Transportation as a Resilience Enhancing Tool
Urban Dualism and the Latin American City

Diego Silva Ardila

In the last decades, and with increasing intensity in recent years, resilience has become an important intervention framework for imagining the future of urban settlements (Zhang/Li 2018). Policy makers, politicians, bureaucrats, urban planners, academics, and others regularly advance the narrative that cities need to develop robust capacities to overcome diverse shocks. In Latin America, this concern with crisis is understandable. The cities explored in this essay have experienced environmental adversities, persistent urban violence, massive immigration flows and debilitating economic crises. Over the mid and long-term, though, these cities have continued to deliver urban services, economic prospects and collective goods that attract population, improve quality of life, and urban amenities. This seeming paradox – between crisis driven narratives and existing pertinacity– is one of the reasons that resilience as a concept, discourse, and practice has found such a receptive audience in Latin American urban policy frameworks. All of this, though, raises several questions. The first question pertains to the novelty of the resilience framework. Is 'resilience' really something new or is it rather part of the DNA of cities, as Vale and Campanella argue (2005)? Second, is resilience a quality or characteristic that develops organically over time, or is it possible to fabricate resilience within urban frameworks? If it is possible to 'create' resilience, what areas should planners and designers target? Too often, analysts, policy makers, politicians and private sector actors call for more resilient cities, without really questioning what it is they expect to create, and how that might be different from what already exists.

The failure to ask and answer these questions has a number of potentially negative consequences, not the least, that it opens up resilience frameworks to a variety of neoliberal actors and interests (e.g., transnational insurance companies and global financial markets (Evans/Sewell 2013; Lamont/Hall 2013)). This does not mean that resilience as an analytical framework should be excised from urban policy discussions, or that all resilience building projects are neoliberal. Rather, it suggests that an historically informed approach to contemporary urbanism debates can help us to distinguish between resilience narratives that are driven by a neoliberal agenda, and those that have the potential to create more just, equal, and accessible ci-

ties. In this chapter, I examine the differing roles of urban transportation in four Latin American cities in order to 1) identify urban resilience enhancement logics under specific urban social dynamics in the region and 2) understand tensions between private and public sector approaches to resilience building.

In the introduction to this work, Dorothee Brantz and Avi Sharma argue that recognizing the asymmetrical power relationships between the different actors is extremely important for understanding the dynamics of resilience in discourse and practice. This point should equally be made for research into dynamics of urban transportation, where powerful political and economic interest groups (dis)engage with the needs and demands of local populations. While these negotiations promise to meet the needs of the population as a whole, they tend to marginalize the voices of the most vulnerable citizens. Resultant gaps in service have generated a range of alternative interventions aimed at remediating this unequal access. Recent urban transportation interventions aimed at ameliorating the circumstances of marginalized persons can offer insights into efforts to build more inclusive resilience frameworks for Latin American cities.

By exploring transportation as an infrastructure for resilience enhancement, I hope to demonstrate that there are, in fact, two resilience processes that are simultaneously at work in many (Latin American) urban areas. On the one hand, one sees a wide range of urban planning and top-down actions that have developed over the longer history of cities as a way of managing disruption and mitigating shocks. On the other hand, there is an organically developed complex of resilience practices that citizens use in their everyday lives to navigate the city (Castillo de Herrera 2009). Researchers from a wide range of disciplines tend to define the first complex of practices as "formal" and second one as "informal", and many scholars argue that Latin American cities are the sum of a formal and an informal city (Amato 1970; Gilbert 1996; Castillo de Herrera, 2009). This has been a richly productive body of scholarship, but I want to approach the cases from a slightly different perspective to add a new dimension to debates about in/formality. I argue that these two tendencies – the formal and informal – are so historically entangled and so mutually constitutive that they must be seen not as distinct and discrete spaces, but as what may be conceptualized as an 'urban dualism' that is much more than the sum of its parts. By using the term 'urban dualism', I hope to advance an interpretation that emphasizes the constant co-creation of two allegedly distinctive spheres, and to show how power and vulnerability create the urban form through dynamic interaction.

Metropolitan Configurations in Latin America during the 20th Century

Across Latin America, the 19th century saw the end of more than three centuries of oppressive ties with the Spanish Empire (Castells 1973; Carmagnani 2004). In that period of new nation-state formation, the attendant social, political, legal and economic transformations dominated the discourses among political elites, most of whom were concentrated in former colonial political capitals (Almandoz 2002; Mejía Pavony 2013). These upheavals – and the military conflicts that were common in the last decades of the century – created some spaces for social mobility within urban environments. Because economic activity across the continent continued to be essentially focused on mining and agriculture, though, the period of decolonization saw rural areas change far more than urban ones (Cerrutti/Bertoncello 2003). Only in the 20th century did industrial manufacturing truly begin to draw the working poor to Latin American cities.

Of course, there were dramatic differences in the urbanization patterns of Latin American cities, with factors like geography, demography, and access to global markets shaping the temporalities of urbanization (Almandoz 2014). In general, though, it can be said that the leading cities in Latin America – among them Buenos Aires, São Paulo, Mexico City and Caracas – adopted innovations like electricity, railroad systems, radio, cinema, automobile, and other technologies earlier and more fully than elsewhere. Cities became attractive for populations who were able to afford the new urban lifestyle, but it also drew poor migrants from the countryside. Ideas about "modernity" came to dominate the minds of urban dwellers in Latin America, while modernization transformed the material fabric of urban landscapes (Almandoz 2002, 2013b, 2014; Mejía Pavony 2013).

