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Bird's Eye View: Local Perspectives from a Case Study of Aerial Cable Cars in Bogotá, Colombia



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Abstract

The TransMiCable is an aerial cable car route that was inaugurated in December 2018, in Bogotá, Colombia. This paper examines the impacts of the TransMiCable on public transit accessibility and mobility through an ethnographic case study of two *barrios* in Ciudad Bolívar, a poor peripheral locality of Bogotá where the aerial cable car route was built. Although the aerial cable car is not a common form of public transit in the United States, it is a promising mode of transportation in regions like the mountainous Andes of South America, where geography limits the efficiency and feasibility of more traditional modes like cars, buses, subways, and trains. The aerial cable car is a relatively new mode of public transit, which gained widespread interest from policy-makers and academics after it was successfully implemented in Medellín, Colombia.

My research addresses two central questions: How do peripheral residents in Ciudad Bolívar perceive the impact of the TransMiCable aerial cable car route on their urban mobility? And, how can city government policies and investments in public transit, particularly aerial cable cars, address historic inequality and improve public transit accessibility? My case study of Paraíso and Mirador, the two *barrios* at the end of the TransMiCable route, included 13 interviews and 8 group observations, mainly conducted with adult residents of Ciudad Bolívar. Interview questions and observations were designed to elicit participants' subjective experiences with public transit, and their perceptions of the TransMiCable's impact.

This paper concludes that TransMiCable users' commutes to the urban core are faster, safer, and more comfortable than before. The TransMiCable inspires pride and hope for some residents of Ciudad Bolívar. But respondents also identified limitations which prevented them from enjoying better mobility despite the new TransMiCable route. TransMiCable users in my research explained that although they saved a significant amount of time using the aerial cable cars instead of a public bus, budget constraints still prevented them from participating in activities around their city. From a policy perspective, my findings are particularly relevant for Bogotá and other cities with similar geographic and spatial-economic contexts, namely urban centers experiencing high income inequality with poorer residents located on the mountainous periphery.

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Introduction

The cabins of the TransMiCable,¹ an aerial cable car route that opened in Bogotá, Colombia in December 2018, feature panoramic windows and bright red fixings. Two external solar panels adorn the roof of each cabin, and the cables overhead comfortably shuttle passengers high above Ciudad Bolívar, passing between four newly built stations (Appendix 1). Between Las Manitas Station and Juan Pablo II Station, painted houses form the hues of a rainbow, offering a pleasant vista commissioned by the former mayor of Bogotá for this very purpose (Appendix 2). After two years of construction and an investment of US\$100 million, the new route is expected to benefit the 750,000 inhabitants of Ciudad Bolívar, as well as other visitors and tourists (Emblin 2018).

However, beneath the modern technology and design of the aerial cable car route, a bleak economic reality exists. Ciudad Bolívar, a peripheral locality in southwestern Bogotá, is one of the poorest regions in the city (Bocarejo et al. 2016). Haphazard road networks, mountainous terrain, and a general lack of urban planning pose barriers to accessibility (Agudelo and Maldonado 2014; Bello, Pérez, and Guevara 2018; Ramírez 2018). Additionally, social exclusion and limited educational or occupational opportunities contribute to the cycle of poverty experienced by residents in Ciudad Bolívar (Agudelo and Maldonado 2014; Zambrano 2014).

A case study of the TransMiCable allows me to evaluate the impact of aerial cable cars on urban mobility and public transit accessibility. My research captures the adaptation process through peripheral residents' testimony about their use of the aerial cable cars and its effects on their mobility. My interviews and observations expand the current dialogue about public transit accessibility and incorporate voices from an under-studied locality of Bogotá. The concerns mentioned by respondents reveal the limitations of aerial cable cars with respect to public transit accessibility, validating some prior research but also challenging our assumptions.

Public transit is extremely important in cities like Bogotá, because it serves to connect distinctly different economic realities (Bocarejo and Hernandez 2012; Bocarejo et al. 2016; Hernandez and Titheridge 2016). In fact, Colombia is one of the most unequal countries in the world. In 2013, Colombia had a Gini coefficient² of 0.536, placing it in the company of other

¹ TransMiCable is pronounced *trans-mee-cah-bley* in Spanish.

² The Gini coefficient, a standard measure of wealth distribution, increases with greater income inequality.

countries in Latin America and southern Africa that experience the highest internal income inequality (Guzman and Bocarejo 2017, 4494; Kiersz 2014). In peripheral communities like those within Ciudad Bolívar, public transit is often the only mode of access (for some residents) to better occupational, educational, and social opportunities located in the urban core (Bocarejo et al. 2016; Guzman, Hernandez, and Rivera 2017; Ramírez 2018). Spatial analyses by other researchers highlight the uneven distribution of employment opportunities. Appendix 3, for example, shows population density (left) and job density (right) in Bogotá. Researchers Guzman and Bocarejo explain:

Bogotá has a large housing deficit, particularly in social housing, which has encouraged an urban development based in unplanned and informal settlements. As a consequence, many informal neighborhoods emerged on the city periphery with poor urban living conditions. It is in these zones that the highest [population] densities occur...In general, people do not live where jobs are located (Guzman and Bocarejo 2017, 4496) (Appendix 3).

These economic and spatial inequalities create the conditions for poor accessibility, especially when transit options within and between regions are inefficient or simply unavailable. Public transportation, in particular the mode of the aerial cable car, exemplifies how policy-driven infrastructure can reflect and transform the landscape of opportunity.

Although the aerial cable car is not a common form of public transit in the United States, it is a promising mode of transportation in regions like the mountainous Andes of South America, where geography limits the efficiency and feasibility of more traditional options like cars, buses, subways, and trains (Alshalalfah, Shalaby, and Dale 2014; Dávila 2011; Rubiano, Jia, and Darido 2017). The aerial cable car is a relatively new mode of public transit, which gained widespread interest from policy-makers and academics after it was successfully implemented in Medellín, Colombia. Most of the current literature about aerial cable cars in Colombia focuses on Medellín, but there are ongoing efforts to include the cities of Cali and Bogotá, which have recently implemented new routes (Bello, Pérez, and Guevara 2018; González 2011; Ramírez 2018). As aerial cable cars are built in new geographies, research like mine enables a better understanding of their general impacts as well as the influence of the specific urban context.

From June to September 2019, I lived in Bogotá, Colombia conducting ethnographic research and volunteering for a national nonprofit that serves communities like Ciudad Bolívar. I visited Mirador and Paraíso, two peripheral *barrios* at the end of the TransMiCable line, to interview local residents and make observations. My research focuses on two central questions:

- How do peripheral residents in Bogotá perceive the impact of the TransMiCable aerial cable car route on their urban mobility?
- How can city government policies and investments in public transit, particularly aerial cable cars, address historic inequality and improve public transit accessibility?

To answer these questions, my case study focuses on Mirador and Paraíso. I also include relevant commentary from residents of the urban core, to capture their perceptions of these *barrios* as well as their views on public transit in Bogotá.

This paper is broadly organized into five parts, all focused on public transit accessibility and mobility. First, Background will map out the segregated spatial and economic landscape of Bogotá. It will also provide the history of public transit in Colombia, focusing on the integrated bus rapid transit (BRT) system in Bogotá and the aerial cable cars of Medellín and recently, Bogotá. The Literature Review will discuss relevant prior research. Methodology will present my research methodology, while Analysis will feature results and key insights from my interviews and observations. Finally, Policy Recommendations will develop suggestions which could improve the implementation of current and future cable car routes designed for the purposes of urban mobility and accessibility. From a policy perspective, my research is particularly relevant for other cities with similar geographical and spatial-economic contexts, namely urban centers experiencing high income inequality with poorer residents located on the mountainous periphery.

Background

1. Spatial Inequality in Bogotá: Urban Core and the Periphery

The “urban core” and the “periphery” are commonly used terms to differentiate urban space based on geographical and spatial-economic characteristics (Guzman, Hernandez, and Rivera 2017; Hernandez and Dávila 2016; Hernandez and Titheridge 2016; Inostroza 2017; Milan and Creutzig 2017). In the context of Bogotá, the city government formally recognizes 19 localities which are subdivided into 38,875 city blocks (*El Tiempo* 2019b) (Appendix 4). Each block is assigned to a certain socioeconomic strata, or *estrato*, on a scale of 1 to 6 based on external characteristics of residential spaces including their construction materials, road infrastructure, quality of public space, and overall degree of development or deterioration (“¿Sabe usted cómo funciona la estratificación?” 2018). Although income is not explicitly considered, residential patterns show that the income and stratum levels are strongly correlated (*El Tiempo* 2019b; Guzman and Bocarejo 2017). Generally, the blocks in *estratos* 1 and 2 have the worst amenities and access, and are occupied primarily by poor residents who have no choice but to live in low rent areas. As shown in the map (Appendix 4), these low rent areas are concentrated on the southern and eastern edges of Bogotá. For the purposes of this paper, these zones are collectively referred to as the “periphery.” In contrast, the blocks in *estratos* 4 to 6 contain amenities including the majority of employment and higher educational opportunities, and are better connected through major road networks and public transportation (Guzman and Bocarejo 2017). These northern and central zones are called the “urban core.”

In the context of Bogotá, the dichotomy of the urban core and the periphery entails a complex set of interactions based on geography and topology; population density; transportation flows; socioeconomic relations; and more. This case study focuses on Paraíso and Mirador, two peripheral communities situated in the mountains overlooking central Bogotá. High rates of poverty and crime, already barriers in themselves, also give these *barrios* a poor reputation in other parts of the city that can manifest as a stigma against their residents. The uneven distribution of opportunities throughout the city exacerbates these disadvantages, because many residents have to commute long distances to work (Guzman, Hernandez, and Rivera 2017). Steep terrain, winding roads, and physical distance from the urban core renders traditional modes of

transport inefficient or inaccessible (Church, Frost, and Sullivan 2000; Guzman, Hernandez, and Rivera 2017) (Appendix 5).

Unfortunately, this situation is far from unique. According to 2011 data from the city government, 66% of households in Bogotá live in *estratos* 1 and 2, sometimes in dense informal settlements that cover the mountainsides to the south and east. 82% of the households in the city earn less than US\$1,050 per month (Guzman and Bocarejo 2017, 4495). Population growth, internal migration, and immigration from countries like Venezuela have made the sprawling metropolis even larger and more dense (Baddour 2019a; Bello, Pérez, and Guevara 2018). Researchers conclude, “The new residents are mostly poor, and due to the location of their housing, they have long commutes, due to the lack of economic activities available in their area” (Guzman and Bocarejo 2017, 4498).

However, the case study in Ciudad Bolívar is distinctive in one important way. The recent introduction of the aerial cable car, TransMiCable, transforms the daily commutes of some residents who use public transportation. The TransMiCable route includes four stations and shuttles passengers from peripheral communities to the nearest feeder station of the TransMilenio bus system that serves central Bogotá. From the most peripheral station on the border of Paraíso and Mirador, the TransMiCable reduces the time to access the TransMilenio bus system from a 1 hour commute, down to a mere 13.5 minutes³ (“Abecé de TransMiCable” 2018). This paper will investigate the impact of the TransMiCable on the urban mobility of impoverished residents, focusing on how and to what extent they access social and economic opportunities in their city before and after implementation of the new route.

2. History of Public Transit in Bogotá

Colombia’s public transit history provides important context to understand the implementation of the TransMiCable. In the past two decades, Colombia has received global recognition for innovative transport policies, namely the TransMilenio bus rapid transit (BRT) system in Bogotá and the integrated MetroCable system in Medellín. Both were championed by

³ The aerial cable cars operate at different speeds throughout the day. During the *horas del pico*—rush hour—when demand is high, the cable moves at a maximum velocity of 5.5 meters per second, and it takes 13.5 minutes for the cars to go from one end of the route to the other. During the *horas del valle*—non rush hours—the cable slows to 3.5 meters per second, and it takes 21.5 minutes instead (Socha 2019).

strong mayors through city, rather than national, governance. This section discusses three chronological developments in Bogotá: the introduction of BRT in the urban core, its subsequent integration with auxiliary routes, and finally the construction of the TransMiCable.

2.1 TransMilenio, Bus Rapid Transit (2000)

The TransMilenio BRT system improved public transit in central Bogotá through effective public-private partnership. It centralized a haphazard network of private operators, forcing them to replace aging capital with high-capacity articulated buses in exchange for contracted rights to operating zones and exclusive lanes along major thoroughfares. A new public authority, the TransMilenio S.A., was created to designate routes, coordinate services, and manage contracts with private operators (Kraas 2013, 183; Sandoval and Hidalgo 2004, 37).

The key elements of BRT, including exclusive lanes dedicated to buses and features designed to speed up boarding, exiting, and purchasing fares, were developed half a century ago in Curitiba, Brazil (Gilbert 2008; Kraas 2013). However, Bogotá was the first to adapt the model to the needs of a megacity. Since it began operating in December 2000, “The overwhelming success of TransMilenio has led to a ‘renaissance’ of Bus Rapid Transit, revolutionising the way many metropolises, especially in developing countries and transformation countries, organise their public transportation systems” (Kraas 2013, 179). BRT also offered a much cheaper alternative to the subway or above-ground electric rail, a model developed in first-world megacities for high capacity rapid transit (Gilbert 2008).

The TransMilenio was widely regarded as a success, because it improved conditions for multiple stakeholders by optimizing routes, reducing traffic accidents and congestion, and formalizing the central transit system. Before, when the transit industry was fragmented and informal, busy main roads were plagued by overcompetition (Gilbert 2008). Bus drivers battled daily for each passenger, a phenomenon known as *la guerra del centavo*, or the Penny War. Overcompetition promoted a culture of dangerous driving and long working hours, resulting in traffic jams, accidents, and air pollution (Gilbert 2008; Kraas 2013). “Only four years after the implementation of TransMilenio, the average travel times in the city decreased by 32%, accidents in the corridors where the system operates were reduced by 90%, and air pollution due

to emissions of particulate matter decreased by 9%” (Guzman, Hernandez, and Rivera 2017, 237).

Moreover, the city government’s achievements were cost effective, and gained international recognition. A study commissioned by the U.S. Department of Transportation concluded, “The capital cost effectiveness of TransMilenio [was] likely to be superior to most transit investments of any mode in the U.S.” (Cain et al. 2006, xiii). Although the TransMilenio received large capital subsidies of around US\$450 million⁴ for the initial construction of roads, bus stations, and pedestrian bridges, it was designed to run without an operating subsidy. Therefore, both private contractors and the TransMilenio S.A. are expected to cover operating costs using their share of the revenues from passenger fares (Gilbert 2008; Sandoval and Hidalgo 2004).⁵ The same expectation holds with respect to the TransMiCable, where city authorities hope that system-wide fares will cover the operating costs of the new cable car route.

The implementation of the TransMilenio, however, still left many peripheral residents without adequate transportation (Kraas 2013). First, the TransMilenio covered main corridors in the urban core, prioritizing employment centers with existing road infrastructure (Gilbert 2008). Peripheral communities lack both. In their paper about transport, urban development, and the peripheral poor in Colombia, Hernandez and Dávila state:

[The TransMilenio] improved accessibility in wealthier areas but restricted connectivity in neighbourhoods farther away, which house mostly low-income populations. As a consequence, the latter became captive of lower quality traditional and often informal modes of transport either for the last leg of their commutes or the entire trip (Hernandez and Dávila 2016, 182).

Second, the absence of fare subsidies for low-income users prevented them from using the new mode of public transportation for non-essential travel. In his study of Santiago, Chile in 2008, Ureta describes the catch-22 residents of the poor periphery face: On the one hand, long distances and rough terrain limits their ability to travel by foot. On the other hand, the high cost

⁴ TransMilenio cost US\$240 million in Phase 1 and \$207 million in Phase 2. During Phase 2, an additional \$338 million was spent on corridor and public space improvements e.g. green space and bike lanes (Cain et al. 2006, 21).

⁵ However, from 2012 to 2015, ticket revenues fell behind costs, forcing the city government to subsidize the transit network a total of 1.9 billion COP (US\$554,000) (Buckley 2016). Since then, fares have increased dramatically to balance the TransMilenio S.A.’s operating budget, including in March 2020. The cost to board the TransMilenio was 2400 COP (US\$0.70) when this research was conducted, but in March 2020 it increased again to 2500 COP (US\$0.73) (Martínez 2020).

of public transportation relative to household income limits them to strictly essential travel for work and education (Ureta 2008). There is a good reason to believe that a similar dynamic is at play in Bogotá. In the poorest segments, average mobility is less than 1.5 trips per day even though residents spend over 20% of household income on transportation (Bocarejo and Hernandez 2012, 142). Lack of access and affordability exacerbates inequalities within peripheral communities, too. Able-bodied, working members of poor households are given priority to use the limited travel budget, while the activities of homemakers, children, and the elderly are confined to a walking range (Brand and Dávila 2011).

2.2 Integrated Public Transit System of Bogotá (2012)

While the TransMilenio focused on the urban core, the city government's next intervention expanded its sphere of influence through the formalization and integration of auxiliary routes that extend to the periphery. The *Sistema Integrado de Transporte Público* (SITP), or integrated public transportation system, was first conceived as part of the city government's 2006 Master Plan for Mobility ("Plan Maestro de Movilidad" 2006). Prior to the TransMilenio and the SITP, privately owned *busetas* were the only form of public transportation in the capital city (Kash and Hidalgo 2014). The TransMilenio replaced *busetas* along major corridors, but auxiliary routes were still operated by decentralized private bus companies.

