, modern public transit corridor, by replacing four lanes of open vehicular traffic with dedicated busways [12]. From the point of view of transport hierarchy, one may question, if this corridor should be parallel to an existing sub-way. Still, it is the transformation of the most significant urban corridor and benefits of this process are unquestionable. Nearly 200,000 passengers and up to 10 bus lines benefit from the project. Another aspect of this is the reduction in commute time: by 50 % for busses, 40 % for minibuses and 20 % for cars. All three BRT corridors in Buenos Aires result in estimated Greenhouse Gas Emission (GGE) reduction of the equivalent of 49,000 CO<sup>2</sup> tons per year.



**Figure 5.** High-capacity BRT corridor famous Avenida 9

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The city is also increasing lengths of cycle lanes and pedestrian zones significantly. Till 2013, 110 km of new bicycle paths were created, developing the on-street bike lane network across the city's central area, connecting key transport hubs, office buildings and universities. The network will soon reach its catchment area [10]. To ensure cyclists' protection, the city also implemented bike lanes segregated from car traffic, as well as traffic calming devices at intersections. Bicycle parking is also located throughout the city along roads and near public buildings. Cycling offers an environmentally-friendly and space-efficient way to travel around the city. The City of Buenos Aires seeks to promote this emission-free, low-cost travel mode as part of its strategy to increase non-motorized transportation and

decrease private vehicle use [1]. Also a public bicycle rental system was launched in 2010. In 2013 there were 31 free bike stations, 80,000 users making 5,000 daily trips and parking in 2,816 street bike spaces. The Mayor of Buenos Aires has announced the expansion of the number of bikes up to 3,000, with about 200 stations. The above-mentioned investments had increased bike usage in the city from 0.4 % in 2007 to 2.5 % of all the trips in 2015 [13].



**Figure 6.** Newly-pedestrianized blocks in the downtown “microcentro”

Policies that give priority to pedestrians have also been introduced in 2010 and in the following years the city of Buenos Aires began to implement an initiative to pedestrianize over 100 blocks of the city centre. Until 2013 five pedestrian streets have been created in the downtown area. Walkability was improved by introducing pedestrian-priority woonerf-type roads which have been designed through central business district, creating so called downtown ‘microcentro’.

The urban streets were not only pedestrianized but also given new qualities including urban furniture and new type of urban textures. Iconic buildings within the area were illuminated with energy-saving LED lamps. It was a significant change for Buenos Aires City in which twelve lanes urban routes are still not uncommon.

The implementation of Buenos Aires’ Plan for Sustainable Mobility is still an ongoing process, but one can already observe substantial outcomes. So far, the introduction of Bus Rapid Transit (BRT) lines on key routes has cut travel times by 20 to 40 percent on average and in some cases by 50 percent or more. Adopting articulated buses on some routes has also led to a reduction in carbon consumption [14].

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Establishing a connection with local stakeholders was an important part of the implementation. Elements of an information campaign include identification of all groups likely to be affected by the project, and then tailoring appropriate communication with them through advertising, community meetings, leaflet, surveys, regular consultations on plans etc.

Public engagement through active opinion polling, awareness campaigns and the launch of a dedicated educational website also remains a key focus for the city [10]. It really helps to build a wide consensus around the project, though it is more focused on building awareness and support for the valuable projects, than on participation and common decision making process. At the same time, initiatives like City-Lab and Streetsblog, prize the new pro-ecological approach of Buenos Aires city and initiatives such as BRT corridors as well as the support for bike transport development or walkability.

## 5. Discussion and Conclusions

Buenos Aires has made a very important step toward sustainability by supporting development of more sustainable modes of transport, increasing share of voyages done by bicycles and improving walkability of the City centre [13]. One cannot argue that 'the ambitious and comprehensive nature of Buenos Aires' Plan for Sustainable Mobility, and the joined-up thinking behind it, make this initiative an inspiring example for other cities to follow' (City Climate Leadership Awards 2013) [10]. Buenos Aires City government demonstrates strong leadership by implementing well-planned BRT solutions, stressing the importance of political will and support, flexibility and an open mind in listening to the points of view of all stakeholders involved. Strong leadership and unceasing effort of the City to listen to the points of view of all stakeholders involved, are vital in this process [15].

Also walkability of the city is developing steadily with a strong political support. This initiative combined with strong focus on public spaces is adding to tourist attractiveness based on diversity of capital of Argentina. Large scale development project of Puerto Madero has much stronger impact on the city in which it is situated, than urban regeneration projects in Europe or Northern America. By building the new mixed-use centre Buenos Aires used opportunity to consolidate its position as competitive knowledge centre with diverse morphology based on port heritage.

## Acknowledgment

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