While the first decades of 20th century saw relatively slow urban growth, the decades after World War II saw dramatic transformations. During these decades, urban growth accelerated to a level that overwhelmed cities' capacities to react, with new housing construction and infrastructure failing to meet dramatically increasing demands (CEPAL 1963; Greenfield 1994). It was at this moment of urban acceleration that dualism emerged as an attribute of large and rapidly growing cities in Latin America (Abramo 2003; Castillo de Herrera 2009; Mejía Pavony 2013). Explosive urban growth is not unique to Latin American cities – indeed, cities across the globe have experienced these kinds of transformations. What was, perhaps, unique was the way in which different actors in Latin American cities addressed the negative consequences of rapid urbanization. In cities like Bogotá, Mexico City, Lima or Caracas, low-income and elite urban dwellers developed an asymmetrical but still symbiotic relationship aimed at managing extreme housing scarcity and inadequate infrastructure (Mejía Pavony 2003; Almandoz 2014).

The most remarkable example of this process is the allocation of land for housing. Housing in fast growing Latin American cities was allocated and built by state actors, with market-based financing strategies playing a subsidiary role. In their capacity as landowners, capital holders and governmental actors played a crucial role in crafting these programs. During the second half of the 20th century, when experiencing urban massification, top-down strategies like publicly financed housing were important for managing housing scarcity. Other kinds of bottom-up strategies – land invasion and occupation, for example – also became common. These alternative housing strategies of the urban poor are widely thought to constitute the origins of the so-called informal city. Sometimes portrayed as a confrontation where new urban dwellers invaded vacant land to build homes, these processes were in fact typically aimed not just at securing space but bypassing urban building regulations. To be clear, it is essential to recognize that occupying space is not just about gaining access to land but evading the authority of restrictive regulatory regimes. The "informal" cities, contrary to the most common narratives, emerged in cities in Latin America with the consent of different elite actors.

Indeed, in many cases, elite groups facilitated the occupation process in order to enable building projects that would otherwise have been derailed by building or other regulations (Castillo de Herrera 2009; Almandoz 2014). When land occupation did in fact occur spontaneously, and when confrontation emerged, elites tried to recover their value by using legal practices to collect the money via governmental policies or via "formalization" strategies (Castillo de Herrera 2009). So, informal developments were not spontaneous and discrete phenomena separated from the rest of urban dynamics, but an entrenched and entangled process that involved economically and politically privileged urban actors.

Alan Gilbert has argued that traditional informal/formal approaches to Latin American cities treat the informal sector as "the sector of last resort, whose function is merely to help sustain those whose labor is not required in the capitalist sectors of the economy. It performs no effective economic role and contributes nothing to the modernization process" (Gilbert 1998: 16). Gilbert's analysis fails to capture the complexity of the "informal" economy and its role in society more generally. In fact, contrary to what Gilbert argues, informal sectors are critical dimensions of the economic and political organization of Latin American cities, underpinning both processes of modernization and modernity narratives. Indeed, Latin American cities were able to manage periods of explosive urbanization – and attendant pressures on urban services – precisely because new urban survival strategies that bypassed urban regulatory regimes operated parallel to and in tandem with institutional policy agendas (Almandoz 2014). The present chapter offers the concept of urban dualism as a way of understanding this symbiotic relationship of the formal and informal sectors and shows that this entanglement was part of the very

formation of Latin American urbanities. The enduring capacities of cities in Latin America to function in the absence of transparent, robust and comprehensive local governance is a consequence of urban dualism that creates capacities that function not as "best case scenarios," but second-best solutions. The emergence of what I have called urban dualism during the second half of the 20th century points to the active linking bonds between local elites and low-income inhabitants. Resilience should, in this sense, be observed and analyzed as a complex of social practices resulting from the interaction, bargaining and negotiations between ruling elites and low-income communities in cities in Latin America.

Urban Dualism and its Manifestations in Urban Transportation in Latin American Cities

Urban transportation solutions in Latin American cities grew in tandem with population growth and spatial expansion in the second half of the 20th century. By the 1950s, for example, only Buenos Aires had a developed underground metro system[1], while Mexico City inaugurated its subway system (Metro) only in 1969 as a project complementing large-scale investments in public works for the 1968 summer Olympics. São Paulo and Santiago implemented Metro services in the mid-1970s, with four other Brazilian cities, and Caracas in Venezuela following suit in the 1980s (Figueroa 2005). Overall, Metro systems were quite rare because they depended not only on substantial financial resources and coordinated government action, but also a steady commitment from national level governments (Almandoz 2013a).

1 Buenos Aires is an exceptional case that opened its first subway line in 1913. By 1955, the city had five lines and developed a bus irrigation system that facilitated the mobility of thousands of urban dwellers. (Figueroa 2005).

Figure 1: Buenos Aires "Subterraneo" (Silva Ardila 2012).

In contrast to metro systems, which are still relatively rare, the most common transportation solution in Latin American cities was the urban bus (Almandoz 2013a; 2014). By the mid-20th century, urban growth put pressure on the existing transport systems, but it was politically complicated to increase fares. This, in turn, made the expansion of networks impossible. As Figueroa has shown, though, small companies that established bus routes provided an alternative to other transport services (Figueroa 2005: 112). This was a process that occurred spontaneously, largely without coordination by the urban authorities.