Auxiliary routes were inefficient and dangerous. Due to overcompetition, private buses were underutilized, transporting only 1.6 passengers per kilometer—compared to 5.6 passengers per kilometer on the TransMilenio (Greiff, Luengas, and Gúzman 2017, 79; Sandoval and Hidalgo 2004, 45). In 2011, 68 people died in *buse* collisions, representing 12.5% of total traffic deaths, even though buses were only 1% of the total registered vehicles in Bogotá (Kash and Hidalgo 2014, 110).

SITP planners copied the approach of the TransMilenio, proposing a public-private partnership with existing bus companies. Of the 66 former providers, 52 received contracts to operate the new SITP routes and buses, many of which connect to TransMilenio feeder stations serving the urban core (Kash and Hidalgo 2014, 111). Unlike the TransMilenio, SITP buses drive in mixed traffic without special lanes. SITP was originally projected to begin operating in December 2011, but it was delayed by project setbacks and administrative changes. The gradual

rollout began in September 2012 with SITP routes and buses slowly replacing decentralized operators, and concluded in April 2014 (Carvajal 2013; Kash and Hidalgo 2014).

In spite of early setbacks, integration improved the overall transit system. The SITP brought many benefits to auxiliary routes, similar to the ones the TransMilenio had achieved in the urban core. Bus drivers enjoyed the benefits of formal sector employment;⁶ the aging *buse*ta fleet was replaced with SITP buses with automated fare collection; and traffic accidents were greatly reduced (Buckley 2013; Kash and Hidalgo 2014).

However, the SITP had variable effects on public transit accessibility. Many users were initially unaware of the change, causing a great deal of confusion. In 2011, Kash and Hidalgo conducted a community survey to identify users' awareness and expectations of the SITP. Only 37.6% of those surveyed even recognized the name or acronym. And it gets worse. Just 12% of respondents knew that the new auxiliary routes would be integrated with the TransMilenio; 9% that there would be a fare card instead of cash payment; and 4% that there would be official bus stops. Levels of awareness were significantly different across gender and socioeconomic status. For example, residents of mid-level *estrato* 3 were nearly six times more likely to be aware of SITP than people of the lowest *estrato* 1. The differences were even more pronounced for respondents of higher stratum (Kash and Hidalgo 2014, 119).

The old *busetas* did not use designated bus stops and took payment in cash, so even the simple acts of paying for fares and figuring out where to board the SITP buses were new to users. During the rollout, *Tu llave* smart fare cards were introduced. *Tu llave* cards were required to board SITP buses, but in 2013 could only be purchased at three terminals in the city. Once users purchased the *Tu llave* cards, there were over 4,500 locations where they could be loaded, but finding a refill location was difficult at times. For some commutes, the only option was to load the card in advance to pay for the round trip (Buckley 2016; Kash and Hidalgo 2014). In summary, information asymmetries about the SITP's fare cards, routes, and boarding locations—even its mere existence and acronym—detrimentally affected some users' access to public transit during the initial rollout.

⁶ Including better pay and hours, less competition, and safer driving.

Transit integration reduced travel times, but increased travel costs due to a higher baseline fare and the elimination of fare negotiation (Bocarejo et al. 2016; Kash and Hidalgo 2014). Fare collection for the TransMilenio and SITP was not fully integrated until 2015, because the two systems originally used different cards and payment terminals. When a single fare card valid on both systems was finally implemented, a discount for transfers was also introduced. The fare scheme was intended to decrease costs for users who paid for transfers (Buckley 2013; Kash and Hidalgo 2014). Many peripheral residents had to transfer to reach the urban core, but modeling by Bocarejo et al. based on the new fare scheme indicated that the higher baseline fare still increased net costs to peripheral users, although the fare increase was greater in the city center (Bocarejo et al. 2016, 317).

Furthermore, researchers documented a widespread practice of fare negotiation with *busetas* which was eliminated by smart fare cards, and constituted a “hidden” fare increase of up to 40% for users who engaged in fare negotiation (Gilbert 2008; Kash and Hidalgo 2014). A 2011 community survey revealed:

A substantial portion of respondents reported receiving a discounted fare, generally 1,000 COP (0.55 USD) rather than the official fare of 1,400 COP (0.77 USD). 8.7% of respondents reported always receiving a discounted fare and 32.1% reported sometimes receiving a discount...Interviews with bus drivers and operators confirmed the prevalence of this phenomenon, and also the widespread practice of allowing children and students board the bus for free, despite regulations to the contrary (Kash and Hidalgo 2014, 117).

The TransMilenio and SITP improved the quality of public transit in Bogotá, extending the formal network into more peripheral communities. But it had the unintended effect of raising fares for some low-income users, and more importantly, relied on a road network that was often inefficient or nonexistent in the mountainous periphery.

In conclusion, the current provision of public transportation in most peripheral *barrios* is insufficient. Lack of mobility and access has compounding effects with poverty and social exclusion: “Limited mobility constrains participation in urban life in general, and opportunities to expand work horizons, social and leisure activities, political and civic engagement. Lack of mobility turns geographical marginalization into deeper social exclusion” (Brand and Dávila 2011).

2.3 TransMiCable, Aerial Cable Car (2018)

Bogotá initially focused its investment on an integrated bus rapid transit system. But the TransMilenio primarily serves the urban core, leaving peripheral residents dependent on SITP buses, walking, or informal transit for the last leg of their journey home. Their daily commutes often entail a crowded bus ride up steep, winding mountain roads. The most vulnerable population spends more time in transit compared to other city dwellers (Bocarejo and Hernandez 2012). Adults in the lowest income groups spend an average of 67 minutes per one-way trip to their place of work or study, 22% more than middle-income residents (55 minutes) and 40% longer than high-income residents of Bogotá (48 minutes) (Guzman, Hernandez, and Rivera 2017, 239).

The TransMiCable, in part, was designed to address some of these concerns. It introduced a new mode of public transit to the city, inspired by the innovation in Medellín. Three spatial models of the Bogotá metropolitan region by Guzman et al. depict the potential accessibility of different localities based on the average number of cars owned per capita and the number of walking-distance bus routes, using 2011 city government data (Guzman, Hernandez, and Rivera 2017) (Appendix 5). Appendix 6 includes a map of the new TransMiCable route (Appendix 6). These maps demonstrate that the new aerial cable car route was built in a region with historically low transit accessibility, in an attempt to reduce inequality by giving peripheral residents safer, faster access to the urban core.

Through interviews and observations, I studied the implementation of the new 3.34 kilometer aerial cable car route that connects four stations within Ciudad Bolívar to the nearest feeder station of the TransMilenio. It consists of 163 cabins, each with a maximum capacity of 10 passengers. It operates constantly from 4:30am to 10:00pm Monday through Saturday, and 5:30am to 9:00pm on Sunday and holidays, eliminating wait times to board except when there is a long queue. Each cabin is handicap accessible and equipped with free Wi-Fi and closed-circuit video and an intercom that links directly with the control center, features designed to guarantee safety and comfort. Unlike previous transit policies, the TransMiCable offers an additional service, rather than replacing a legacy system. The existing SITP bus routes continue to operate in Ciudad Bolívar (“Balance de operación” 2019).

Learning from its past mistakes, the city widely publicized the TransMiCable and integrated the same *Tu llave* fare cards that were already used for the TransMilenio and SITP (Appendix 7). Besides, two years of construction overhead was impossible for the residents of Ciudad Bolívar to miss. There is no transfer fee from the TransMilenio to the TransMiCable (or vice versa), which has the potential to reduce costs for users who previously transferred to and from auxiliary routes operated by informal transport providers. However, as my research will discuss, the adaptation process reveals new uncertainties and limitations that are unique to the aerial cable car.

3. Metro and MetroCable of Medellín

Medellín is considered to be the first city in the world to implement the aerial cable car as a large scale method of public transportation, interconnected with its Metro elevated train system. The basic technology for the aerial cable car has existed for several decades as a low-capacity mode of transit at ski slopes and tourist attractions. Medellín reimaged its purpose with the audacious decision to build cable car routes that connect residents of urban informal settlements in the mountainous periphery with economic and social opportunities in the valley below (Alshalalfah, Shalaby, and Dale 2014; Rubiano, Jia, and Darido 2017). The first line of the MetroCable was implemented over a decade ago, in 2004. Since then, a total of five routes have opened covering 11.9 kilometers, with a sixth⁷ currently under construction but behind schedule (*El Tiempo* 2019a; *El Tiempo* 2020; “Medellin MetroCable” 2018) (Appendix 8). Thus, the aerial cable car became not just a tourist spectacle for the few, but also a mode of public transit that could serve many.

The MetroCable increased peripheral residents’ transit access to the urban core. User benefits include time and financial savings; increased community pride and sense of belonging; and improved quality of life. The literature assesses improved quality of life using a variety of indicators, including access to employment, environmental quality, crime reduction and safety, and trust in public institutions (Bocarejo et al. 2014; Cerdá et al. 2012; Heinrichs and Bernet 2014; Milan and Creutzig 2017). However, transit inequalities in Medellín still exist despite the

⁷ The sixth route, Line P, is the second longest at 2.8 kilometers (“Medellin Breaks Ground” 2018).

build out of the integrated Metro and MetroCable network. For example, peripheral residents still have much longer commutes to work, on average (Bliss 2016; Lotero et al. 2016).

The impacts of the MetroCable and other associated policies will be discussed further in the Literature Review. For now, this context merely demonstrates the influence of Medellín as the source of inspiration for the recent construction of the TransMiCable—and, the source of high expectations for its impact on the peripheral *barrios* it serves in Ciudad Bolívar, Bogotá. These high expectations, in light of important similarities between the two cities' geographic, socioeconomic, and transit policy contexts, necessitate more research into the impacts of the TransMiCable. My case study of Mirador and Paraíso, two *barrios* at the end of the new route, attempts to do just that.

Literature Review

4. Defining Mobility, Accessibility, and Transit Equity

The concepts of mobility, accessibility, and transit equity are central to transportation research, policy, and development. Academics and policy-makers generally agree on their definitions, although the methods used to measure mobility, accessibility, and transit equity differ. This section will define these concepts and discuss major research methods and considerations.

Within the past two decades, the field has shifted away from using mobility and toward using accessibility as the primary performance indicator to evaluate public transit networks (Martens 2015). **Mobility** is defined as the actual movement of people and goods, while **accessibility** is the ease of reaching desired destinations given the available transit options and intrinsic limitations to the resources (usually time and money) used to travel from the origin to the destination (Bocarejo and Hernandez 2012; Guzman, Hernandez, and Rivera 2017; Martens 2015). Accordingly, there has been a recent increase in the academic literature focused on transit accessibility in the context of Colombia (Guzman, Hernandez, and Rivera 2017, 236). The reason for this shift is clear. Accessibility accounts for the users' travel time and cost relative to their ability/willingness to spend, in addition to how they are (or are not) able to reach their desired destinations using currently available routes. Therefore, accessibility can be more relevant to policy-makers than actual movement, i.e. mobility, because it considers the opportunities and limitations of the public transit network relative to users' needs and wants.

The correlation between mobility and accessibility cannot be taken for granted. Although high mobility can imply good accessibility, this assumption is not necessarily true. In Bogotá, for example, the working population of the periphery travels longer distances to work than the residents of the urban core. Depending on the population and metric used to study mobility, the peripheral residents might have higher mobility, but lower accessibility than their working counterparts in the urban core (Guzman and Bocarejo 2017). "It has also been argued that areas with poor potential mobility, such as congested urban centers, do not necessarily provide poor levels of accessibility, precisely because of the high density of various types of land uses in a small area," adds Martens. If urban dwellers work, study, and play close to home, they may be

less reliant on city-wide transportation and experience high accessibility even if their mobility is low (Martens 2015, 1).

In quantitative studies of accessibility, researchers typically set users' residence and employment location as the origin and destination. The constraint is usually modeled in units of distance, time, or money that the user is able/willing to travel or spend. For instance, Bocarejo and Hernandez explain, "Labour market was selected as the core of the accessibility methodology" in their study of Bogotá, "mainly due to data availability and relevance in travel needs in cities of developing contexts (more than 70% of all travel [is for work] in the case of Bogotá)" (Bocarejo and Hernandez 2012, 144).

Geurs and Van Wee offer a concise but comprehensive framework for evaluating accessibility using four components: land use, transportation, time, and individual constraints. Their often-cited framework is summarized as follows:

1. **Land use** includes the "amount, quality, and spatial distribution" of destinations such as employment and educational opportunities, stores and medical facilities, as well as recreational and cultural amenities in relation to the demand for these at origin locations.
2. **Transportation** considers the available transit modes and routes, including "the amount of time (travel, waiting, parking), costs (fixed and variable), and effort (reliability, level of comfort, accident risk)" required to use them.
3. **Time** describes the users' time constraints, including their ability to travel or access opportunities at different times of the day, and their time available for specific activities like work, school, or recreation.
4. **Individual** reflects "the needs (depending on age, income, educational level, household situation, etc.), abilities (depending on people's physical condition, availability of travel modes, etc.) and opportunities (depending on people's income, travel budget, educational level, etc.) of individuals" (Geurs and Van Wee 2004, 128).

Land use and transportation are attributes of the built landscape and can be directly influenced by public policy, while time and individual components depend on the users' needs, wants, and constraints. Geurs and Van Wee's framework is very similar to the definition of accessibility discussed earlier, with an important addition being the category of "individual"

which broadly encompasses not just the users' financial constraints, but also their "needs", "abilities", and "opportunities" as determined by individual characteristics and social factors.

There are two key insights from Geurs and Van Wee's framework: First, because accessibility considers both *desired* destinations and the *available* transit options, effective policy interventions need to consider land use in addition to transportation. Martens explains, "Low accessibility levels in an area may be the result of a poorly performing transport system, and they may also be the result of a low density of desirable destinations in the surroundings" (Martens 2015, 1). Second, transportation network expansion will not necessarily improve accessibility, unless the features of the system including fares, routes, and hours of operation are compatible with user needs. For example, "In recent years, many developing cities have implemented a number of public transport projects such as bus-rapid-transit (BRT) lines, cable cars, and rail-based transit systems in order to reduce access gaps between low-income population groups and the rest of the city" (Bocarejo et al. 2014, 49). However, one problem in Bogotá is that some peripheral residents do not consider the new and available public transit routes to be affordable to them (Hernandez and Titheridge 2016, 160). This leads to the concept of transit equity.

Transit equity has two dimensions that sometimes lead to conflicting priorities: horizontal and vertical equity. **Horizontal equity** requires the equal provision of transit access to everyone, where resources (such as transit routes, stops and stations, fare subsidies, etc.) are allocated evenly to groups or individuals irrespective of socioeconomic status (Guzman, Hernandez, and Rivera 2017, 237; Milan and Creutzig 2017, 123). Delbosc and Currie argue that horizontal equity shaped the logic of 'mass transit,' which is aimed at maximizing the number of users served based on demand and efficiency (Delbosc and Currie 2011). **Vertical equity** attempts to mitigate existing inequalities by providing enhanced access to disadvantaged groups or individuals. To achieve vertical equity, disadvantaged groups must be identified (e.g. on the basis of income or residence) in order to shape transit policies in their favor (Guzman, Hernandez, and Rivera 2017, 237; Milan and Creutzig 2017, 123). The TransMiCable is an example of a policy designed to foster vertical equity, while previous developments with the TransMilenio and integrated bus system (SITP) were more in the vein of horizontal equity.

5. (Im)mobility of the Periphery: Commute Patterns in Bogotá

Most of the urban periphery of Bogotá suffers from poor transit accessibility due to the city government's historic focus on public transportation in the urban core, coupled with geographic and socioeconomic spatial inequalities. Inadequate transit provision “can contribute to the production and reproduction of social inequalities and levels of exclusion in cities” (Guzman, Hernandez, and Rivera 2017, 236).

This section highlights key findings from the literature about commute patterns in Bogotá, looking first at public transportation and second at private automobiles. Low-income households are much more dependent on public transportation: “The lower income groups are about 4.5 times as likely as the high income group to make a trip by public transportation” (Guzman and Bocarejo 2017, 4504). In addition, the poor travel farther, spend more time in transit, and spend a higher percentage of their income on public transportation compared to wealthier residents...in spite of making fewer trips overall (Bocarejo et al. 2016) (Appendix 9).

The poor travel longer distances to reach essential activities like work and school. As discussed in the Background section, this is due to the spatial mismatch between population density and employment density (Appendix 3). Indeed, the spatial distributions are nearly opposite between the two indicators (Bocarejo and Hernandez 2012). According to Guzman et al., “Bogotá, like other major metropolises in Colombia and Latin America, tends to maintain a centralized distribution of economic opportunities, which increases the land and housing prices in these high-activity areas and pushes the poor toward more affordable, housing, often informal, at the urban peripheries or suburban areas” (Guzman, Hernandez, and Rivera 2017, 244). These occupational and higher-educational opportunities are especially concentrated along major transport corridors in the urban core. In fact, 44% of all formal sector jobs in Bogotá are located in the north-central region, although it encapsulates just 12% of the total city area (Guzman, Hernandez, and Rivera 2017, 238).

The poor spend more time traveling. Their commutes are slowed down by transfers, poor road infrastructure, and steep or winding terrain. For example, trips made on the TransMilenio are 33% longer for the poorest residents versus other income groups (Guzman, Hernandez, and Rivera 2017). In 1974, Zahavi hypothesized that “the average individual travel

time budget is around an hour a day” in a report for the U.S. Department of Transportation. But modern research shows that transportation innovation has not kept up with the growth of megacities, resulting in longer rather than shorter travel times. In Bogotá, the most vulnerable population spends more than an hour, on average, per one-way trip. Assuming they return home at the end of the workday, this amounts to over two hours in transit per day, more than twice Zahavi’s prediction (Guzman and Bocarejo 2017; Zahavi 1974).

The poor spend a higher percentage of their income on transportation, even though wealthier Bogotanos/as make more frequent trips and use more expensive transportation modes (e.g. taxi or private car). Here too, international standards of cost budgeting did not hold up in recent studies. Zahavi found that travel expenditure remained fairly constant across income levels, about 7 to 9% of the household income (Zahavi 1974). But according to Bocarejo and Hernandez, the most vulnerable populations in Bogotá spend upwards of 20% of their income on transportation (Bocarejo and Hernandez 2012, 146). Due to the uneven distribution of employment, they have no choice. Transportation is a necessary expenditure.

Finally, private transportation also contributes to unequal commute patterns in Bogotá. Only half of trips in the city are motorized, and of these a majority (70%) are on public transportation based on 2019 data (“Encuesta de Movilidad” 2019). However, private transportation is gaining popularity and as of 2019, the city’s car fleet had grown 24% over five years prior (Restrepo 2019). Unsurprisingly, car ownership is strongly correlated with income level. In the low-income zones (*estratos* 1 and 2), there is one car for every five households, increasing to one car for every two households in the middle stratum and 1.3 cars per household in high-income stratum (Guzman and Bocarejo 2017, 4504) (Appendix 6). Transit inequities persist across different income groups even among car users with access to a private vehicle. Due to the limited road infrastructure and mountainous topography of the periphery, a low-income car user spends 46% more time driving than a car user in a high-income zone (Guzman, Hernandez, and Rivera 2017, 239).

6. Studies of the MetroCable

The city of Medellín, Colombia was the first to implement the aerial cable car as part of its integrated public transit network, beginning in 2004. The first MetroCable route, Line K, cost US\$26 million to build and spanned 2.8 kilometers, connecting four stations (Alshalalfah, Shalaby, and Dale 2014, 7). Since then, a total of five MetroCable routes have opened covering 11.9 kilometers, with a sixth currently under construction (*El Tiempo* 2019a; *El Tiempo* 2020; “Medellin Breaks Ground” 2018) (Appendix 8). The MetroCable was swept into the international spotlight, and as a result there is a trove of academic literature about its impacts.

Previous studies illustrate **similarities between the geographic and socioeconomic contexts** of the TransMiCable in Bogotá, and the MetroCable Line K in Medellín. Line K was built in the densest sectors of Medellín. The impoverished northeastern sectors, called Comuna 1 and Comuna 2, averaged over 400 dwellings per hectare. Many of the dwellings were informal and self-constructed, and poor road infrastructure and mountainous terrain limited accessibility even though private buses did serve the area (Dávila 2011, 3). A case study of Santo Domingo, the *barrio* at the end of Line K, found that “few people had private transportation and the only form of public transit was a private bus company that infrequently served the area. At the time, a resident of Santo Domingo could expect to spend 2 to 2.5 hours commuting to work in the Medellín core each way” (Alshalalfah, Shalaby, and Dale 2014, 7). Similarly, some residents of Paraíso and Mirador—the *barrios* at the end of the TransMiCable route, where my case study is located—had to travel about 2 hours each direction for work. Before the TransMiCable, it took around 1 hour to reach the nearest TransMilenio bus rapid transit station that serves the urban core (“Abecé de TransMiCable” 2018). From there, a trip to the densest employment centers in eastern Bogotá (Appendix 3) could take 1 hour or more depending on bus transfers.

There are also important **similarities between the policy contexts** of the TransMiCable and MetroCable, although the interventions in Bogotá were carried out at a much smaller scale. The MetroCable was implemented as part of a comprehensive set of policies known as *Proyectos Urbanos Integrales* (PUIs), or integrated urban projects (Brand and Dávila 2011, 11). TransMiCable policy-makers copied the PUI approach, even using the same term in press releases for the TransMiCable (“Cable aéreo de Ciudad Bolívar” 2014).

The Medellín PUIs exemplified transit-oriented development, a policy approach that “concentrates urban development around stations in order to support [public] transit use, and develops transit systems to connect existing and planned concentrations of development” (Renne 2016). Transit-oriented development incorporates a key insight of Geurs and Van Wee’s accessibility framework: Effective policy interventions need to consider land use in addition to transportation (Geurs and Van Wee 2004). For example, the MetroCable Line K did not merely connect Comunas 1 and 2 to the urban core. Instead, complementary policies upgraded land use in the peripheral communities along its route, transforming them into more dignified living spaces for residents as well as a destination for visitors from Medellín and beyond. The PUIs consisted of four main categories: mobility, housing, environment, and public space policies.

6.1 Mobility Policies

Aerial cable cars were the cornerstone of Medellín’s mobility policies. The MetroCable was accompanied by complementary investments in road and walking infrastructure,⁸ particularly those designed to connect residential and commercial areas to the cable car stations (Bocarejo, Velásquez, and Galarza 2014, 136). Mobility policies promoted public transit and discouraged private modes; for example, parking lots and direct automobile access to buildings were restricted within a 20 meter buffer from Line K (Bocarejo et al. 2014, 51).

6.2 Housing Policies

Between 2004 and 2007, PUIs were implemented in Comunas 1 and 2, where the MetroCable Line K was built. Housing policies legalized informal settlements by giving poor residents the titles to the land they had built upon. Social housing projects were also constructed in an effort to provide adequate and safe housing especially in geotechnical risk areas where self-constructed dwellings rested on steep, precarious mountain sides (Bocarejo et al. 2014, 51).

6.3 Environment Policies

Policies were designed to clean up polluted areas, increase green space, and work with local communities to establish “new codes of social coexistence, respect, and use of common and

⁸ Walking infrastructure including pathways, stairs, and pedestrian bridges were added in Comuna 1 and 2, and later in other sectors where MetroCable routes were introduced (A. Bliss, Clarke, and Myers 2013).

public space” (“State of Latin American and Caribbean Cities” 2012, 73). Prior to 2004, most homes did not have formal plumbing, so sewage flowed into three streams running through Comuna 1 and 2. Urban planners and waste management teams cleaned up the Juan Bobo, La Herrera, and Santa Ana streams (*Mejoramientos Integral de Barrios* 2012; Gaviria 2015). Additionally, the city and national government funded projects to deliver water, sewage, and garbage collection to residents. Public parks and pathways added green space. These efforts “were underscored by respect for the environment and avoidance of new [land uses] deemed at risk environmentally” (“State of Latin American and Caribbean Cities” 2012, 73).

6.4 Public Space Policies

Public spaces were built near the MetroCable Line K stations, including libraries, community kitchens, parks, and sports fields (Bliss, Clarke, and Myers 2013; Doyle 2016). One example is Biblioteca de España, a massive 59,200 square foot library and auditorium built in Santo Domingo. It cost US\$4 million to build (Mazzanti 2008). Public spaces like these fundamentally changed the landscape of opportunity, by creating high-quality spaces for cultural and social connection, education, and recreation outside of the urban core.

In conclusion, the MetroCable was implemented alongside mobility, housing, environment, and public space policies. As future sections will describe, policy-makers in Bogotá adopted similar, but much smaller scale, policies to complement the TransMiCable. This begs the question: How did the TransMiCable and other transit-oriented development policies in Ciudad Bolívar, Bogotá compare to the far reaching effects of the MetroCable in Medellín? My research begins to answer this question, but to make this comparison, one must first understand the impacts of the MetroCable.

6.5 Benefits and Limitations of the MetroCable

The MetroCable’s benefits include time and financial savings, increased community pride and sense of belonging, and improved quality of life (Bocarejo, Velásquez, and Galarza 2014; Cerdá et al. 2012; Dávila 2011; Heinrichs and Bernet 2014; Milan and Creutzig 2017). However, the MetroCable also has significant limitations. Cable cars have a limited carrying capacity, and the MetroCable is used by a minority of residents within the *barrios* where stations

are located. Most importantly, transit inequalities persist despite large investments in Medellín's integrated public transit system (Dávila 2011; Lotero et al. 2016).

6.5.1 Time and Financial Savings

As expected, the MetroCable reduced users' commute times. According to Dávila, "In optimum conditions, Line K, for example, allows a cable car/Metro journey 10 kilometers from and 350 metres above the city center to be undertaken in 20 minutes" (Dávila 2011, 12). However, his research team also found that this statement requires careful qualification. First, some users walk significant distances to reach the nearest station, and once they arrive, there may be a queue to board the MetroCable. Researchers found that in 2011, queue wait times at Line K stations were zero at off-peak times, but over an hour in peak periods. Second, these optimum conditions do not describe commutes to more distant non-city center destinations which entail additional transfers, walking, or biking (Dávila 2011, 12; Heinrichs and Bernet 2014). Despite these caveats, researchers and passengers agree that shorter user journey times are a major benefit of the MetroCable.

The majority of MetroCable users either pay the same cost per trip as they would without the aerial cable cars, or they save money due to reduced transfer fees. The integrated public transit system of Medellín employs a combined tariff, single ticket that lets users transfer between the MetroCable (cable car), the Metro (elevated train), and city buses at no cost. The combined tariff, single ticket makes the MetroCable economically attractive to long-distance commuters. When Line K was implemented, users who previously incurred a transfer fee for taking two buses saved 33% by switching to MetroCable with no transfer fees (Dávila 2011, 12).

6.5.2 Community Pride and Sense of Belonging

According to the city government of Medellín, high quality architecture and infrastructure such as the aerial cable cars inspires "community pride, self-esteem, and a sense of belonging" ("Medellín: transformación de una ciudad" 2008). Researchers tested the city government's assertions. Community surveys and ethnographic interviews revealed that the MetroCable and other transit-oriented development projects had symbolic value; the projects increased community pride and peripheral residents' sense of inclusion in their city (Dávila

2011; Heinrichs and Bernet 2014). Peripheral residents thought the projects reduced the social stigma associated with their *barrios*, and felt that the city government's investments were finally addressing their needs (Cerdá et al. 2012; Heinrichs and Bernet 2014).

However, the Dávila study also casts doubt about whether users will perceive the transit-oriented development projects in such a positive light in the long-term, if their symbolic value is not accompanied by more tangible changes in their quality of lives. Dávila concludes, "The spectacular nature of the aesthetics of the cable-car systems loses its appeal against a backdrop of unmitigated poverty" (Dávila 2011, 16).

6.5.3 Improved Quality of Life

Research on the impacts of the PUIs indicate modest improvements in peripheral residents' quality of lives. The literature assesses improved quality of life using a variety of indicators, including access to employment, education enrollment, environmental quality, housing affordability, access to basic utilities, crime reduction and safety, trust in public institutions, and participation in community organizations (Bocarejo et al. 2014; Cerdá et al. 2012; Heinrichs and Bernet 2014; Milan and Creutzig 2017). For example, Bocarejo et al. studied changes in employment accessibility and housing-related costs (e.g. rent and utilities) before and after the implementation of Line K. According to their projections, residents nearly doubled the number of employment opportunities they could reach within a fixed time and cost budget. Moreover, the researchers predicted that housing-related costs would increase, because infrastructure improvements often raise rents. But the data did not support their hypothesis; instead, complementary policies added or improved housing, and the city government fixed public utility rates during the same period which controlled costs (Bocarejo et al. 2014). In another example, Cerda et al. showed that high-quality physical structures reduced violence in Comunas 1 and 2 for their study period from 2003 to 2008. Homicide rates decreased 66% more, and resident reports of violence decreased 75% more, in transit-oriented development areas compared to control areas (Cerdá et al. 2012). Community improvements and the presence of security personnel at the MetroCable stations was also linked to a reduction of criminal gang activity and territorialization (Heinrichs and Bernet 2014, 65). Finally, in their female-only focus groups, Heinrichs and Bernet found that women felt more secure on the cable cars compared to

public buses and trains. On the MetroCable and TransMiCable, passengers sit on two benches facing each other. “This makes it impossible for someone to grope or touch another person without everybody noticing it,” Heinrichs and Bernet conclude (Heinrichs and Bernet 2014, 65).

Another quantitative analysis by Milan and Creutzig used the annual Citizen Perception Survey, a detailed survey of 187 questions administered by *Medellín Cómo Vamos* between 2009 and 2012, to study fourteen quality of life indicators in sectors recently impacted by transit-oriented development. A full table of the fourteen quality of life indicators is included in Appendix 10, and they include [1] socioeconomic variables such as education enrollment and housing affordability; [2] public infrastructure variables such as environmental quality and access to basic utilities; and [3] social capital variables such as trust in public institutions and participation in community organizations (Milan and Creutzig 2017) (Appendix 10). By comparing the results in three transit-oriented development sectors (*comunas*) with three non-intervention sectors, Milan and Creutzig discovered a statistically significant difference in the increase of quality of life variables in transit-oriented development sectors. Amazingly, the increase in quality of life not only helped to address inequalities between poor peripheral sectors versus middle-class or wealthy ones in the urban core, but it also reduced inequalities between residents of the same poor sector. Within the same sector, “lower incomes profited more than middle and higher incomes; and women’s quality of life improved more than men’s” (Milan and Creutzig 2017, 127). The results indicate that these groups, disadvantaged on the basis of geography, income, or gender, were helped by the PUIs. However, it is important to note that the survey data makes it impossible to disentangle the specific impacts of the MetroCable; instead, the package of PUIs including but not limited to the introduction of aerial cable cars produced positive quality of life impacts (Milan and Creutzig 2017).

6.5.4 Limited Capacity

Aerial cable cars can be built more cheaply and quickly than bus rapid transit and rail systems, because the technology is straight-forward and does not require much land acquisition. However, unlike buses and trains, cable cars are *not* a form of mass-transit. Based on his study of Line K and Line J, the first two routes built in Medellín, Dávila concludes that the aerial cable cars cannot transport more than 3,000 passengers per hour (Dávila 2011, 4). Meanwhile, bus

rapid transit such as the TransMilenio can move 45,000 passengers per hour—in fact, the busiest route in Bogotá currently carries 56,000 passengers per hour per direction at peak capacity (Hernandez and Cuellar 2018, 3). The MetroCable’s limited capacity can leave peripheral communities underserved, because users must either wait long queue times during peak hours (Dávila 2011, 12; Heinrichs and Bernet 2014), or choose another transit method altogether.

6.5.5 Persistent Transit Inequities

It is important to note that despite the MetroCable, transit inequities persist in Medellín. Evidence suggests that the benefits of greater mobility are concentrated to a small subset of peripheral users. In 2011, Lines K and J were utilized by less than 10% of the residents in the sectors (*comunas*) where they were built (Dávila 2011). Low-income residents of Medellín still endure longer commutes, in terms of both time and distance. Factors including the last mile problem,⁹ multiple transfers, and the sheer distance between popular origins (e.g. residences in the periphery) and destinations (e.g. employment centers in the urban core) contribute to these persistent inequalities, and cable cars are not sufficient to resolve them.

A paper published in 2016, after most of the current MetroCable lines were implemented, studied morning and evening transit patterns of wealthy versus low-income residents in Medellín. It found that residents of the wealthiest strata—*estrato* 6—had travel patterns that were highly localized and redundant. In other words, they lived in a few wealthy pockets of the city and traveled short distances over common paths to reach the city center. Meanwhile, residents of the poorest strata—*estrato* 1—used a plethora of different routes to travel long distances. Their morning commutes originated in the mountainous periphery, but their jobs were located all across Medellín, with notable clustering in the city center (Bliss 2016; Lotero et al. 2016). Additionally, transit activity peaked later in the morning for middle- and high-income residents, indicating that low-income residents had less time for sleep, leisure, or home activities due to their longer commutes (Lotero et al. 2016).

⁹ Last (first) mile problem: Defined as the difficulty in getting people from (to) a public transit hub such as a train station or bus stop to (from) their destination (origin). When public transit hubs are located far away from final destinations, potential users must either walk, bicycle, or take private transportation to the nearest stop, or find an alternative method of transportation altogether. In the peripheral context, the last mile problem is exacerbated by limited local transit, poor road and walking infrastructure, and difficult to travel terrain.

In conclusion, the MetroCable offers a perspective into the potential long-term impacts or reception of aerial cable cars in other mountainous urban areas of Latin America. The practical implications of the similar geographic, socioeconomic, and policy contexts of TransMiCable and MetroCable will be discussed further in the Analysis and Policy Recommendations sections.

7. Studies of Cazucable and TransMiCable

7.1 Cazucable (Proposed in 2009)

Before the TransMiCable, the national government explored an alternative cable car project for the periphery of Bogotá. The proposed Cazucable route would have connected Altos de Cazucá in Soacha, an independent municipality that borders Ciudad Bolívar to the west, to the TransMilenio bus rapid transit system. (As a reminder, Ciudad Bolívar is a peripheral locality in Bogotá, and two of the *barrios* in Ciudad Bolívar—Paraíso and Mirador—were chosen for my case study). Unlike Ciudad Bolívar, Soacha is not part of Bogotá, although it is part of the larger Bogotá metropolitan region. As a result, the residents of Cazucá face even more systemic challenges than the residents of Paraíso and Mirador, even though the *barrios* are fewer than three miles apart. For example, Appendix 11 compares statistics such as the share of dwellings without piped water, sewage, or gas, for residents in Soacha and in Ciudad Bolívar. The share of residents without access to basic utilities and primary education is much higher in Soacha, because the Bogotá city government provides these resources to its own localities, but not to independent municipalities like Soacha (Rivadulla and Bocarejo 2013, 145).