The principal advantage of the bus was its flexibility: companies could change their routes quickly and regularly extend their service to the edge of the city. So, by the 1950s large cities in Latin America had incorporated motorized bus systems that either replaced or ran parallel to already existing horse-drawn or electrical trams (Figueroa 2005; Almandoz 2002; Mejía Pavony 2013). Urban buses, typically owned either by a private company or individual owner-operators, provided transportation services that used organic route-design and profitability calculations to reach a maximum number of riders. Minimally regulated and using local government permits resulting from interaction between bus operators and local officials, the-

se buses supplemented inadequate transportation services, providing low-quality employment for drivers and ticket-takers, and generating profits for company owners (Figueroa 2005). Oscar Figueroa argues that, by the 1960s, "the bus systems in all of the cities (Buenos Aires, Mexico City, São Paulo, Rio de Janeiro and Lima) were run mainly by private companies." And while "the form of those companies differed widely… those differences reflect the different histories of transport development of each city" (ibid: 113). While urban buses added capacity to inadequate transportation infrastructure, they did not fully service the needs of residents of fast-growing Latin American cities: "under these circumstances, public transport has not fulfilled its social function and has become another source of congestion and disorganization. Most operators increasingly used smaller buses and too many bus companies run old buses, which contain large numbers of standing passengers, along routes crowded with other traffic" (ibid: 119).

Limited transportation and mobility solutions make urban dwellers more vulnerable in a whole range of ways: for economically vulnerable persons, for example, it can make access to work and urban amenities extremely time-consuming and costly (Figueroa 2005). This, in turn, can lead to higher levels of unemployment, lower levels of educational attainment, poor health and other negative outcomes – all of which have a direct impact on the levels of urban violence, economic capacities and social relations that affect urban resilience. In a direct response to the inadequate provision of public transportation, different spontaneous forms of urban mobility have evolved across Latin America. While these are sometimes viewed as isolated and ad hoc, they are deeply entangled with local economic powers. These ad hoc infrastructures show how vulnerable communities adapt to gaps in public service provision. This was not, however, simply a matter of vulnerable urban populations filling a gap in services left by elite actors. In fact, elite actors played an important role in facilitating these adaptations by providing resources and establishing alliances that defined and limited the possibilities of transportation solutions that appear to have emerged organically. Capital allocation, the creation of legal frameworks, policy design and implementation, police and juridical support are just a few of the areas where elites supported allegedly informal activities. (Silva Ardila 2020). The cases of Buenos Aires, Bogotá, Mexico City and Medellín highlight several elements that can illuminate issues of urban dualism, and resilience narratives and practices. The distinctive urban transportation cases presented in this chapter operated in different contexts, and with different assumptions and levels of regulation, that produced different solutions. As I hope to show, these outcomes do not easily correspond to specific economic, political, or ideological models. Instead, I hope to show that resilience is a collectively produced attribute of urban landscapes that is defined by contextual constraints.

Remises in Buenos Aires: Solutions for Individual Needs

By the end of the 1950s, Buenos Aires had a consolidated rail-based system and a solid network of buses servicing neighborhoods in the expanding metropolis, but taxi services were also widely used by growing upper-middle income inhabitants. Beginning in the early 1920s, taxi service was regulated by the municipality to protect drivers and passengers, with emphasis on reducing long working hours. Because the supply of drivers was not increased, though, this led to shortages in availability – particularly during the evening hours that saw high demand from an expanding middle class who wanted to use urban amenities like the theater, restaurants, and dance venues (Clichevsky 2000). As an expected market reaction, independent automobiles (privately owned, often unlicensed and unregulated) started offering services door-to-door from the central city to peripheral neighborhoods. These services – called *remise* from the French, and sometimes castilianized as *remís* – quickly grew in popularity, offering services from informally designated collection points during the evening and nighttime hours. During the 1960s spontaneous gathering areas in the city center transformed into permanent facilities known as *remiserías*. Similar little stations and offices popped up in the neighborhoods (Clichevsky 2000; Gutiérrez 2012).

Initially *remises* were similar in form and service to regulated taxi services, with well-maintained automobiles and elegantly dressed drivers providing the experience expected by sophisticated middle-income urbanites. However, despite steady growth, *remis* services were never regulated, instead functioning as an informal strategy of satisfying a specific urban demand. It is important to note that, at least in the 1950s and 60s *remis* services operated only at specific times of the day and were not, therefore, in competition with existing taxi services. In the 1970s, though, the growing *remis* system evolved in response to a more profound fragility of urban mobility in the city: identifying gaps in service provision to peripheral neighborhoods, the *remis* model generated strong incentives to invest in an alternative network that was designed to serve (and draw profit from) under-served areas of the city, Susana Kralich states that remis proliferation and explosive growth during the 1980s and especially 1990s responded to unemployment growth, self-employment entrepreneurship initiatives facing the economic crisis and the incremental demand growth caused by the deterioration of public transportation services (Kralich 2005: 1) Spontaneous allocation of neighborhood *remiserías* facilitated the provision of local short-distance trips covered neither by the inflexible metro system nor by the bus routes.

The expansion of the *remis* across the city generated several financial and other innovations, with groups of drivers pooling resources to invest in automobiles, facilities, and publicity. Pressures emanating principally from invested capital and resources forced *remises* operations to run on a 24-hour basis, and this expanded

service provision was facilitated by loose police oversight. It was not until the 1980s – when the system was ubiquitous in metropolitan Buenos Aires - that the *remis* was labeled as "private service of public interest" in order to initiate the much-needed regulatory intervention (Kralich 2005). The *remis* system was neither a centralized nor a planned solution, but an organically organized one that developed in response to inadequate service in a rapidly expanding urban marketplace. It is worth pointing out that, while this spontaneous and decentralized transportation intervention resulted from the identification of market failures – periods of no service, areas that were underserved – it was *also* critical in meeting the needs of vulnerable citizens living in peripheral neighborhoods. While solutions did not come from state actors, or even regulated private-sector actors, the *remis* did ultimately constitute a parallel infrastructure that provided low-cost transportation solutions to many people who were otherwise excluded.