Many Cazucá residents regularly commute to the Bogotá urban core for work (Acevedo, Velásquez, and Bocarejo 2013; Guzman, Hernandez, and Rivera 2017). However, the development of transport networks has not kept up with the past two decades of population growth in Soacha; high-density, low-income informal settlements in this peripheral municipality have low transit accessibility (Hernandez and Dávila 2016). The proposed Cazucable route was intended to improve transit accessibility. It would have been 2.8 kilometers long, with stations in four *barrios* along the Soacha border with Ciudad Bolívar (García and Sáenz 2013).

The Cazucable began as a presidential promise. In February 2009, former President Uribe visited Altos de Cazucá and promised “to make it happen,” even claiming that the national government would fund 80% of the construction costs (Rivadulla and Bocarejo 2014, 2027). He

hired a team from Metro de Medellín, the public company that runs the Metro and MetroCable network, to complete a technical study. The team submitted a proposal that would have had the aerial cable cars in operation by 2011. Construction never began. In December 2012, Colombia's former President Santos visited Cazucá and renewed the presidential promise. In front of residents, he signed a commitment that Cazucá would have access to public transportation before the end of 2014: "We do it with great pleasure. The important thing is to accelerate it, to have it as soon as possible" (Rivadulla and Bocarejo 2014, 2028). But to date, residents of Cazucá do not even have a public bus that runs through their community, let alone an aerial cable car. For example, to reach the nearest public bus, Cazucá residents must either walk more than 20 minutes or pay 1200 COP (US\$0.35) plus transfer fees¹⁰ to board a private auxiliary bus that takes them to the nearest public bus route connecting to central Bogotá (García and Sáenz 2013).

Ethnographic studies of Cazucá reinforce the dichotomy of the urban core and the periphery, and reveal how the uneven spatial distribution of work and study opportunities exacerbates transit accessibility problems. Based on their interviews with 67 Cazucá residents, Hernandez and Titheridge found that work was the main activity for 60% of respondents, followed by housekeeping (15%), school (13%), and retirement (6%) (Hernandez and Titheridge 2016, 159). Of those who work or study, the majority depended on opportunities located in Bogotá, and traveled between 40 and 130 minutes each way to reach work or school. One man told researchers, "Transport takes too long, but we cannot stop working" (Hernandez and Titheridge 2016, 159). Financial constraints also reduced accessibility and mobility. Hernandez and Titheridge explain that residents sacrificed time to save money, for example by walking 20 minutes each way instead of taking the private bus to the nearest public bus stop. They also avoided nonessential travel on the TransMilenio due to budget constraints:

Resistance to using TransMilenio was commonplace among respondents. This was put down to the greater complexity of the TransMilenio system and the inflexibility of the system. Most complaints about formal transport were about

¹⁰ From June to August 2019, I also volunteered with a Colombian nonprofit that works with poor communities (including communities in Ciudad Bolívar and Soacha) to provide basic housing and improve schools and public spaces. Based on personal experience, the private bus from Cazucá to the nearest TransMilenio stop cost 1200 COP (US\$0.35) without fare negotiation, and it cost an additional 2400 COP (US\$0.70) to board the TransMilenio to Bogotá.

price and quality; the general perception is that the system is not affordable for local residents (Hernandez and Titheridge 2016, 160).

In 2014, Rivadulla and Bocarejo studied local attitudes toward the Cazucable in order to understand why the proposed route was so popular even though residents prioritized other needs such as legalization of informal settlements, crime reduction and safety, and access to water above transit development (Rivadulla and Bocarejo 2014, 2026). Results from focus groups with residents and interviews with local politicians revealed that the Cazucable had enormous symbolic significance:

Perhaps, if [an aerial cable car route] is constructed in Cazucá, it will not prove to be such a strong engine for social change as people imagine, but, for now, it is the only possibility local inhabitants and politicians believe they have. Thus, cable cars are metonymic objects that stand for something greater than themselves; in this case, they stand for economic and social development as much as for visibility and inclusion in the city (Rivadulla and Bocarejo 2014, 2027).

As a result, an overwhelming majority (98%) of local survey respondents said they would like to see the project become a reality (Rivadulla and Bocarejo 2014, 2031). Thus, research about the Cazucable demonstrates poor residents' high aspirations for the proposed route. Their aspirations are unlikely to be met, even if the aerial cable cars are implemented, without broader policy changes that address the multiple causes of poverty and inequality on the periphery.

7.2 TransMiCable (Opened in 2018)

Unlike the Cazucable, which was (ineffectively) championed by the national government, the TransMiCable had early support from city bureaucrats. Construction began under Mayor Petro, and was finished by his successor, Mayor Peñalosa (*The Guardian* 2015). This subsection will include research conducted during the planning, implementation, and adaptation phases of the TransMiCable.¹¹ Because the TransMiCable route opened less than a year and a half ago, there is a dearth of published research about the cable cars' impacts and the adaptation process. In fact, most of the current (as of March 2020) academic literature about the TransMiCable consists

¹¹ For the purposes of this paper, *planning* is defined as the phase before construction, and includes policy articulation, route selection, and budgeting. Next, during *implementation* the TransMiCable was constructed, paid for, and opened for use. Finally, *adaptation* began once the TransMiCable was opened in December 2018. Adaptation is an ongoing process, when residents begin to use the new mode of transit, and policy-makers make adjustments as needed to improve the project's results.

of masters theses written by graduate students in Colombia. These theses highlight the differences between city bureaucrats' aspirations for the TransMiCable, and the on-the-ground experiences of users and non-users in Ciudad Bolívar.

7.2.1 TransMiCable Planning

Research about the TransMiCable was published as early as 2014, after the route was selected and designed. Pre-implementation studies found that formal transit and road infrastructure was lacking in the areas where the new route was to be built. For example, a case study of Manitas, a *barrio* in Ciudad Bolívar where one of the cable car stations is located, found that the only formal public transit in the area at the time was one SITP bus route. Most of the residents got around the local area on foot (Zambrano 2014). Two studies noted that road infrastructure was either non-existent, poor quality, or not wide enough to support two-vehicle lanes and pedestrians (Agudelo and Maldonado 2014; Zambrano 2014). Near Portal Tunal, where passengers would transfer between the TransMilenio and TransMiCable, 80% of roads were paved, but the majority of them were in “poor condition” and some ended abruptly. And farther up the mountain, fewer and fewer roads were paved. A mere 38% of roads were paved between Las Manitas Station and Paraíso Station, which made driving and walking through the *barrios* difficult (Agudelo and Maldonado 2014) (Appendix 6). Ultimately, Ciudad Bolívar was chosen for the new TransMiCable route because of the “precariousness of its public spaces, transportation deficiency, insecurity, and environmental deterioration, [which] demonstrated that the project would benefit the social and integral development of the area” (Ramírez 2018).

Newspapers and reports also record city bureaucrats' efforts to engage with the affected communities, in a process known as participatory planning. Project planners held meetings with 13 community leaders from Mirador-Paraíso, Manitas, and Juan Pablo II, who communicated their hopes for the new route and also helped officials tour their *barrios* and gather primary information. Six hundred residents of Ciudad Bolívar were also invited to attend a townhall about the TransMiCable, and 315 of them showed up to listen and voice their opinions (Ramírez 2018, 23–24). Overall, the literature suggests that the planning process was successful, in that a

compelling case was built for the selected region and community members were actively engaged.

7.2.2 TransMiCable Implementation

Later, while the cables went up overhead, officials held workshops with 35,000 local students to teach them about urban renewal. Another community-led initiative engaged local representatives and residents to build grassroots support for the TransMiCable (Emblin 2018).

The project cost US\$100 million to construct and took 26 months to complete, and stakeholders held high hopes for its anticipated impacts. Ramírez, a graduate student, discussed some of the ambitious goals stakeholders had for the TransMiCable:

After reviewing the results of the social impact analysis, it became evident that the project would generate changes in vehicle mobility, faster commuting times, and job creation. On the other hand, [stakeholders also hoped] the aerial cable would not only benefit [users] but also the entire locality of Ciudad Bolívar, and that it would provide a better quality of life (Ramírez 2018, 25).

According to Ramírez, bureaucrats and peripheral residents imagined that the cleaner transportation mode would reduce air pollution, generate a better landscape, increase architectural quality, and even transform Ciudad Bolívar into a tourist destination in the future (Ramírez 2018, 25).

7.2.3 TransMiCable Adaptation

Some of these anticipated impacts, such as improved environmental quality, have either not been observed or not been studied in Ciudad Bolívar. Although the TransMiCable reduced commute times and increased tourism according to studies including mine, these benefits require careful qualification. For example, the TransMilenio S.A. advertised that the length of a one-way trip from the most peripheral station in Paraíso would drop from 1 hour to 13.5 minutes (−46.5 minutes). But according to Socha's differences-in-differences analysis using data from a survey administered to 518 residents of Ciudad Bolívar, TransMiCable users “only” experienced a 31.4 minute reduction in travel time (Socha 2019). There are three possible causes for this discrepancy: [1] Time spent walking or transferring could reduce users' time savings. The TransMilenio S.A.'s projection only considers the cable car trip, while Socha measured the total commute from origin to final destination which includes walking and transfer times. The

TransMilenio S.A.'s projection is also based on ideal conditions, when the cables are moving at maximum velocity and there is no queue to board the cabins. [2] In practice, the cables move slower during non-peak hours, so the trip takes 21.5 minutes instead of 13.5 minutes (Socha 2019). [3] And, during peak hours, there may be a line to board the cable cars.

Because the TransMiCable opened less than a year and a half ago, this summary presents the extent of current knowledge about its impacts. Other research is ongoing, but appears to be unpublished as of March 2020. Therefore, my ethnographic case study helps to better understand the adaptation process and the aerial cable cars' impact on mobility and accessibility. To conclude, prior research for the TransMiCable documented participatory planning efforts and the poor condition of mobility infrastructure in Ciudad Bolívar, as well as the *anticipated* effects of the cable cars. Meanwhile, the *observed* effects are currently under study.

8. Aerial Cable Cars: International Development

Colombia pioneered aerial cable cars for mass transit, and other countries followed suit. In Latin America and Africa, the use of aerial cable cars as a form of public transportation has increased in the past decade. Appendix 12 includes a summary table of 13 urban projects that have been implemented in Latin America and Africa (Appendix 12). Many of the current urban projects share two common contexts: First, the aerial cables cars operate over hilly and mountainous topographies. Second, the aerial cable cars serve regions with a high population of low-income users and residents, often connecting them to wealthier regions with a concentration of employment opportunities (Bello, Pérez, and Guevara 2018, 61). As recently as January 2020, the mayor of Pittsburgh, U.S. proposed aerial cable cars as a transportation solution to accommodate his city's hilly terrain (Belko 2020). He also framed his proposal in terms of transit equity,¹² although it remains to be seen how the route is specifically designed to serve low-income or historically disadvantaged populations. Therefore, research into the impacts of the aerial cable cars in Colombia has applications in Latin America and beyond.

¹² On January 27, 2020, Mayor Peduto stated at a forum sponsored by the Pittsburgh Downtown Community Development Corporation: "This is really about how you get from the Hill District to the Strip District [for example]...And there's now an opportunity to potentially put a gondola there that could also link into Oakland. How can you connect different parts of the city in the most efficient, effective, and equitable way? We don't have the vehicle to deliver that right now—pun intended" (Belko 2020).

Methodology

9. Location

All of my interviews and observations took place in one of the three locations:

- Bogotá, Colombia: locality of Ciudad Bolívar
- Bogotá, Colombia: locality of Teusaquillo
- Medellín, Colombia

The two localities in Bogotá, Ciudad Bolívar and Teusaquillo, are clearly labeled on the map in the Appendix (Appendix 4).

The locality of **Ciudad Bolívar** on the southwestern periphery of Bogotá was the site of my case study. The two *barrios* in Ciudad Bolívar, Paraíso and Mirador (Appendix 13), are of particular interest because residents face significant socio-economic and geographic barriers that limit their physical and social mobility. The aerial cable cars sought to address some of these problems. Their recent arrival in December 2018 makes Ciudad Bolívar a prime case study to better understand the impact of aerial cable cars on the mobility of peripheral residents.

Teusaquillo is a locality in central Bogotá. It is a middle-class area known for two important landmarks, the Simón Bolívar Park and the National University of Colombia. Interviews were conducted with individuals in Teusaquillo to learn more about how central residents view public transit in their city, especially the TransMilenio and TransMiCable. My observations in Teusaquillo also provided insight into the views central residents may harbor about peripheral *barrios* like Paraíso and Mirador.

Medellín is a city to the north of Bogotá that is famous for, among other things, its aerial cable cars. The TransMiCable of Bogotá was certainly inspired by the MetroCable of Medellín, and both were developed to connect peripheral, impoverished areas with the public transit networks serving the city's center. The MetroCable was included in the Background and Literature Review, and explicitly studied during two observations I carried out in Medellín. It offers a perspective into the potential long-term impact or reception of aerial cable cars, although the two cities' observed impacts are likely to be distinct. However, the main focus of my research is the case study in Ciudad Bolívar.

10. Target Population

The main target population was adult residents of Paraíso and Mirador, and others who were impacted by the new aerial cable car route. The most peripheral station of the TransMiCable sits on the border of Paraíso and Mirador (Appendix 13), and these two *barrios* exemplify the disadvantages of spatial inequality through characteristics such as high poverty and crime, stigmatization, poor road infrastructure, and lack of local employment and higher education opportunities. Adult residents were selected, because they are the most likely to commute to the urban core, typically for work, and therefore be affected by the TransMiCable and other changes to the transit infrastructure. Although the majority of participants were low-income and frequent users of public transportation due to my sampling method, use of public transportation was not an explicit requirement. As mentioned in the previous section, my research was also supplemented by interviews and observations conducted in central Bogotá and Medellín.

11. Interviews and Observations

In total, I conducted 13 interviews and 8 group observations. Interactions were translated from Spanish to English by the author, Kimika Padilla. A complete table of interactions with relevant details are included in the Appendix (Appendix 14).

One-on-one interviews were conducted with willing participants in Spanish. Effort was made to approach adult individuals across genders and age groups, in an attempt to gain inclusive perspectives. Permission was requested and obtained to audio record the interviews. I explained that their comments and profile¹³ could be included in my undergraduate thesis paper, and offered two options: I will refer to them by first name and profile, or by profile only. Other personally identifiable information, such as full name or residence, will not be included. Interviews were semi-structured, with general questions prepared in advance about the participant's transportation usage and access (Appendix 15).

Group observations consisted of unstructured interactions with people I encountered in public settings including buses and aerial cable cars. At the end of each observation, I introduced

¹³ The profile includes the person's gender and approximate age (e.g., Male, 40s) along with information about whether they are a resident of the city center versus the periphery of Bogotá.

myself and my research, and made sure to obtain their verbal consent to write about the interactions I had witnessed. Unlike the interviews, the observations were not audio recorded and are written from my perspective only. Every attempt has been made to describe what I witnessed as accurately as possible, based on notes taken during or immediately after the observation.

12. Strengths and Limitations

My research focused on ethnographic interviews and observations, conducted with willing individuals in the physical spaces they typically inhabit. This methodology lends itself to understanding users' subjective experiences with public transit, and recording their narrative depictions of the TransMiCable's impact.

However, there are three noteworthy limitations due to sampling: [1] The small sample size is a potential weakness. It is important not to extrapolate my case study, although I believe that my research is generalizable and insightful within reasonable bounds. [2] Sampling bias due to convenience sampling is likely, because participants were recruited in-person when they did not appear deeply engaged in other activities. Out of the 17 individuals approached, 13 agreed and 4 declined to interview. None of the observation participants expressed objections to being included.¹⁴ Also, I visited Paraíso and Mirador during weekdays and weekends between the hours of 10:00am and 6:00pm. On weekdays, many members of the working population were probably unavailable for sampling. [3] Most interviews and observations in Paraíso and Mirador were conducted within a 500 meter radius (~5 minute walk) of the station, corresponding to the TransMiCable's "area of influence" as defined by TransMilenio S.A. ("Balance de operación" 2019). Residents within this radius may be more likely to use the TransMiCable compared to other Ciudad Bolívar residents, due to their close proximity to the station.

Finally, my approach privileged user experiences rather than policy expertise. Therefore my research, fundamentally, is about understanding the on-the-ground impacts of the new aerial cable car route rather than elucidating the policy landscape or official rationale behind the development of the TransMiCable and its expected outcomes.

¹⁴ For Observation 5, verbal consent was obtained from the only individual who is specifically referenced in the Analysis, but not from all 27 bus passengers.

Analysis

13. TransMiCable Adaptation Process

My research captured the TransMiCable adaptation process, because I arrived in the city just six months after the new route opened in December 2018. Commentary from residents of Ciudad Bolívar, as well as the urban core, indicated a high-level of awareness of the TransMiCable even if many urban core residents had not used the aerial cable car.