The economic crisis of the 1990s saw thousands of unemployed factory workers find temporary employment in the *remises* (Gilbert 1996; Kralich 2005; Blanco 2010). Newly unemployed workers with some available capital invested into existing *remís* cooperatives, and while this generated intensive competition, it also allowed extremely precarious individuals and families to reach subsistence levels during the hardest years of the long-lasting economic turmoil (Kralich 2005).

Remises moved from discretionary and sporadic trips to a more frequently used service within the city, particularly due to the competitive prices. And when tourism (mainly due to the attractiveness of exchange rate advantages) sky-rocketed, the *remises* became a good source of dollars access in an economy that had limited access to foreign currencies. This is not, in any way, a normative argument about whether spontaneously evolved, under-regulated, market-driven alternative transportation infrastructures should be a solution to mobility gaps in fast growing cities. It is not, in other words, my purpose to argue that this is a 'good' model or a 'bad' one. Rather it is an attempt to show how these alternative mobility infrastructures developed, functioned, and ultimately stabilized mobility gaps and economic livelihoods in the context of a rapidly expanding urbanity. The case of Bogotá, explored directly below, offers different insights.

Bogotá and the Struggle for Public Regulation in Highly Privatized Transportation Contexts

In 1948 in Bogotá, a young presidential candidate named Jorge Eliécer Gaitán – openly opposed traditional elites and with a high likelihood of victory – was murdered in the streets when leaving his office for lunch. In less than twelve hours of rioting, still remembered as the *Bogotazo,* substantial parts of the city's core were badly damaged by angry supporters (de Urbina González/Zambrano 2009). What

happened next was perhaps more surprising. Over the next several days, as documented by de Urbina González and Zambrano (2009), unscrupulous real estate owners and developers took the opportunity to demolish dozens of buildings that were protected by historical preservation regulations (Aprile-Gniset 1992; de Urbina González/Zambrano 2009; Niño Murcia/Reina Mendoza 2010: 78).

On the April 9, 1948 protesters destroyed a publicly owned tramway connecting downtown with some of the urban expansion areas in the north and west sections of the city. Three years later, Mayor Fernando Mazuera decided – without consultation with the tramway company's governing board (Mazuera 1972) – that the tram line was no longer needed. He ordered public works employees to cover the tracks with asphalt, paving the way for a privately owned and operated bus service to expand operations. In Bogotá, private interests ruled urban transportation services during the next five decades.

This privileging of private transportation providers in the 1950s and 60s is one reason why unregulated bus service gradually replaced the publicly owned tramway company, but these networks also grew because they filled a genuine need for connectivity to new neighborhoods during the peak years of urban expansion. In Bogotá, every neighborhood had an urban transportation provider that was focused on connections with the downtown area, which was primarily a commercial district (Acevedo 1990). During the 1980s each company created a small geographical monopoly, functioning as the sole service provider for captive neighborhoods. Monopoly attributes implied that companies could reduce their service standards without fear of customers choosing alternative transportation providers (Acevedo 1990; Ardila Gómez 2004; Figueroa 2005). Service was provided using a franchise scheme that was commonly labeled as "*Guerra del Centavo*" (war of the pennies), which described the aggressive and sometimes violent competition. During this period, bus operators essentially "rented" the right to sell their services on designated routes from a small number of private companies who owned official permits that allowed them to provide bus service. It is important to emphasize that these companies did not own buses. They owned the right to provide service along designated routes, and then sold these rights on a concessionary basis. This complex transactional network was extremely profitable for the companies holding permits; it could be profitable for bus owners. For bus drivers, though, it contributed to terrible working conditions, with low wages, long hours, and extreme pressure to fill passenger quotas.

The poor quality of service caused anger among riders, but it was the chaotic and often dangerous traffic in congested urban areas that drew public attention (Silva Ardila 2016). While there was public pressure to resolve the situation, powerful stakeholders – including bus operators, permit owners, and local politicians and public servants – involved in these quasi-monopolistic franchises had an incentive to maintain the status quo, as it offered a steady income stream. The problem of

concessionary bus transportation was discussed publicly for more than three decades, but reforms were consistently obstructed by elites who were profiting from the high demand for transportation solutions to everyday needs. Public policy was constantly obstructed by elite groups who were profiting from the public's basic need for transportation services (Silva Ardila 2016).

In 1991, the landscape of transportation services began to change, in large part due to transformational political events: in that year, a newly ratified Constitution modified the territorial organization of Colombian provinces, granting increased autonomy to municipalities. In this new scenario, local governments – increasingly exposed to public scrutiny – experienced intense pressure to reform mobility infrastructures. Owners of transportation concessions also recognized that, if they hoped to retain access to profitable routes, they would have to accept new forms of service allocation (Ardila Gómez 2004). In this case, political transformations created the conditions for new constellations of transportation policies. The political changes did not, however, immediately displace vested interests (Silva Ardila 2016). Instead, political and economic elites turned to techno-infrastructural solutions to address two of the primary areas causing popular anger: badly outdated buses and congested arterial roads in downtown areas.