Details, big and small, demonstrated the city government's concerted effort to publicize the TransMiCable. The grand opening was covered in major local newspapers and a person was selected at random to take the first ride, which was broadcast on television (“Así Fue El Viaje” 2018). For the first two days, on December 27 and 28, anyone could ride the TransMiCable for free (*El Espectador* 2018). At Portal Tunal—the feeder station that connects the TransMiCable to the TransMilenio bus rapid transit system—colorful billboards advertised the new route with slogans like: “*Más tiempo para tí,*” “More time for you” and “*Bogotá mejor para todos,*” “Bogotá better for everyone” (Appendix 16). Even the *Tu llave* fare cards, used throughout the city to board public transportation, received a new 2019 design featuring the TransMiCable (Appendix 7).

Andrea, a woman who ran a new tourism shop near Paraíso Station, shared the history of transit in Ciudad Bolívar leading up to the arrival of the TransMiCable. Andrea also participated in the TransMiCable planning process, as a representative of her community at meetings and workshops held to discuss the new cable car route before and during construction. Speaking from her experience in the planning process, Andrea told me that the TransMiCable project began under former Mayor Gustavo Petro, whose administration started to expropriate property and plan construction. He lost the 2015 municipal election to his successor, Mayor Enrique Peñalosa, who finished implementing the TransMiCable (*The Guardian* 2015).¹⁵

¹⁵ Transportation has been a defining policy issue for every elected mayor of Bogotá so far in the 21st century. Two of the most influential were Mayor Enrique Peñalosa (Jan. 1998-Dec. 2000), who introduced the TransMilenio bus rapid transit system, and Mayor Gustavo Petro (Jan. 2012-Dec. 2015), who consolidated auxiliary routes under the *Sistema Integrado de Transporte Público* (SITP). In addition to developing the TransMilenio, during his first term Peñalosa famously declared war on the automobile and began a network of bike paths that now cover over 185 miles (*The Guardian* 2015). He was reelected for a second term (Jan. 2016-Dec. 2019) and finished the TransMiCable route proposed by his predecessor, Petro. However, Peñalosa controversially scrapped his predecessors' proposals to build a subway, instead proposing above-ground rail (Alsema 2020). Peñalosa never got the chance to deliver on

As we sat together on a bench outside of Paraíso Station, Andrea narrated, “Approximately 20 or 30 years ago, there was no public transportation [in Mirador and Paraíso]. We [traveled] on foot...” She told me that donkeys used to deliver people, clothing, and water to the *barrios*. Around 20 years ago, small private trucks started to operate illegally, providing transportation for a fee. Beginning in 2000, informal buses served Ciudad Bolívar, until their operation was formalized as part of the SITP. Andrea’s testimony corroborates the formalization process described in the Background section: “Today we have the SITP, the integrated public transportation system. We have the *alimentador* (feeder route) that takes you to Portal Tunal...When the SITP arrived, the majority [of informal bus companies] tried to obtain a contract [to operate the new official routes]. Those are the ones that provide us with the SITP service today” (Interview 9). Eight years ago, according to Andrea, a study from a district school of Mirador-Paraíso found that it took 40 minutes to 1 hour to reach Portal Tunal, the nearest TransMilenio station. Then came the TransMiCable, which carries passengers from Paraíso Station to Portal Tunal in 13.5 minutes. “*Nos demoramos mucho menos*”—“It takes us much less time,” said Andrea (Interview 9).

Although many residents in the TransMiCable’s area of influence¹⁶ have switched to the new mode of transit, some expressed reservations about the aerial cable cars. For some, the advantages of the TransMiCable were enough to overcome their hesitation. While most respondents found the aerial cable cars to be more comfortable than grounded alternatives, at least two passengers felt uncomfortable due to fear of heights. For example, Janice is a former resident of Ciudad Bolívar. She moved away to San Cristóbal to raise her kids, but returns to her childhood home to visit and help her mother. When Janice entered the cabin after me, she told me that she always has to sit facing away from the direction of travel, because “*Me da miedo. Me asusto. Me da mucho miedo*”—“It scares me. It scares me. It scares me a lot” (Interview 13). In a

above-ground rail. On October 27, 2019, citizens elected Claudia López Hernández, the first female and openly lesbian mayor of Bogotá. She ran on a platform of anti-corruption, minority rights, and equal opportunity. In her inauguration address (Jan. 2020), Hernández spoke about her upbringing in the peripheral locality of Ciudad Bolívar, and promised transit development including new peripheral routes that link to the TransMilenio, and the Bogotá Metro, an above-ground rail network designed to complement the bus rapid transit system (Emblin 2020). The new mayor’s transit policies will be discussed further in the Policy Recommendations section.

¹⁶ In its publications and user impact reports, the TransMilenio S.A. defines the area of influence as the 500 meter radius (~5 minute walk) around the four TransMiCable stations (“Balance de operación” 2019).

separate observation on June 30th, 2019, I returned from Paraíso via TransMiCable. During the ride, my fellow passengers cracked jokes about the safety of the cable car as one woman clasped her partner's hand and locked eyes with the floor of the cable car to avoid looking at the ground below through the cabin's transparent walls. An older man, who switched back and forth between teasing and assuring, began to share facts about the aerial cable cars. He told us that each cabin fits up to ten people, and during peak hours, they move faster to accommodate greater demand but never carry more than ten passengers. As we passed through Juan Pablo II Station, he remarked, "the last part is the steepest" (Appendix 1). In response, the woman cringed, her eyes still fixed on the floor of the cable car. As our cabin approached Portal Tunal, the lowest elevation station, the older man announced lightly, "We arrived, and nobody died!" The other passengers, even the woman who was afraid of heights, appeared mildly amused (Observation 4). As some passengers adapt to the unfamiliar sensation of riding high above the ground, the safety of the new system is certainly on their minds. However, for these two passengers, their fear of heights seemed rooted in discomfort rather than perceived danger. Despite their fears, both women still use the TransMiCable. The reason? Janice said, "Because it is much faster. The bus always stops for every person" (Interview 13).

Other public transit users continue to use the SITP buses which still run through the *barrios*, sometimes because they are more efficient for their specific commutes, and other times out of habit or preference. Jefersson, a well-traveled man aged over 50, is a habitual bus user. When I approached Jefersson, he was drinking coffee inside of a tiny cafe about six blocks from Paraíso Station. He welcomed me to sit down, and we had our conversation over *tinto*, black coffee, and *aromatica*, herb tea:

Kimika: Where do you go in the city? Do you generally stay nearby, or do you go to other places in the city—other parts?

Jefersson: Right now, I will go to the feeder bus that goes to Portal Tunal, and then I will transfer to the 127 [the bus that goes to Calle 127].

Kimika: Do you use the TransMiCable?

Jefersson: No, I am not accustomed to it. It's not that I am nervous to board it, but I am accustomed to drinking a little *tinto* [before boarding the bus]. I am like a machine that runs on a little *tinto*...

We both laughed, and Jefersson continued: "It's a question of habit. The TransMiCable is fast, but I prefer the bus." He told me that it takes about half an hour to reach Portal Tunal by bus, and

1.5 hours to complete the entire one-way trip to the city center, or “2 hours...when there is traffic.” The walk to the bus stop from the residence that he shares with a cousin adds another 15 to 20 minutes. Jefersson commutes about 2 hours each way, every day (Interview 7).

Previous research by Guzman et al. using data from the 2011 Bogotá Mobility Survey found that low-income residents’ average travel time to work was 67 minutes (Guzman, Hernandez, and Rivera 2017, 239). However, my ethnographic research suggests that this figure does not capture the daily experiences of some bus users in very peripheral communities such as Paraíso and Mirador, which are located on Bogotá city limits. Respondents including Jefersson, Mel, and Catalina reported that prior to the arrival of the TransMiCable, they or their family members had no choice but to commute over 2 hours and take multiple buses to reach essential activities in the urban core (Interviews 6; 7; 12). Therefore, case studies at the level of a single locality or even specific *barrios* complement studies carried out at a city-wide level. Together, this research reveals disparities within and across income and demographic groups, and ultimately helps to identify areas where transit intervention is (or was) most needed and measure its impacts.

Near the end of our conversation, Jefersson reflected, “I like my little *tinto*...and if I didn’t [have this habit], I would not have met you! We wouldn’t be here right now!” He added, “I rode the cable cars with my cousin. It’s not my habit, but one time.”

Throughout the interview, he also peppered me with questions about life in Chicago, and he ended with this one: “Are there cable cars in Chicago?”

“Oh, no!” I told him.

“There aren’t mountains?”

“No, no mountains. Chicago is very flat,” I replied (Interview 7). His question prompted me to imagine what Chicago would look like if the Loop were located in a valley, with the city’s resilient, yet vulnerable, communities to the South and West overlooking the urban core from the mountains. How foreign, indeed. I wondered how Jefersson might picture Chicago, if it would be a flattened version of Bogotá, or Mexico City, or some of the other Latin American and Caribbean cities he had seen. I walked away from our interview with a greater appreciation for

how geography and spatial inequity shapes a city—physically and socially. Meanwhile, Jefersson walked away to board his first of three buses on his 2 hour daily journey to work.

14. Observed Benefits and Limitations of TransMiCable

14.1 Benefits of the TransMiCable

Interviews and observations with residents in Mirador and Paraíso revealed three major benefits of the TransMiCable: travel time savings, improved safety and comfort, and increased community pride and inclusion. While most participants agreed that the TransMiCable is faster and more comfortable than the bus, only some residents felt proud or more included because of the new route.

14.1.1 Travel Time Savings

Based on my research, the primary benefit of the TransMiCable route is time saved in transit. This is no small feat. Respondents explained how reductions in travel times made their commutes easier, especially for peripheral residents who work in the urban core. For example, Mel told me that her husband worked in Chapinero, a locality in central Bogotá (Appendix 4). She described his daily commute step-by-step:

Mel: He works in the center.

Kimika: And how does he get to the center?

Mel: He walks 20 minutes [to reach] Paraíso, the last [TransMiCable] station. He descends and from there, travels from the south to the north.

Kimika: From the TransMiCable?

Mel: Yes, and he transfers to the Red [referring to the red TransMilenio buses]. So [the TransMiCable] is good because he transfers and it doesn't cost more.

Although he had to walk 20 minutes to reach the nearest aerial cable car station, the new route benefitted Mel's husband, because it was still the fastest way to get to the TransMilenio feeder station that took him to Chapinero for work. With TransMiCable, the one-way trip to Chapinero took an hour and fifteen minutes. It used to be closer to two hours (Interview 6).

During one interactive observation, I spoke to three young men at a cafe three blocks away from Paraíso Station. Two of the men worked, and one of the men studied, all in Ciudad Bolívar. Although they only visited central Bogotá a few times per month, all three young men preferred the TransMiCable. According to them, the TransMiCable is faster than the buses they

used to take to reach the city center. It is also important to note that the men lived close to the TransMiCable, which makes it easier to get to the station without long walking times (Observation 2).

The consistency of the TransMiCable is another factor that contributes to time savings. First, wait times are more predictable or nonexistent on the TransMiCable. From 4:30am to 10:00pm Monday through Saturday, and 5:30am to 9:00pm on Sunday and holidays, the cable cars run continuously along the defined route (“Abecé de TransMiCable” 2018). Cable cars enter each station at less than 30-second intervals, and therefore, there is always a cabin for passengers to board. For example, Mel told me, “I like [the TransMiCable] when I am stepping on, because [the cabins] arrive frequently” (Interview 6). That said, two users told me that during peak times, queue wait times can be up to 10 minutes¹⁷ (Observation 4). It is important to note that if demand for the TransMiCable grows over time, longer wait times could impact the user experience and reduce time savings if demand exceeds the TransMiCable’s carrying capacity of 3,600 passengers per hour per direction (“Balance de operación” 2019). Still, respondents reported that current wait times are zero during off-peak hours and under ten minutes during peak hours. In contrast, wait times at bus stops can be unpredictable and difficult to avoid. Although the red TransMilenio buses operate in regular intervals and drive in exclusive lanes to avoid traffic delays, during peak hours the platform can be too crowded to board the first bus that comes. Boarding blue SITP buses, which drive in regular lanes, can entail long wait times due to inconsistent bus schedules or infrequent bus service (Observations 5; 6). On at least four occasions during my three months in Bogotá, I stood at a bus stop for 35 minutes or more before the SITP bus finally arrived more than 20 minutes behind schedule.

Second, unlike buses whose journey times are impacted by traffic conditions, the cable cars always complete the trip on schedule. Once aboard the cable car, it takes 13.5 minutes to reach Portal Tunal from the most peripheral station in Paraíso. In contrast, users who take the bus to reach Paraíso are at the mercy of traffic and road conditions. For example, on September 4th, 2019, I took an SITP bus to Paraíso to conduct interviews and observations. After passing the

¹⁷ This figure is not verified by quantitative data, it is just what I was told. Further research into wait times to board the aerial cable cars (and how wait times change with user demand and the time of day) is needed to better understand the temporal and psychological impacts of wait times on the passenger experience.

Portal Tunal station, most of the remaining bus ride was spent with the entire bus at a 15- to 30-degree angle. The roads were paved, but steep and winding. Although the roads technically have two-way lanes, at times it was difficult and dangerous for two medium-sized buses to turn around a corner at the same time, so the bus drivers had to maneuver the corners one at a time. At one point, the bus got stuck on an incline due to traffic ahead, and we had to wait four or five minutes before moving again. When the bus came to a stand still, the woman sitting next to me uttered “*Dios mío, el trancón*”—“My god, the traffic” (Observation 5). When the bus began to move again, she silently made the sign of the cross over her chest.

Inconsistent wait and journey times on public buses negatively impact passengers, because they either arrive late at their destination, or have to build in extra “cushion time” to account for potential delays. Since a majority (70%) of trips on public transportation in Bogotá are taken for work (Bocarejo and Hernandez 2012, 144), punctuality is important to passengers. Although the aerial cable car does not eliminate the need for a bus, since most users transfer to the TransMilenio to reach the urban core, it does substantially reduce total travel time as well as inconsistency.¹⁸ The TranMiCable operates continuously on a predictable schedule, and cable cars are guaranteed to arrive at each station in short, regular intervals. For the six public transit users I interviewed who used to ride the SITP bus for the last leg of their journey home, and now use the TransMiCable-TransMilenio integrated system instead, the cable cars have removed the biggest source of inconsistency (SITP bus) from their trip (Interviews 6; 9; 10; 12; 13).

14.1.2 Safety and Comfort

Many passengers also perceived the TransMiCable to be safer and more comfortable to use than the public bus. To understand why, on two occasions I decided not to use the TransMiCable to reach Mirador and Paraíso. Instead, I took the SITP bus. To reach the peripheral *barrios* from my middle-class residence near the National University in Teusaquillo, I had to take two separate buses (Observation 5).

¹⁸ One respondent, Sarah, claimed that the aerial cable cars not only reduced travel times for TransMiCable users, but also benefited SITP bus users, because it reduced the total traffic on the ground routes. Therefore, travel times by SITP bus decreased, too. More data is needed to verify this claim, but Sarah does provide an intuitive and interesting hypothesis about the wider benefits of adding new methods to access the urban core via public transit (Interview 10).

Observations taken on the SITP bus revealed clear challenges to safety and comfort. The second time I boarded the SITP bus to Ciudad Bolívar, it was standing room only. After a while, I got tired of standing and perched on a small 4-inch ledge at the front of the bus. It was impossible to get comfortable, my feet planted firmly to avoid falling off the ledge and my back pressed against the plastic panel that separated the bus driver from the passenger compartment. Seated less than a foot higher than the floor of the bus, I had a vantage point of the entire passenger compartment (Observation 6).

At the first stop in Ciudad Bolívar, a woman in the front row window seat yelped, startling me. Looking over, I learned that someone had reached through the open window in an attempt to grab her cellphone out of her hand. Fortunately, she reacted quickly and pulled the phone away from his reach. I watched the would-be thief run away down the street. You would never see this happen on an aerial cable car, where the cabins are enclosed and equipped with 24-hour security cameras and a two-way intercommunication system. But the passengers on the SITP bus seemed accustomed to the risks of navigating the streets. Now, the woman was laughing as she replayed the incident for six or seven passengers who watched with casual interest. She tucked her cellphone into her bra and closed her window. A group of three school-aged boys, who provided music for the rest of the bus from a large boombox, stopped goofing around with each other to chat with the woman. One of them playfully mimicked the would-be thief by snatching at the air, while another commended her for the quick reaction. A few passengers, including myself, instinctively grasped our cellphones. The female passenger reopened the window, and the bus continued uphill (Observation 6).

In Colombia, there is a phrase, “*No dar papaya.*” Literally translated as “Don’t give the papaya,” it is an idiom that means, “Avoid situations where you are likely to be taken advantage of.” Although the vast majority of people in Colombia, as in most places in the world, will treat you well, there is always the risk of a bad apple. The best way to avoid them, as the saying goes, is to take precautions with your possessions and to be alert to your surroundings. On the bus that day, I tugged my iPhone out to double-check the route, careful as always to cover the conspicuous *marca*, or brand—the Apple logo. While most of the adults I saw or spoke to in Ciudad Bolívar carried a cellphone, higher-end models by Samsung and Apple are simply

unaffordable for them. Even in the urban core, the imported iPhone is considered a status symbol in the eyes of some Bogotanos/as. Facts like these made me acutely aware of my privilege as I volunteered and conducted research in the periphery of the city.¹⁹

The TransMiCable's impact on the safety and comfort of its users became more clear in contrast with the SITP bus. In fact, the majority of TransMiCable users who I interviewed framed their preferred aspects of the new route by comparing the TransMiCable to the SITP (Interviews 6; 9; 10; 12; 13). On my first bus trip to Ciudad Bolívar, the SITP bus passed behind Portal Tunal station, which connects the TransMiCable and TransMilenio systems. I could see cable cars arriving and taking off from Portal Tunal. We drove over a bridge that transversed an exposed river of sewage, and three passengers moved to close the bus windows even though they provided the only source of breeze on the crowded bus. Five others, including myself, covered our noses and mouths to avoid the unpleasant smell of sewage. I felt envious of the passengers on the TransMiCable soaring overhead (Observation 5). Aside from the security challenges and discomfort of the roadway, buses can get packed with passengers, while strictly enforced capacity limits prevent TransMiCable from becoming overcrowded. Each TransMiCable cabin seats a maximum of 10 people, and station operators and security guards enforce rules designed to ensure safety, comfort, and cleanliness. For example, "You can't walk around the cabin or eat," a security guard told me (Interview 11).