Resulting from more than a decade of debate about design and policy, and inaugurated in December 1999, *Transmilenio*[2] is a trunk-based bus system[3] functioning with articulated buses that increase operating capacity. Using dedicated lanes that reduce overall congestion, *Transmilenio* dramatically improved average commuting times in the city. While the design innovations – trunk-based systems and dedicated transit lanes – are globally recognized transportation models, perhaps the most important improvement was the upgrading of a large proportion of the urban bus fleet, which won widespread approval from local citizens. The World Bank reported this labeled "best practice" as "following pioneering experiences in Curitiba and São Paulo and a recent successful implementation of the *Transmilenio* system in Bogotá, Colombia, the bus based rapid transit (BRT) mode has emerged as a great hope for cities interested in high-quality public transport services at a moderate level of capital and operating costs (Hidalgo/Graftieaux n.d.). In Bogotá, this widely implemented techno-infrastructural approach solved existing problems of congestion, pollution, and ease of access *without* taking control away from the private companies who were largely responsible for the mess in the first place

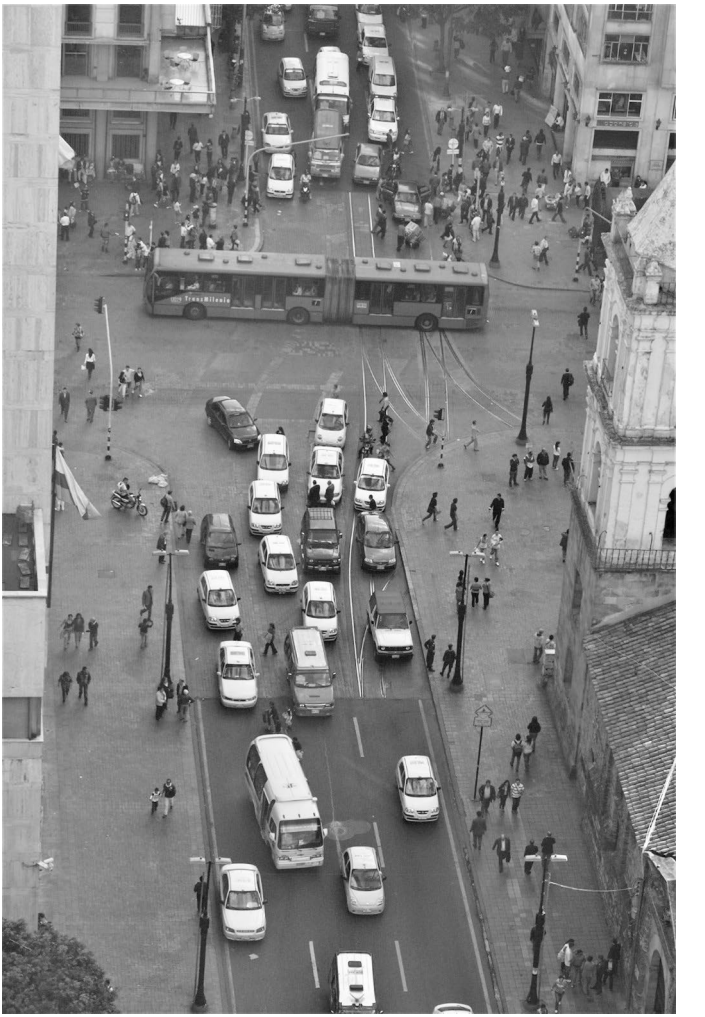
2 *Transmilenio* officially designates the publicly owned regulatory agency of Bogotá, but it is commonly used to mean the whole transportation system, which includes both the material infrastructure (which is public) and the private bus operators.

3 A Bus Rapid Transit (BRT) or a trunk-based system uses large scale buses – sometimes bi-articulated or tri-articulated – with a dedicated right-of-way and off-boarding fare collection system similar to metro systems. BRT sometimes use a platform level boarding system that forces the use of stations to board the buses.

(Ardila Gómez 2004). While existing permit and concession owners had to adjust their business model, they could retain control of their companies. The new urban transportation system replaced large parts of the previously existing material infrastructure. It was, however, built upon the already existing networks of actors and stakeholders. *Transmilenio* may not have addressed the issue of the influence of special interests on politics at all scales, but it did largely resolve the most pressing mobility challenges facing residents of this city of more than seven million residents.[4]

4 *Transmilenio* ultimately modified but did not replace the business model that allowed the majority of previous owners to retain their control public transportation. It did, however, also create a new institutional capacity via the creation of a publicly owned regulatory, planning and management company. While this new urban transportation system discarded most of the previously existing material infrastructure, it was constructed on top of existing networks of actors and stakeholders. This was a solution that was adequate in terms of time, context and interests and constraints, but not an ideal solution.

Figure 2: Transmilenio at a downtown intersection where tramways were asphalted in the 1950 (Silva Ardila).



Initially, at least, it appeared that Transmilenio's impact would be relatively limited in scope, constrained by the influence of other interests. The policy superficially transformed the transportation service by substantially improving service quality for a more engaged citizenship while retaining most of the economic structures that had contributed to monopolistic control of urban transportation.

Nevertheless, the developments in the last 20 years suggest that large scale centralized planning strategies have the potential to generate systemic disruptions which profoundly transform deeply entrenched and organically developed infrastructures: the success of the single bifurcated service line triggered continual expansion, with seven lines now servicing once peripheral neighborhoods and after years of negotiations with remaining "traditional system" providers, a comprehensive system was created under the label of SITP (Sistema Integrado de Transporte Público) (Hidalgo/King 2014). The professionalization of urban planning and transportation policy in Bogotá can be directly traced to the success of Transmilenio. But this innovative system also modified behavioral patterns in the city in ways that have led to a reorganization of the urban mobility patterns that service the new bus rapid corridors: novel forms of transportation such as pedicabs, mototaxis, and collective taxis or vans emerged in different nodes of the urban landscape to facilitate access to the central transportation corridors (Mejía-Dugand et al. 2013). These adaptations were entirely unanticipated by transportation designers, but they are another manifestation of the urban dualism that is shaping cities like Bogotá over the long-term. Urban dualism is defined by continual adaptations of the urban form. As such, it serves to create urban resilience, while also being evidence of the resilience of the urban form.

Mexico City: David vs. Goliath

When Mexico City inaugurated its rail-based Metro system in 1969, it represented a huge investment in the potential for transportation infrastructure to generate urban transformation. Metro service, though, was never enough to satisfy the mobility needs of the city's rapidly growing population, and even as the municipal authorities attempted to expand services, alternative transportation solutions – the ubiquitous VW Beatle taxi, an expanded network of private buses, and private automobiles – grew across the city. By the 2000s, Mexico City was a huge urban agglomeration with a wide range of transportation alternatives, but it was still facing a profound urban mobility crisis (Gilbert 1996; Montoya 2006).

The geographies of mobility in Mexico City also, though, very clearly marked the city's extreme economic inequalities. City residents literally moved across space in two distinct vertical planes. Low-income groups and vulnerable urban dwellers travelled on the surface on buses and underground in the Metro, while those who could afford private cars traversed the city using the stunning urban elevated Periférico Highway – a "*segundo piso*" or "second floor" constructed since 2003 that allowed them to use a 23 kilometer second story highway on top of a surface highway to travel high above the congested surface arteries. In the 1980s, urban transportation systems in Mexico City became a visible manifestation of the historical divisions

between rich and poor (Rodríguez López/Navarro Benítez 1999). Two examples suggest how transportation in this emerging mega-city can help us to understand the dynamic processes that underpin urban dualism: Bus Rapid Transit (BRT) and bicycle infrastructure. While it is not possible to discuss these examples in depth in the present chapter, I do want to briefly discuss a couple of elements that show how allegedly distinct formal and informal infrastructures and practices in fact emerge in tandem.

The implementation of a BRT in Mexico City is a clear example of the way that policy diffusion works: because of the triumphal narratives emerging out of Bogotá, BRT-policies rapidly achieved a worldwide recognition as an urban best-practice that could be easily replicated in diverse global settings (Wood 2015; Silva Ardila 2016, 2020; Montero 2017). In Mexico City, *Metrobus* adapted the "Bogotá model" by using the BRT corridors as a complement to, and feeder for, the existing metro lines. Rather than functioning as primary arteries across the city, the *Metrobus* provided enhanced access to the Metro in a way that was similar to the ways that alternative transportation services like collective taxis brought riders to the *Transmilenio* in Bogotá. Results varied during the following years and the model slowly adapted to the conditions of Mexico City. But for the purposes of this chapter, I want to highlight one unexpected product of the new system which emerged when the construction of BRT corridors created new segregation spaces for urban mobility.

The premise of the BRT system is a simple one – create dedicated lanes for buses which stop at regular loading platforms at scheduled times in order to take on passengers in the most efficient way. The advantages of the BRT are many. The dedicated lanes reduce braking times which grow asymptotically according to the number of vehicles, mitigate "bunching", and minimize lane changing. The relative simplicity of BRT is one of the reasons it is so easy to replicate and is so effective at speeding transit times and reducing traffic congestion. And as transportation engineers have demonstrated through congestion studies, BRT does in substantial measure realize these goals (Mejía Dugand et al. 2013).

What is surprising, though, is the way that the transport ecology adapted to reduced congestion. Those without cars take the metro if it goes near their destination, but otherwise rely on buses or collective taxis. In Mexico City, though, middle and upper-income individuals who owned or could afford to purchase a car responded to reduced congestion by driving more. In other words, more efficient public transit in Mexico City incentivized a substantial segment of individual users – those with the financial means to own cars – to drive in increasing numbers. Now heavily congested avenues provided specific lanes to the use of public transport, thereby creating spaces for more individual automobiles in the remaining lanes. This increased the average speed in the corridors but diminishes the irrigation possibility of the system which at the end affects the most vulnerable

making their commute more expensive due to the financial and physical cost of reaching the corridors. The real problem in Mexico City was rising car ownership. And as Rowland and Gordon have shown, when "people own a car, they use it" (1996: 112). Congestion and pollution remain at increased levels despite more sustainable transportation alternatives.

Increased car traffic also made it more difficult for pedestrians to navigate an increasingly car-centered urban environment: more cars traveling at higher speeds now meant that pedestrians had to cross at designated crossings rather than finding a path through slow moving autos and buses. This problem was amplified by the fact that dedicated bus lanes are separated from other traffic by a concrete barrier, which means that pedestrians either have to cross streets at designated crossing points or climb over a small wall. In some cities – Berlin or Munich, for example – this might not have changed mobility in any noticeable way. But in Latin American cities, where pedestrians regularly share roads with cars, motorcycles, trucks and buses, this constituted a major change in urban rhythms. BRT in Mexico City was a public solution based on global best practices, but it generated a host of place-specific problems. These problems, in turn, led to another major public intervention, this one, aimed at transit on two wheels.

Figure 3: Contesting urban transportation spaces (Silva Ardila).