Security guards protect the areas around TransMiCable and TransMilenio stations, too. I was watching the aerial cable cars arrive from a scenic overlook at Paraíso Station when Axier approached me: "Wait for it, wait for it, she is going to take a photo!" he teased as he saw me pull out my cellphone. He was right. (The photographs I took that day from Paraíso Station, and previously from within the cabins themselves, are included in the Appendix) (Appendices 17; 18; 19; 20). Axier was hired by TransMilenio S.A., the public company that oversees the transit network of Bogotá, to guard the aerial cable car stations. Before the route opened, he used to

¹⁹ This thesis would be remiss without an acknowledgement of privilege, a subject that in reality deserves many pages, but only for the sake of focusing on the research topic will be placed in the footnote instead. Like many of the researchers who study poor urban areas in Colombia, I am privileged to have the finances to travel abroad, to learn Spanish (as a second language), and to conduct research supported by the academic resources of an institution like the University of Chicago. I believe people with privilege have a responsibility to use their positions to advocate for minorities and vulnerable populations, and more importantly, to elevate others' voices to let them speak for themselves. Fortunately, ethnographic research is well-suited to these personal aims.

work as a private security guard. According to Axier, he is responsible for the security of the station and its users. He said that he protects the infrastructure of the TransMiCable, including the pylons²⁰ and the stations, from terrorism or vandalism (Interview 11). Prior studies in Medellín found that crime rates dropped near the cable car stations after Line K was introduced (Cerdá et al. 2012; Heinrichs and Bernet 2014). Further research is necessary to determine if and how the TransMiCable affected crime rates. However, Axier's testimony demonstrates a new state security presence—at least near the TransMiCable stations (Interview 11)—in Ciudad Bolívar, which has the highest rates of homicides and drug trafficking in Bogotá (Mojica 2018).

14.1.3 Community Pride and Inclusion

Previous ethnographic studies revealed increased community pride and sense of belonging among residents of peripheral communities in Medellín after an aerial cable car route was introduced (Dávila 2011; Heinrichs and Bernet 2014). These studies pointed to two main sources of pride and inclusion: First, the aerial cable cars and other urban integrated projects (PUIs) targeted areas with a historic deficit of public infrastructure. Therefore, peripheral residents perceived the new routes as finally, a form of public transit designed to benefit them (Cerdá et al. 2012; Heinrichs and Bernet 2014). Second, the aerial cable cars attracted tourism. As people from around the city, the country, and more distant origins visited the peripheral communities, there is some prior evidence to suggest that it led to their greater social inclusion within Medellín (Leibler and Brand 2012).

Several respondents cited tourism as a new opportunity to improve Ciudad Bolívar's inclusion within the city (Interviews 7; 9; 11; 13), but only two of the participants in my case study expressed pride in the TransMiCable itself (Interview 3) (Observation 4). One of them was Mauricio. He lived in Ciudad Bolívar, but ran a private business delivering water to approximately 60 families in Soacha, a neighboring municipality that is even more distant from the urban core than Paraíso and Mirador. Mauricio recalled the arrival of the TransMiCable in matter-of-fact statements, but his expression and tone gave away his pride. He seemed to be a

²⁰ A pylon is a tall tower used to hold the aerial cables that guide the cabins along the TransMiCable route (Appendix 17).

modest man, only mentioning his water delivery and real estate²¹ businesses in passing. When I prompted him for details, Mauricio answered my questions about his self-made success without boasting. In fact, the only other time during our interview when I got a similar sense of his pride was when he told me that he could deliver water “on demand” in addition to his scheduled route, providing the families he serves with a more reliable water source than his competitors (Interview 3). The same man who teased our fellow passenger about the height of the TransMiCable also expressed pride. Most of us in the cabin were visitors to his *barrio*, and he was eager to share facts about the new route. To assure the woman who was afraid of heights, at one point he bragged that the TransMiCable cabins were “*los mismos que los de Medellín*”—“just like the ones in Medellín” (Observation 4). The MetroCable of Medellín has gained international acclaim as a symbol of innovation and progress, and the man’s comparison hinted at the hope that users and politicians alike share for the TransMiCable, based on the legacy of its illustrious predecessor.

At the end of my summer research, I visited Medellín to hear the city’s public transit origin story for myself. I was surprised how deeply public transit seemed to be embedded into the city’s identity. A culture of respect for the Metro system’s buses, trains, and cable cars—officially known as “*la Cultura Metro*”—shaped norms of use on public transit (“Cultura METRO” 2014). Passengers did not eat or drink on public transit, and while the downtown streets were littered with trash, inside the Metro it was nearly spotless (Observations 7; 8). “We are very proud of our Metro. And when foreigners say, ‘Yeah, but it is just a Metro’...You have to understand the history and how incredible it is that [the elevated train] was built thirty years ago in the middle of a civil war, when the city was still very dangerous,” said Camilo, a guide with Real City Walking Tours (Observation 7).

The civil war Camilo was referring to was fought all across Colombia between guerilla groups, drug traffickers (*narcos*), paramilitary groups, and the government. It began in 1964, when the leftist National Liberation Army (ELN) and People’s Liberation Army (EPL) were founded. Two years later, a guerilla group called the Revolutionary Armed Forces of Colombia (FARC) joined the conflict. Over time, FARC gained control of large parts of the country using

²¹ Mauricio bought small plots of land in Soacha, and sold them for a profit as land values rose due to population growth (increased demand) on the periphery of the Bogotá metropolitan region.

military tactics, along with kidnapping and terrorism. Major drug traffickers, including the Medellín cartel headed by the infamous Pablo Escobar, also fought in the five-decades long war over turf, money, and power. Although the government and national army tried to regain control, their efforts were challenged by armed opposition forces as well as corruption within their own ranks (*BBC News* 2018). The national army eventually forced the militants into gradual retreat, but it took decades—and thousands of civilian lives—before the government regained some rebel strongholds in the urban periphery and countryside (Observation 7). In 1993, Pablo Escobar was shot dead. The government began peace talks with guerilla forces in 1998 (*BBC News* 2018). By the time the civil war ended in 2016 when the FARC signed a peace and demobilization agreement, over 220,000 people had died in the conflict, and 7 million Colombians were displaced from their homes (Miroff 2016). This very brief summary does not do justice to the gravity of the conflict, but it provides important historical context which also influences perceptions of transportation and public works in Medellín and Bogotá. For example, many of the MetroCable routes were built in the worst-hit regions, in part as a form of delayed reparations (Freedman 2019).

To understand the significance of public transit in Medellín, Camilo continued, foreigners need to:

Imagine what it would be like if you lived through these difficult times [referring to the civil war from 1964 to 2016]. How would that affect a person? A society? ...I want to explain it to you like this: Imagine that you are in the water with your foot stuck between two rocks. You cannot get free, and the water level is rising faster and faster. So you panic and are getting closer and closer to death. Then at the last possible moment, you see a branch just above your head and you grab it and pull yourself out. You are so happy to be alive and have just escaped death. *Well, the Metro was our branch* (Observation 7).

Camilo pointed out that the two Metro elevated train lines were constructed amid ongoing civil conflict, and it was very expensive and dangerous to construct them while the government still lacked control over many parts of the city. Moreover, the city government's resources were spread thin by corruption, underdevelopment, and the civil war effort (Observation 8). It was from this legacy of resilience and belief in democratic institutions and infrastructure that the MetroCable was born.

Inclusion was also a prominent theme in the cable car's origin story. During a separate observation in Medellín, a tour guide named Walter pointed out the social benefits of the Metro system, some of them unintended. For example, the Metro train was a site where the rich and the poor mixed, unlike many residential areas throughout the city which to this day are often segregated by income and social status, similar to the 'wealthy urban core and poor periphery' dynamic in Bogotá. According to Walter, the act of sharing the Metro train "permitted them [the residents of Medellín] to see that they are more alike than different. Walter added that the cable cars were widely perceived to be among the first large-scale infrastructure projects built specifically for poor people, representing an important shift in the city government's infrastructural investments and priorities (Observation 7).

On the other hand, Walter indicated that tourism was an unintended effect of the PUIs. The cable cars were originally built to transport residents from their peripheral homes to occupational, educational, and social opportunities in the valley below. However, as places like Comuna 13 developed into tourist attractions centered around the cable cars, more and more visitors came from other cities and abroad. At the time of my research, the long-term effects of tourism were still developing. Walter said that locals noticed an exponential increase in tourism within the past five, and even three, years (Observation 7).

Although the scale of cable car tourism is smaller in Bogotá than in Medellín, peripheral residents and TransMiCable users have already noticed the difference. "*Siempre hay turistas,*" or "There are always tourists," Axier told me (Interview 11). Before the opening of the TransMiCable, this statement would have been unthinkable. Historically, Ciudad Bolívar was not viewed as a desirable destination; a common perception was that people did not go there unless they had to. A later section, entitled 15. Social Exclusion: Perceptions of Ciudad Bolívar will show how unfavorable perceptions are still prevalent among residents of the urban core. However, there are many people from Bogotá and beyond who have come to view the TransMiCable as a destination in itself, one that draws them to Ciudad Bolívar.

Andrea spoke about the stigma residents of Ciudad Bolívar face, and how visibility from tourism offers an opportunity to change outsiders' perspectives of the place where she was born and raised:

The people are beginning to have another view. [A view other than the one] spread by the media....The media speaks of the crimes, the robberies, the murders. [But] this does not just happen in Ciudad Bolívar. This happens in all of Bogotá. In all of Colombia! So I am telling you. We are trying to say, ‘Look! It is not what the media are telling you. It is not what you read in the news. It is not what you hear, it is what you see! Therefore, you look! You come! And [you will see that] today, it is different!’ (Interview 9).

She pointed to changes in the built environment, including not just the TransMiCable but also the gradual formalization and improvement of houses, as an example of progress: “We have changed a lot. In the past, our houses were made of brick, of wood, they were prefabricated homes.”²² Today, she said, a growing number of homes near the TransMiCable station have materially improved and now qualify to be in *estratos* 2 or 3—instead of the lowest *estrato* 1. She added, “I work with community leaders to better the community, to help displaced people who arrive, and to improve what you study...the environment. We also plant gardens” (Interview 9).

Further, Andrea explained how the arrival of the TransMiCable prompted her to found a tourism company that seeks to change the public perception of Ciudad Bolívar. The key, she suggested, is to encourage visitors to step out of the TransMiCable cabins and to walk through the *barrios* themselves:

Kimika: Are there many people who use the TransMiCable?

Andrea: Yes, daily, 20,000 people²³ use the public transit service...Although, you won’t see all 20,000 people here in Paraíso. Because there are many [visitors] who do not leave the cabins. Although now, [some visitors] leave [the cabins]...they are starting to make connections with people and share experiences.

To attract visitors into Mirador and Paraíso, and to earn some money, Andrea’s tour company gives walking tours to large groups for 10,000 COP (US\$2.90) per person, or to small groups for 20,000 COP (US\$5.80) per person (Interview 9).

Kimika: Who organizes these groups?

Andrea: It’s the TransMiCable. It brings groups. Or us. We bring groups. Our organization, called *Amigos de Turista* (Friends of the Tourist).

²² Prefabricated homes are small, modular dwellings, usually built using cheap materials that are produced in a factory and assembled on-site. Some nonprofits, such as the one I volunteered with in Bogotá, produce and assemble prefabricated homes to give shelter to people who would not otherwise have a stable place to live.

²³ According to a TransMilenio S.A. report published in April 2019, 21,000 passengers rode the TransMiCable on weekdays in the first three months of operation. On average, 19,500 and 17,500 passengers used the aerial cable cars on Saturdays and Sundays, respectively (“Balance de operación” 2019).

Kimika: And are the tourists generally foreigners or are they people from Colombia?

Andrea: Both. Sometimes they are foreigners, sometimes people from Bogotá. [They are from] different places. From Amsterdam, from the United States, from India, from Mexico, from Puerto Rico. Different places (Interview 9).

It is literally true that the TransMiCable “brings” (transports) groups, but Andrea’s remark also conveyed that the TransMiCable is the attraction that “brings” (attracts) the tourists up to the peripheral *barrios* in the first place. In fact, the TransMiCable had brought—in both senses of the word—me to Paraíso on that Tuesday afternoon, too.

For the time being, the people I spoke to about the topic expressed positive sentiments toward tourism. As a foreigner myself, I found that Colombians throughout the city were generally welcoming, and the people of Ciudad Bolívar were no different. Many of them, like Jefersson and Sarah, were curious about my life in Chicago (Interviews 7; 10). Others expressed their own desires to travel and learn other languages, including Axier, Catalina, and Andrea (Interviews 9; 11; 12). Respondents shared their hopes and dreams for their own futures, for their children, and for their community. There was a widespread perception that learning English would benefit their job opportunities. I was humbled to hear their stories of resilience and hope in the face of limited opportunity, and feature many direct quotes throughout this paper with the intent to let respondents speak for themselves.

However, it is important to note that tourism can at once problematize uneven development, tackle stigmas, and reveal the human faces of vulnerable communities—but also reinforce existing inequalities. In Medellín, where cable car tourism is even more robust, locals I spoke with hinted at the mixed consequences of tourism. On one hand, it is viewed as an economic stimulus. When I asked Walter how foreigners and tourists were perceived by residents, he told me, “Tourism is good for the economy. So they like you. Well, let me be honest...they like your money” (Observation 8). But on the other hand, the phenomenon of mostly wealthy, often foreign, tourists coming to the *comunas* to indulge in the peripheral communities’ “transformation stories” can also leave behind a sour impression of poverty tourism. Part of the *comunas*’ draw is their legacy of violence and poverty, and tourism threatens to calcify this history. Places like Comuna 13 have a financial incentive to sell their culture—literally, in the numerous gift shops that sell prints of local graffiti artists’ work, for

example—in order to sustain a local economy that depends in part on the fetishism of inequality. The heavy dependence on tourism also distorts incentives for local residents, creating potentially unsustainable economic dependency. For example, Walter told me that students sometimes skip school in order to beg for money from unwitting tourists, who may not realize that they are doing a disservice to the child’s educational attainment by giving them money (Observation 8). In conclusion, although residents in Paraíso and Mirador were optimistic about the prospect of tourism and greater inclusion within their city (Interviews 6; 7; 9; 11) (Observation 4), one seasoned observer in Medellín expressed reservations about the role of MetroCable in connection with the influx of visitors to the periphery (Observations 8).

14.2 Limitations of the TransMiCable

The introduction of the TransMiCable brought positive impacts to Mirador and Paraíso, but residents’ mobility and access is still limited. This subsection describes three direct limitations of the TransMiCable, while 16. Barriers to Mobility and Accessibility in a few pages will discuss broader limitations of the entire transit network, and how land use interacts with transportation to reinforce barriers to accessibility. For now, the three direct limitations are as follows: Due to the high cost of fares relative to residents’ income, the TransMiCable is [1] unaffordable for some residents, and [2] most household travel is still limited to the strictly essential. Finally, aerial cable car stations stop infrequently compared to bus stations, so [3] many users have to walk or transfer from another peripheral bus to reach the station.

14.2.1 Lack of Affordability

A common complaint about the integrated TransMilenio-TransMiCable network was that it is too expensive. According to prior research, low-income households²⁴ in Bogotá spend over 20% of their income on public transportation (Bocarejo and Hernandez 2012, 146). Respondents including Mel, Jefferson, Sarah, Janice, and others who opted not to be named (Male, over 50) (Three Males, 20s) all cited the cost as a primary factor in their decisions of which public transit methods to use, and whether or not to access other parts of their city for “non-essential” leisure

²⁴ Low-income households are defined as those in blocks designated as *estratos* 1 or 2 (Bocarejo and Hernandez 2012).

activities (Interviews 4; 6; 7; 10; 13) (Observation 2). Jefersson pointed out that fares in Bogotá are more than double those of Mexico City:

Jefersson: I [have visited and lived in] other countries. I am familiar with the public [transit] services of other countries. Good ones, bad ones, average ones. Here [in Bogotá], it is the worst! It is very expensive, very expensive...for example, in Mexico City, the Metro costs 5 Mexican pesos (US\$0.25). The articulated bus costs 6 Mexican pesos²⁵ (US\$0.30) (Interview 7).

Meanwhile, one trip cost 2200 COP (US\$0.64) on the SITP bus and 2400 COP (US\$0.70)²⁶ on the TransMiCable or TransMilenio.

Next, Jefersson wanted to know, “How many times can you transfer between buses in Chicago, and for how much time [is the fare valid between routes]?” I could not answer him, because I did not know (Interview 7). After our interview, I looked it up and learned that transfers between Chicago Transit Authority (CTA) buses cost US\$0.25, and were valid for up to two additional rides within 2 hours. It occurred to me how privileged it was not to know the cost of a bus transfer; my ignorance reflected my ability to treat US\$0.25 like a trivial expense. When I tap my prepaid Ventra fare card to board the CTA bus, I barely even register it as a financial transaction.

Meanwhile, commuters from Ciudad Bolívar often choose whether to use the faster, more consistent²⁷ TransMilenio-TransMiCable network, or the cheaper SITP buses. For example, Jefersson transfers between two SITP buses, a choice that could be more efficient for his specific commute, and one that also saves him money (Interview 7). A ticket to board the TransMilenio or TransMiCable costs 2400 COP compared to 2200 COP for the SITP. Therefore, it costs 200 COP (US\$0.06) more to board/transfer onto the TransMilenio or TransMiCable. Once the 2400 COP fare is paid, there are no transfer fees between the three modes of public transit. This fare structure seems fair, but could dissuade price-sensitive transit users from taking advantage of the TransMilenio-TransMiCable network (Observation 5). Further research is necessary to determine

²⁵ The fares Jefersson described are accurate for Mexico City at the time when this thesis was written (March 2020).

²⁶ Although US\$0.70 may seem cheap relative to the cost of public transit in U.S. cities, it is important to note that the purchasing power of a dollar in countries like Colombia is much higher than in the U.S. For example, in Bogotá a simple breakfast including eggs, cheese, bread, and a coffee costs around US\$1.45 (5000 COP).

²⁷ The TransMilenio and TransMiCable are faster and more consistent, because [a] average wait times are much lower and less varied and [b] traffic is avoided with the TransMilenio which operates in exclusive lanes, and with the TransMiCable which runs on a cable high above the road network.

the impact of the current fare structure on peripheral residents' use of the TransMiCable, but previous research indicates that as a general trend, peripheral residents do sacrifice time to save money on their daily commutes (Hernandez and Titheridge 2016).

14.2.2 Limited Nonessential Travel

The peripheral residents who I spoke to do not frequently travel to the urban core, except for essential activities like work or school. Aerial cable cars are often promoted as a method to increase poor peripheral residents' access to social and leisure activities in the urban core, but these activities are still unaffordable for many residents. I asked residents, "How frequently do you travel to other parts of the city?" Their responses were largely dependent on whether or not they had to travel there for work. For example, Mel's husband goes to Chapinero several times a week for work, but Mel rarely leaves her house. On the day that we met, she was commuting out of necessity, to meet legal requirements to maintain her home (Interview 6).

Mel: I go [to the city center] infrequently. Today I was there delivering papers for a deed to the house.

Kimika: How do you access other parts of your *barrio*?

Mel: Only walking.

Her case appears to corroborate other research conducted in Bogotá, which found that able-bodied, working members of poor households are given priority to use the limited travel budget, while the activities of homemakers, children, and the elderly are confined to a walking range (Brand and Dávila 2011).

Other examples also substantiate prior research which found that public transit trips were mostly restricted to the essential, such as work or study. My research indicates this remains true, even after the cable car was introduced (Interviews 4; 10) (Observations 2; 3). Three young men who work and study in Ciudad Bolívar told me that they leave the locality "infrequently." Two of them said they visit central Bogotá on a monthly, but not weekly, basis to have fun or to pass the time (Observation 2). In another example, I stopped by an open-air café across the street from the Paraíso TransMiCable station at midday and introduced myself to the elderly couple who owned the business. "*Niña, no sabemos nada de eso*"—"Child, we don't know anything about [the TransMiCable]," the older woman told me after my introduction. Neither of them had ever used the TransMiCable, despite working less than 100 meters from the station. The elderly

couple stated that they do not travel to the (center) city, and did not indicate any interest or desire to do so (Observation 3). New mobility options like the TransMiCable do not necessarily increase potential users' propensity to travel to the urban core, especially if they do not perceive there to be any opportunities there, at least ones that are affordable and accessible to them.

14.2.3 Last Mile Problem

There are only four TransMiCable stations, and unlike public buses, it is not efficient or feasible for aerial cable cars to pick up passengers more frequently. As a result, 3 of the 5 TransMiCable users I interviewed walk between 15 to 20 minutes to reach the nearest station (Interviews 6; 7; 13). The TransMilenio S.A. defines the area of influence of the new route using a buffer distance of 500 meters (0.31 miles, roughly a 5-minute walk) from the TransMiCable stations, but their testimony indicates that some peripheral residents are willing to walk up to a mile to reach the stations. In the American context, researchers typically use a 400 meter (0.25 mile) buffer to capture origins and destinations within a “walkable” distance to a transit stop, although some studies also include an 800 meter (0.50 mile) buffer (Duncan et al. 2013; Foda and Osman 2010; Jaffe 2015). However, these standards do not appear to hold up in the case of the TransMiCable. This has important implications for city government policies, because it could expand the area of influence that should be targeted for transit-oriented development related to the TransMiCable, as discussed further in the Policy Recommendations section.

Meanwhile, fewer stops benefit the TransMiCable users who live close to the stations (Interviews 9; 10; 12). For example, Evelyn and Catalina told me that they preferred the TransMiCable, because it makes fewer stops than the bus (Interviews 10; 12). In public transit planning, there is a central tradeoff between access and geographic coverage. Murray and Wu explain: “Additional stops along a route usually mean greater access, because a stop is more likely to be within an acceptable walking/driving standard for a larger number of people. On the other hand, more stops and greater access slow transit travel speeds, thereby decreasing the area of service reachable given a travel time budget” (Murray and Wu 2003, 93).

However, the long walking times of some TransMiCable users could be indicative of the new route's great benefits. This counterintuitive interpretation assumes that the benefits of using the new route—such as speed, comfort, and reliability—outweigh the costs such as longer

walking times to reach one of the four stations. The walk to the station can be difficult, because of steep terrain and lack of infrastructure. The main commercial streets near Paraíso Station are paved, but many of the residential roads are not. Beneath the station, relatively flat land gives way to mountain slopes. Settlements are built in dense clusters, and some homes protrude out from the mountain side on stilts (Appendix 20). Some residents, such as Mel, live in these more distant settlements, which are often not served by public transit. There are *carritos* (informal shared taxis) that go from the TransMiCable station to her home, Mel told me, but they cost extra, because they are not part of the integrated public transit system (Interview 6). It is important to note that the last mile problem is an inherent limitation of the aerial cable car, but complementary policies like those proposed in the Policy Recommendations section can be designed to mitigate it.

15. Social Exclusion: Perceptions of Ciudad Bolívar

Interviews with people of the urban core, conducted in the locality of Teusaquillo (Appendix 4), revealed the stigma and social exclusion that residents of Paraíso and Mirador may face. For example, Hector and Sao are two middle-aged male residents of central Bogotá. After introducing my research on public transit accessibility in Bogotá, I told them that I was conducting interviews in Paraíso and Mirador. Surprised, they asked if I intended to go up to those *barrios*. I said of course, and that I had already visited Paraíso and other peripheral *barrios* in Ciudad Bolívar and Soacha to volunteer with a local nonprofit. Hector and Sao laughed, and continued (Observation 1):

Sao: (Still laughing) You couldn't get me to go up there, somebody is going to kill me. And you...a small girl like you shouldn't go up there on your own.

Kimika: There are hundreds of people who live their daily lives in peripheral communities. Maybe it is not as dangerous as you say?

Sao: Sure, if you are from the community it might be safe, but if you don't belong they will know. And they come for you.

Although his depiction is extreme, Sao is not alone in his perception of Ciudad Bolívar.

Jose drives for a popular Colombian rideshare service called Beat, which is similar to Uber. He told me that he occasionally drives clients to the airport, but not to the peripheral *barrios*. Jose perceives both trips to be dangerous, but for different reasons. In Colombia,

rideshare services are illegal, although Beat offers services in several major cities. Jose worked in information technology for nearly two decades before he was laid off, and unable to find a new job, he began driving for Beat (Interview 1). The airport destination is dangerous, because the federal police occasionally set up checkpoints near the airport and stop cars to check for illegal activity. In Colombia, rideshare passengers usually sit in the front seat, because of legality concerns and to avoid offending taxi drivers. Jose described additional steps he takes to reduce the risk of being caught while driving rideshare clients to the airport: Jose takes payment in advance, in cash or via the Beat application. He exchanges names and basic information with the passenger so that they can answer potential questions without arousing suspicion. He tells the passenger to tell the police that they are friends if the car gets stopped. When he nears the airport, he hides his phone and closes out the Beat application (Interview 1).

I asked Jose, “What would happen if the police caught you taking people to the airport?” He told me that his license would be taken away and his car would be impounded until he paid a fine. “And if they caught me a second time, I could lose my [driver’s] license for 25 years. So, it is very dangerous,” Jose concluded (Interview 1). He was correct. If caught in Colombia, the rideshare driver’s first offense is penalized with up to a 6-month suspension of the driver’s license, and a fine equal to 30 days’ wages. The rideshare car is impounded until the fine is paid, and additional charges for holding the car are likely to accrue (Castilla 2019). The second offense, like Jose said, was punishable with up to 25-year suspension of the rideshare driver’s license²⁸ (J. Rodríguez 2019). There is no punishment for riders caught using the application (Castilla 2019).

Meanwhile, Jose believes that a trip to Paraíso would be dangerous, because there was a lot of violence in those communities, in his view. Jose told me that he does not currently drive clients to Ciudad Bolívar, but when pressed, he said maybe on two conditions. First, he would only drive up there during daylight hours for safety. And, he would only go in the early morning, to avoid traffic. According to Jose, he would rather drive clients to the airport using the rideshare application Beat than go to impoverished communities on the fringe of his city, despite the legal

²⁸ The second offense is no longer punishable with up to 25-year license suspension. The Colombian Supreme Court overturned the punishment in September 2019, ruling that it constituted extreme and unusual punishment (J. Rodríguez 2019; *Semana* 2019).

risks of driving to the airport. Jose was both aware of the legal risks, and prepared to guide the passenger through measures to reduce their chances of getting caught on their way to the airport. But in his view, the possibility of crime and violence in Paraíso was harder to mitigate (Interview 1). Like Sao, he also recommended me not to go alone.

It is important to note that not all urban core residents harbor the same views about residents of Paraíso and Mirador. Daniel, who lives in Teusaquillo, assured me that Ciudad Bolívar is safe enough. “Go during the day,” and “*no pasa nada*”—“nothing [bad] will happen,” he advised me (Interview 2). Daniel also recommended me to conceal my cellphone and to return before sundown, and I took his advice.

When I visited Paraíso and Mirador during the day, I never felt unsafe. Like many other *barrios* throughout the city, the streets in the afternoon were populated with children walking home in their school uniforms. *Motos* (motorized bikes) zoomed down the main commercial street, delivering food and other goods to the local shops. The sounds of barking street dogs and music wafted through open-air cafes, shops, and public spaces. Later, when I transcribed the interviews, these background sounds made me miss Colombia. Of course, the street scene of Paraíso and Mirador felt different from cityscapes in the wealthier urban core. Differences in the infrastructure and built environment were the most apparent. For example, many of the peripheral homes were constructed of cheaper materials like brick, wood, and corrugated metal. The roads were not as wide as the main commercial streets in the urban core, and there were far fewer cars and motorized vehicles in general.

For their part, peripheral residents offered mixed reviews of their communities. A comparison between the comments of Mel, a current resident of Ciudad Bolívar, and Janice, a former resident, exemplifies differences in perception. Mel’s perceptions were generally positive, although she felt disconnected from other members of her community:

Kimika: What are the things that you like and dislike about your *barrio*?

Mel: I don’t like that I do not maintain connections with anyone. I stay in my house.

Kimika: And what do you like?

Mel: I like my house. [We both laugh]. It’s beautiful. Well, for me it is beautiful...And I like the high school. Yes, the professors are very good.

Kimika: Did you attend there?

Mel: No, my children.

Later in our conversation, Mel added that she felt the streets were safe until 8:00pm. Until then, you can be in the street and “*no pasa nada*”—“nothing [bad] will happen”—she said, echoing Daniel (Interview 6).

By contrast, Janice expressed negative views about her former *barrio*. It is important to mention that while Mel lives in Paraíso, Janice used to live in Juan Pablo, farther down the mountain. Both are located in Ciudad Bolívar, and both *barrios* have their own TransMiCable station. Over two decades ago, Janice lived in Ciudad Bolívar with her three children (who are all grown now). She became concerned about the negative influence of the area, and after one of her boys started hanging out with the “*muchachos*” of the *barrio*, she decided to leave. Janice said, “Then I said to my mother, it pains me but I am leaving. I took my three children and we left...for San Cristóbal.” At the end of our interview, Janice told me that her children have grown up and left the house, and are doing well, “*pero porque los saque de allí.*”—“but because I took them from [Juan Pablo].” Janice caveated, “Well, there are always people smoking, getting into trouble, [acting as] *muchachos*, but [in Ciudad Bolívar] there are many.”

Negative perceptions can exacerbate the social exclusion of peripheral communities in Ciudad Bolívar, which already face disadvantages due to the uneven distribution of wealth and opportunities throughout the city. Andrea, the tour guide, acknowledged the negative perceptions and defended her *barrio*. She passionately argued that Mirador and Paraíso are changing for the better, partially due to new government investments like the TransMiCable, but also because of local community efforts to improve housing and the built environment. Further, she stated, “Many people live here, [and] we work...It is not as the whole world criticizes or says. Because here, the people are very hard working” (Interview 9).

16. Barriers to Mobility and Accessibility

There is a three-way interaction between transportation, employment, and housing (Sanchez 2008) which together form the barriers to mobility and accessibility in peripheral urban localities like Ciudad Bolívar (Guzman, Hernandez, and Rivera 2017). As the Background section describes, the three-way interaction is caused by spatial mismatch between locations with a high density of employment, and those with a high density of housing. Transportation (public or private) routes connect people to near and distant employment centers. Areas with better

transit access and proximity to work are in high demand but low supply, making them prohibitively expensive for most urban dwellers (Guzman and Bocarejo 2017). Therefore, the poor are forced to live in cheaper, more affordable housing which tends to be located in regions with low transit accessibility. In turn, this reduces the employment opportunities that poor residents are able to access within a fixed cost-time budget. In Bogotá, the divide between the wealthy urban core and poor periphery exemplifies the barriers to mobility caused by uneven employment, housing, and transit provision (Guzman, Hernandez, and Rivera 2017). Seen in another light, this three-way interaction also reflects Geurs and Van Wee's connection between land use (residential and commercial areas) and transportation (Geurs and Van Wee 2004).

Therefore, it is important to understand that the barriers to mobility and accessibility in Paraíso and Mirador are a product of land use, in addition to transit inequity. The next subsection on Transportation will consider the broader consequences of the entire public transit network, which the TransMiCable was added to. Then, the Employment and Housing subsections will feature key insights from my interviews and observations, which suggest that transportation is a necessary but not sufficient explanation for—and, potential solution to—the history of poverty and exclusion on the urban periphery.

16.1 Transportation

My research documented public transit users' complaints about the much larger TransMilenio and SITP bus network, which the TransMiCable was designed to complement. Although the TransMilenio and SITP greatly improved public transit over the status quo, as discussed in the Background section, user dissatisfaction has increased substantially since their rollout. According to the annual Citizen Perception Survey administered by *Bogotá Cómo Vamos*, only 23% of users approved of the TransMilenio in 2019, compared to 49% in 2007 ("Encuesta de Percepción" 2019; Garcia-Suarez, Rivera-Perez, and Rodriguez-Valencia 2018). Likewise, the SITP's approval ratings dropped from 46% in 2013 to 24% in 2019 ("Encuesta de Percepción" 2014; "Encuesta de Percepción" 2019). The complaints users shared with me included overcrowding, unreliable service, safety concerns, long travel times, and high fare costs (Interviews 5; 6; 7; 12; 13). Some of these concerns were already mentioned in comparison to

the TransMiCable, but here we take a second look at **overcrowding** on the TransMilenio and **traffic delays** on the SITP.

In a sense, the TransMilenio has become a victim of its own success. The bus rapid transit system is efficient: For Bogotanos/as who live or work along the main corridors served by the TransMilenio, it can actually be faster to take the TransMilenio bus during rush hour, because they drive in exclusive lanes to avoid traffic. But high demand for the system has led to overcrowding, reducing the quality of the user experience and introducing longer wait times when one bus does not have enough available capacity to pick up all of the passengers at a particular stop. In fact, in 2016, overcrowding was the number one complaint about the TransMilenio (Hernandez and Cuellar 2018, 3).

One resident (Male, 40s) who had lived in Ciudad Bolívar for 18 years told me that he used the TransMilenio infrequently, because he did not travel to the city's center often. Still, he had lots to say about the TransMilenio. He was a smiling man with a big personality that attracted the attention of the other man in the café where we held our interview (Interview 4).

Before his small audience, the interview participant offered a comical account of the “errors on the TransMilenio”—a critique of how users' poor bus etiquette exacerbates overcrowding and causes inconvenience to other passengers. “First, when you are trying to step off the bus. The doors open and the people [on the platform] push forward without thinking of the person trying to step off. And you...push [against] the crowd to leave the bus.” He threw his elbows side to side, mimicking the frantic struggle to move against the crowd and get off the bus (Interview 4). I laughed. After almost two months of riding the TransMilenio, I had to admit, the scene was all too familiar.

“Second mistake,” he continued, “not moving to the back or middle of the bus when your stop is far away. People stand right by the door! And it [makes it] even harder to step on or off, [because the bus door is blocked].” He shook his head disapprovingly. “You are even wasting your own time, because boarding is slower.”