Cycling is hardly new to Latin American cities and has long been a means of transportation for the urban poor, and a cheap way of moving goods around the

city. During the early 2000s – as city planners were introducing the BRT system – urban policy designers simultaneously adopted an ambitious policy to enhance biking infrastructure. However, with a vast increase in bike lanes across the city during the last ten years – and a public relations campaign aimed at highlighting the health, environmental, and aesthetic benefits of cyclo-mobility – bicycling has become an increasingly popular way for some middle and upper-middle class urbanites to travel the city. Of course, this is part of a larger global trend towards a certain brand of metropolitan citizenship. Because it is relatively new in Mexico City, though, "bicycle culture" has generated tensions between drivers who are used to "owning the road", and cyclists who are staking claims to urban space. As the city introduced bike lanes onto major arterial roads, neighborhood ways, and boulevards, these spaces became a new topography of conflict between combustion-based commuters and human-powered alternatives.

These conflicts take on a particular dynamic in the present case because, unlike projects in cities like New York, which was championed by Citibank, or the for-profit bike-sharing ventures of companies like Jump (owned by Uber), the Mexico City ECOBICI initiative does not focus on profitability nor does it target exclusively privileged areas. Mexico City's comprehensive plan means that sharing the road with bicyclists is not a predictable "inconvenience" confined to hip neighborhoods or tourist districts. It includes most of the metropolitan region, and affects most urban citizens, if only by changing customary ways of using the road. While the bike initiative may generate conflicts based on customary and new usages in the short term, there are good reasons to think that it will adapt and adjust in the future for better functionality. The inclusion of a large public asset (the bike fleet and the required technological equipment) and the creation of incentives for cyclo-mobility in the form of a state organized, publicly funded bike-share system, should be understood as adaptations to the unintended consequences of the BRT. In this case, ECOBICI complements the BRT by providing mobility access to the consolidated transportation corridors. And while these twin metropolitan strategies are clearly informed by urban managers' desire to provide a globally recognized brand of urban amenity, it is also very intentionally focused on reducing the vulnerability of low-income populations who have been isolated by changing urban spatial practices.

All the urban adaptations to mobility poverty we have seen so far – the "private" solutions in Buenos Aires; the public strategy that left private interests in place in Bogotá; and the public-public approach to transit in Mexico City – can be seen to produce ancillary challenges which, in turn, force adaptation. In the case of Medellín, directly below, we see an extremely interesting alternative – one in which the politics and land use practices of urban elites *follows from and builds upon* the spatial appropriations of the most vulnerable citizens. While the danger of "capture" by purely economic interests is possible, as shown by Marcela López's chapter in this

volume, my own research suggests that, if the rights of access to urban space of the city's most vulnerable residents can be protected by legal mechanisms, this need not become a case of the rich taking over spaces that were urbanized by the poor.

Medellín: Wiring the Fragmented City

As we have already seen in Marcela López's contribution to this volume, Medellín has come to symbolize urban resilience on a global stage. Indeed, the UN Hub associated with urban resilience is now called the Medellín Collaboration for Urban Resilience (MCUR) (UN-Habitat n.d). Some critics suggest that this resilience narrative is simply good branding, pointing out that violence and inequality persist in spite of the fact that Medellín is one of Colombia's richest and globally networked cities. These objections are not without merit, but it is worth remembering that – despite a small uptick in violence in recent years – homicide rates are down more than 95 per cent from their peak in the 1990s, and that economic development has generated upward mobility for hundreds of thousands of people. The Medellín case offers us a dramatic view not just of tensions within resilience discourse, but also of the urban dualism that is an important characteristic of the cities explored in this chapter. From almost any vantage point in this city that sprawls across a steep valley, it is possible to observe the ways that the "formal" and "informal" city co-produce the urban form. Indeed, the city as it exists today was shaped in powerful ways by the internal violence – drug cartel violence, paramilitary organizations, rebel armies – that displaced so many of the Colombians who eventually moved to Medellín. It is understandable, then, that advocates of resilience-based development point to Medellín as a city that experienced and, in many ways, overcame a profound urban crisis. By focusing on the urban dualism, we can better see *how* the city and its residents have managed to "be(come) resilient" in the face of enormous challenges.[5] What follows is a brief discussion of a set of innovative transportation policies centered on the aerial cable cars, and the ways that these have shaped social and economic relations in the city, enhanced many of those attributes that are associated with urban resilience, and created an easily replicated best-practices model for urban integration.

The aerial cable cars were part of larger strategy that aimed to use municipal financial resources and institutions to reduce violence and create economic opportunities. Here, state intervention was seen as the key to reaching urban locations

5 Without romanticizing Medellín's transformation in recent decades – one that can be traced to constitutional reforms in 1991 – it is clear that the city is less violent, better prepared for environmental disruptions, and more accessible to its most vulnerable citizens.

and populations that had never before been the target of public, collective, or government initiatives. As in the case of the *Transmilenio* in Bogotá, new political forces that were empowered by the constitutional reform of 1991 began to manifest themselves in metropolitan politics in the early 2000s. In the case of Medellín, though, new democratic initiatives and transparent programs directly challenged entrenched corruption and vested interests in ways that, in Bogotá, they were unable to do. Later these successful policies were theoretically framed under the concept of Social Urbanism (Montoya Restrepo 2014; Leite et al. 2020). Multiple projects were designed and implemented attempting to use public resources to enhance the social fabric in a fragmented city. In Medellín, the fragmented materiality of the city was the result not of a catastrophe or an economic or social crisis, but a slow historical process that has seen elites fracturing urban space to create enclaves and zones of distinction. Indeed, local elites have been building their segregated spaces since the 19th century, when massification happened without control, regulation, or political contestation (González 2010). In Medellín, fragmentation existed by default.

In Medellín, low-income urban dwellers, mostly displaced rural populations, learned urban life on their own. They built their own houses, created their own public spaces, connected illicitly to public utilities networks, and created their own transportation systems. During the 1950s and 60s, the Medellín of the vulnerable was built at their own risk with little if any state intervention. In this context – rapid population expansion with little state involvement in planning or infrastructure development – resilience capacities developed on an individual basis that was slowly integrated into the city as part of a long-term process of urban consolidation. Here, the topography represented a particular challenge: because steep hillsides that were difficult to access were the only available land near the urban center, they were a predictable – and predictably difficult – site for land occupation by vulnerable groups. In many of these areas, "walking home" could better be described as hiking. And due to a lack of transportation service providers and limited financial resources, residents of these neighborhoods found themselves challenged not just by their social and economic marginality, but the urban topography. Ad hoc solutions did, of course, emerge, including motorcycles, private vehicles for collective use, and vans and small buses. In a vacuum left by municipal inaction, citizens had to find ways to navigate the steep slopes that separated their homes from places of employment, everyday consumption, and leisure (Dávila 2013).

Figure 4: First cable line in Medellín. San Antonio. The city has built five additional lines in the coming year (Silva Ardila).

During the first yeas of the 20th century, new political relationships between metropolitan elites and vulnerable citizens began to emerge, and in this context, urban managers turned to an existing technology – used primarily for winter sports or summer tourism – to connect peripheral urban dwellers with core urban localities. Medellín hung wires across its mountains to connect these vulnerable citizens with a Metro system that traversed the city center. This was not, however, just a transportation infrastructure. Indeed, each cable car station was designed to connect with newly built urban amenities like public libraries or parks. Because

of the spatial logic of this aerial infrastructure, these new institutions were built on the urban peripheries. Designed, in many cases, by internationally recognized architects, these stations function as points in a changing urban geography – one where the city's most vulnerable residents are able to access the same public resources as more privileged residents of the urban core. Enhancing mobility and reducing the cost of accessing urban goods, this new transportation model has mitigated some of the many vulnerabilities of Medellín's poorest residents. First slums, next public infrastructure (cable cars, libraries, parks), and later tourists and selfies – this process highlights how a symbiotic relationship between the poor and elites has defined the urban cartography.

Final thoughts

Resilience narratives and practices in cities in Latin America are defined by their local contexts and the specific configurations of urban landscapes. The World Bank report titled "Cities in Transition" stated that "in many rapidly growing cities in the poorest countries, weak local governments have been unable to perform even minimal functions, so that households and informal institutions have become the main providers of infrastructure, housing, and social services. While this solution meets some essential needs, it has also resulted in fragmented urban economies" (World Bank 2000: 7). From many urbanists, the fragmented urban realities have been viewed through an analytical framework that is structured by a binary understanding of distinct kinds of urban space. This analytic can be referred to as the formal/informal model.

The model suggests that there is a spatial segregation within cities, and in most cases, this is easy to observe. Wealthy urban areas often offer a stark contrast to precarious dwellings and neighborhoods. This model also, though, tends to suggest that the social and economic processes of exclusion mean that formal and informal processes occur independently of – and with little connection to – one another. In some cases, this has led to the mistaken view that the "informal economy" is a parallel economy that has little to contribute to the social and commercial development of Latin American cities. In this chapter, I have tried to advance an alternative view. By using the concept of Urban Dualism, I try to show that these two allegedly distinctive spheres are in fact deeply entangled and mutually dependent. This does not, in any way, diminish the fact that there are extreme inequalities in Latin American urban landscapes. It is simply to show that, while these inequalities may create spaces of exclusion, they are unable to stop the dynamic process of interaction between different urban actors – including those who are the most precarious. Long-term historical processes have created a symbiotic (though often unhealthy) relationship between different sets of urban actors who despite their

differences, depend on one another. In this view, so-called informal economic and social practices are not independent from the formal city. Instead, they are a fundamental element of the city, and must be part of any attempt to understand urban dynamics.

Urban dualism has profoundly shaped the governance and political culture of cities in Latin America, and ones of the reasons it is so deeply embedded is because it contributes to a plasticity that tends to generate social or economic mechanisms that help to stabilize a system that is experiencing hazards or risks. To a certain extent, Latin American cities combine both sides of Ash Amin´s coin: technologies and governmental action on one side, and active citizens on the other. In this chapter I argued that urban dualism of cities in Latin America can provide a theoretical framework to better understand why urban areas in the region display such strong resilience capacities despite the weaknesses of their institutional architecture and governance structure. For all the direct and indirect complications that this dualism creates, the discussion of urban transportation solutions in four Latin American cities shows how urban dualism materializes different possibilities for resilience in the face of large and small hazards.

Transportation systems that facilitate the daily movements of people and things in the city depend both on technical and material infrastructures, but I would suggest that designing, planning and developing effective mobility solutions is not possible without a good understanding of the urban dualism of Latin American metropoles. Contrary to the widely held view, urban dualism shows that formal and informal systems are not possible to separate: instead, they are profoundly intermingled, adapting to one another according to needs and demands, but also to the interests and power capacities of different urban actors. Formal systems such as rail-based metro systems, Bus Rapid Transit systems, Bike-sharing systems or cable car lines interact with the untidy emergence of informal means such as "remises", bus services or motorcycle and bike taxis. This interaction is a clear form of dualism and a relevant case for the study of transportation and its relation with urban resilience. The central argument is that these informal responses have worked as a buffer for risks in urban areas in Latin America, not only with regard to transportation but many dimensions of urban life.

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