Meanwhile, the SITP buses drive in regular traffic lanes that have become more congested over time. Slow, inconsistent service due to traffic were the primary complaints mentioned by the SITP users I spoke with (Interviews 6; 7; 12; 13) (Observations 2; 5). Their

user experiences, discussed in detail in 14.1.1 Travel Time Savings, animate data which indicate that compared to 2008, the average speed of public transport in regular traffic lanes decreased from 23 kilometers per hour to 15.6 kilometers per hour, resulting in a nearly 30% increase in the average commute time (C. R. Hernandez and Cuellar 2018, 3).

Aside from public transit, driving a car to access the urban core from Mirador and Paraíso is not much better. Cars are unaffordable to most low-income residents (Guzman and Bocarejo 2017, 4504), and moreover, the haphazard road network and traffic conditions often force drivers to endure inefficient, long commutes just like bus users. For example, Jorge did not use public transit at all, but he carpooled to Usaqué for work. I asked him how long it takes to drive to the city's northern locality (Appendix 4). "With this traffic? I don't know, *veci*.²⁹ Two hours...but it can be as long as three hours," Jorge replied (Interview 8).

16.2 Employment

As described in 14.2.2 Limited Nonessential Travel, my findings are consistent with prior research that found most low-income passengers use public transit for essential activities like work and school (Guzman, Hernandez, and Rivera 2017; Ureta 2008). The *barrios* of Paraíso and Mirador are distant from employment centers in the urban core. Peripheral residents, therefore, have to trade off between either spending more time on their daily commutes, or selecting from a smaller set of local employment and entrepreneurship opportunities.

The data indicate that employment opportunities in Ciudad Bolívar are relatively scarce (Bocarejo and Hernandez 2012; Guzman, Hernandez, and Rivera 2017) (Appendix 3). But in one interview, a resident from central Teusaquillo (Female, 40s) noted that the data may not capture the true amount and spatial distribution of employment, because many jobs are in the informal economy. Therefore, she claimed, people can find nearby jobs even if they are not recognized by the government and not included in the official statistics (Interview 5). In "Impact of the MetroCable on the Local Economy," Coupé and Cardona also suggest that many of the jobs located on the periphery of Medellín are in the informal economy (Coupé and Cardona 2013). Coupé and Cardona write, "[The role of neighborhood shops] in low-income settlements of large

²⁹ *Veci*, short for *vecino*, means "neighbor." Colombian Spanish, at least in Bogotá, is ripe with terms of endearment that can be used in casual conversation—even with complete strangers!

cities is particularly important since not only are they accessible but they also constitute an important source of income for many residents (Coupé and Cardona 2013, 93–94).” This phenomenon appeared to play out in Ciudad Bolívar, too. However, neighborhood shops tend to be family-run businesses with few or no employees, other than family members who work to earn their household income (Coupé and Cardona 2013, 94).

In addition to the neighborhood shops that I saw lining the main commercial street in Paraíso-Mirador, Andrea told me that tourism from the TransMiCable has introduced the possibility of new economic opportunities. She said that her company, for example, is part of the tourism industry, but they preferred to market their tours as “community experiences,” because the start-up was operating illegally (Interview 9).

“Illegally, or informally?” I asked.

“It is the same thing,” Andrea replied. “Informal and illegal are the same. If you provide a [tourism] service, but aren’t a certified agency, it’s illegal. You need a certificate to be a tourist agency, and need to prove that you can speak multiple languages.” She told me that she was studying English in hopes of obtaining a legal certificate, but that the process would take at least two years (Interview 9).

In conclusion, the full-time workers I interviewed sorted into two categories: entrepreneurs and employees. Entrepreneurs like Andrea and Mauricio used their businesses to support themselves and their families, but struggled to escape the informal economy (Interviews 4; 9). Mauricio, the water truck owner, confided that he has never opened a bank account, because he was worried that his money would be taken or lost (Interview 4). Other peripheral residents worked in the urban core instead. Employees such as Jefersson and Jorge traveled more than 2 hours each day to get to and from work (Interviews 7; 8). For Jorge, time was a necessary sacrifice to earn a livable income (Interview 8). But Jefersson had had enough of too little:

Jefersson: I am living with a cousin and working [in Bogotá] now, but in one month I am leaving for Costa Rica.

Kimika: Really? What are you going to do there?

Jefersson: I have a brother there, too. Here in Colombia, it is very beautiful, *but there are no opportunities* (Interview 7).

Jefersson lived a nomadic life in the past, working in Mexico for a year and two months before taking odd jobs in the Caribbean, and finally making his way back to Colombia. He had decided once again that leaving was the preferred option (Interview 7).

16.3 Housing

But for others, like Mel, her home, family, and way of life are rooted in Bogotá. Despite the hardships she has faced, she said that she was happy with her life in Ciudad Bolívar. On the day that we met on the TransMiCable, Mel told me that she was returning from a rare trip down the mountain, where she had delivered papers for the deed to her house (Interview 6). Her house was a point of pride that she brought up several times during our conversation, even inviting me to visit it after the interview. (I had to decline, because her house was a 20 minute walk from the TransMiCable station, and I did not know the way back).

Generally, peripheral residents cannot afford to live in middle- or upper-class *barrios* located closer to economic centers and other social and public amenities. Some of them cannot even afford to own or rent property in Ciudad Bolívar. As Andrea explained, over the past decade more and more dwellers in Ciudad Bolívar have gained legal ownership over their home and the land they reside on, but many others have been left out of the formalization process (Interview 9). “*Nosotros somos un barrio de invasión,*” —“We are a *barrio* of invasion,” Andrea declared. There are many reasons why local residents do not own the property rights to the land where they reside. Many simply did not pay for the land where they self-constructed their homes; this is what Andrea meant when she called Mirador-Paraíso “a *barrio* of invasion” (Interview 9). For instance, there are families that have lived on the same plot of land for multiple generations, but without legal documentation. Others settled more recently, but still managed to find an unpopulated lot where no one claimed active ownership.

Historically, residents have not been granted property rights without proof of legal payment, or a deed.³⁰ For some plots, it is hard to know who, if anyone, holds a legal title to the

³⁰ This assertion is based on my conversations with civil engineers and social workers at Fundación Catalina Muñoz (FCM), and Bogotá-based nonprofit that manufactures and builds prefabricated houses for families facing extreme poverty in Colombia. FCM works in poor peripheral communities of Bogotá, and throughout the surrounding metropolitan region. The nonprofit cannot build a prefabricated home until legal property rights are obtained, so their field team has expertise in advising and evaluating beneficiaries’ legal property rights.

land. “Here [in Mirador-Paráiso], we still do not have a [property] designator³¹ ...There are some houses that have deeds, but others that do not,” Andrea informed me (Interview 9). The irony of the situation dawned on me: The areas with the most want of property rights had the least access to property designators. Which meant that to obtain the legal right to live in their homes, peripheral residents had to head down the mountain toward—you guessed it—the urban core.

Worse yet, some peripheral residents were swindled into “purchasing” land with a false deed. When I asked Mauricio how safe he perceived the outskirts of Bogotá to be, he launched into a story about a predatory realtor who had sold false deeds to several people in the area of Soacha (note: not Ciudad Bolívar) where he delivered water. According to Mauricio, the fraudster met his fate: He was fatally shot by two of the men he had swindled. Incredulous, I asked Mauricio if the executors had faced legal repercussions. He told me no. “The police do not go there. Sometimes the *ejercito* (army) passes through, but rarely.” Instead, he said, “The people look out for one another” (Interview 3).

Andrea claimed that the value of some homes near the TransMiCable station has increased with the recent urban development:

Kimika: So, the houses near the station are more valuable because of construction [of the TransMiCable]?

Andrea: Yes, some of the houses near the station are even classified in *estrato* 2 or *estrato* 3 [due to] the enhancement of the TransMiCable (Interview 9).

The TransMiCable is a significant amenity for mobile people within its zone of influence, and many of the homes were also physically improved, sometimes with the help of the Bogotá city government. When we rode the aerial cable car together, Mel told me that the mayorship donated paint to local families to decorate the rainbow-hued houses we were admiring from our bird’s eye view (Interview 6) (Appendix 2). She lamented that her house was not eligible for free paint, because it was too far away from the cable car route (Interview 6). Andrea confirmed the practice, saying that the TransMiCable project team donated paint to some homes in 2017 and 2018 so that “they would look more presentable” (Interview 9).

But residents who do not have a deed do not financially benefit from the increase in property values, Andrea explained. In the eyes of the law they do not have a right to the land. So,

³¹ A property designator is an official vested with the legal authority to notarize documents showing proof of property ownership, e.g. a deed.

legally they cannot sell the land, even if the property value increased while they were living there. An informal property owner might try to sell the land without a deed, but for half the value: “So if there is a house worth 100, 200, 300, 400, 500 million pesos, *baja su costo por no tener designación de terreno. Baja en mitad o menos de mitad*. That is, “[The seller] lowers the cost, because they do not have the designation of land [ownership]. They lower it to half or less than half [of the property value] (Interview 9). Thus, the lack of property rights hurts peripheral residents, even though nobody evicted them from their homes.

In conclusion, the relationships between transportation, jobs, and housing reinforce the challenges poor peripheral residents face. There are no easy solutions. When I asked one urban core resident (Female, 40s) from Teusaquillo about her perception of long commute times to get around the city, she pushed back saying that commute times were not so long. “Because of the high cost of public transit, it is better [for people] to move [and live] near work” (Interview 5). Although her comment may be correct, of course it is not possible to live near work if the available jobs are located in the city’s center, but the only places one can afford to live are far away on the urban periphery. Interestingly, however, her comment also reproduced the three-way interaction between jobs, housing, and transit—even if the alternative she named did not align with the lived experiences of peripheral residents. Without major changes to both transportation and land use, it is not possible to address the multiple causes of poor mobility and low accessibility on the urban periphery.

Policy Recommendations

The first subsection will discuss **minimum criteria for implementation**, defined as the topographic, demographic, institutional, financial, and infrastructural characteristics that urban centers should meet in order to implement aerial cable cars to reduce transit inequities. My purpose is two-fold: First, to provide a list of criteria urban planners and policy-makers who want to build an aerial cable car in their city should consider. (I'm looking at you, Mayor of Pittsburgh!) Second, to evaluate the TransMiCable against these minimum conditions, and identify opportunities to improve current and future aerial cable car routes in Bogotá. In particular, Bogotá should increase **mass transit capacity** in the urban core, and establish **priority queues for local residents** to board the TransMiCable before tourists.

The second subsection will focus on user needs. In particular, policy-makers should strengthen the existing **fare subsidy program** to make public transit more affordable to poor users. Finally, the third subsection will cover transit-oriented development—specifically, how complementary policies that change land use in peripheral communities can reduce spatial-economic inequalities and increase public transit access. These **land use policies** should develop affordable housing, road and walking infrastructure, and local commercial zones near the aerial cable car routes.

17. Minimum Criteria for Implementation

It is important to note that the following minimum criteria for implementation are not intended to evaluate all of the possible uses of aerial cable cars, but rather the subset of cases where aerial cable cars are designed to reduce transit inequities. For example, aerial cable cars designed to connect urban space to popular tourist destinations may not require a high population density to serve its intended purpose, but such examples are out of the scope and focus of my research. Instead, from a policy perspective, my research is particularly relevant for urban centers seeking to improve transit equity for poorer residents located on the mountainous periphery. After all, Bogotá and Medellín are leaders in public transit innovation, especially in Latin America.

Criteria	Description
Topographic: Mountains or Steep Hills	Aerial cable cars are designed to serve urban areas built on mountains or steep hills. Traditional modes of transit such as car, buses, subways, and trains are often less suitable for inclined topography due to the need for long, winding road or rail networks as well as unusually high costs or geotechnical risks (Alshalalfah, Shalaby, and Dale 2014; Rubiano, Jia, and Darido 2017).
Demographic: Population Density and Income Inequality	Previous quantitative research demonstrated that proximity to transit stations was strongly correlated with TransMiCable use. Outside of the cable car's 500 meter zone of influence ("Balance de operación" 2019), the likelihood that a Ciudad Bolívar resident would use the TransMiCable decreased up to 84% for every additional 100 meters away from the station (Socha 2019, 34). Therefore, the area around the cable car station should have a high density of low-income residents who will utilize the route.
Financial: Capital Costs and Maintenance	Although public finance was not a focus of my research, it is important to note that a government must be able to cover the costs of the aerial cable car system. This includes the upfront capital costs, as well as ongoing maintenance costs. ³² In Bogotá, the integrated transit system is designed to operate without a subsidy, meaning that most maintenance and operation costs are paid for by ticket fares (Gilbert 2008; Sandoval and Hidalgo 2004).
Institutional: Coordination and Local Government	Although institutional structures were also not a focus of my research, coordination and local government support was an important component in both Bogotá and Medellín. Specifically, both the TransMiCable and MetroCable had the support of successive mayorships, as well as a dedicated transportation entity (the TransMilenio S.A. and the Metro de Medellín) which was primarily responsible for managing the cable cars.
Infrastructural: Mass Transit Capacity	Most aerial cable car routes used for public transit are integrated with a larger mass transit network. Because aerial cable cars have a limited carrying capacity, ³³ they are typically intended to serve auxiliary routes rather than main corridors. In both Medellín and Bogotá, the aerial cable cars connected to a mass transit network that served the urban core. In Medellín, the Metro elevated train system was actually under capacity in 2004 before the aerial cable cars were built, providing a strong existing network for the city government to build off of (Brand and Dávila 2011, 46). In Bogotá, the TransMiCable integrated with the TransMilenio bus rapid transit system.

³² Two aerial cable car routes built to serve the Alemão and Morro de Providência *favelas* in Rio de Janeiro, Brazil are a prominent example of a financial failure. They opened in 2011 and 2014 as two of many government projects to improve the urban environment for the 2016 Summer Olympics. But in September 2016, just one month after the Olympics ended, the government stopped the service, citing lack of funds for maintenance. The routes remain closed as of March 2020 despite bureaucrats' promises to reopen it (Halais 2019; "Teleférico Da Providência" 2017).

³³ The TransMiCable's state-of-the-art cable cars have a carrying capacity of 3,600 passengers per hour per direction ("Balance de operación" 2019).

In conclusion, these topographic, demographic, financial, institutional and infrastructural characteristics constitute the minimum conditions for implementation. Based on my research, the TransMiCable route appeared to check most of the boxes. However, the TransMilenio system that serves the urban core is overcapacity, and should be fortified.

18. Mass Transit and Cable Car Capacity

Unlike the Metro, the TransMilenio system operates overcapacity along many routes in the urban core. For example, on the popular Avenue Caracas corridor that connects Portal Tunal to the north-central localities of Chapinero and Usaquén, TransMilenio ridership data shows that the number of passengers reached 56,000 passengers per hour per direction in 2016, way beyond the route's intended capacity of 45,000 (Hernandez and Cuellar 2018, 3). As my interviews with peripheral and central Bogotanos/as revealed, overcrowding on the TransMilenio reduced the quality of passengers' experience (Interviews 4; 5; 6; 12). Most of the TransMiCable users I interviewed transferred to and from the TransMilenio at Portal Tunal station, clearly indicating that they depend on both systems for transit access to the urban core (Interviews 6; 10; 11; 12; 13) (Observations 2; 4).

One clear policy recommendation based on these findings is that cities need to build and maintain their mass transit capacity in order to sustain an integrated aerial cable car system. In Bogotá, the city government should increase the capacity of the TransMilenio system to keep pace with demand. Unfortunately, officials cannot simply add more buses to the main corridors to provide more frequent service. The TransMilenio buses drive in exclusive lanes, which would become overcrowded if too many public buses operated along the same routes.

Instead, city bureaucrats have already proposed an alternative: an elevated Metro train line. Section 19.1 Transportation examines the current state of this proposal in more detail. To preview, my research supports the overall goal of current efforts to increase mass transit in the urban core. The reason is that it not only benefits urban core residents, but also peripheral residents who are disproportionately likely to use public transit to move around the city (Guzman and Bocarejo 2017, 4504).

Policy-makers should also prepare for the possibility that the cable cars will eventually meet or exceed their capacity. In interviews and observations, peripheral residents emphasized

that the TransMiCable was faster and more reliable than buses or other mobility options. Therefore, maintaining this advantage will be central to TransMiCable's long-term success. Most of the TransMiCable's users appeared to be either peripheral residents or tourists (Interviews 6; 9; 11; 12; 13) (Observation 4). Over time, the demand from tourism may increase, as it did in Medellín. The TransMilenio S.A. should establish separate "tourism" and "non-tourism" queues at each of the TransMiCable stations, so that local residents get priority to board the cabins.

19. User Needs and Fare Subsidy

My ethnographic case study found that cost was the main constraint that prevented residents of Paraíso and Mirador, Ciudad Bolívar from accessing public transit. The high cost of transportation restricts peripheral residents' mobility to the strictly essential: for work and for school. Although the TransMiCable reduced users' travel times, it did not appear to increase peripheral residents' frequency of trips or propensity to visit other parts of their city (Interviews 6; 10) (Observations 2; 3). Sarah, a 16-year-old student who attended high school just down the street from Paraíso Station, pointed to the explanation. She said she used the TransMiCable when she went to the city's center to visit parks or pass the time. But such trips are infrequent. "*Cuando hay plata,*" or "When there is money," she remarked (Interview 10).

Affordability is a component of accessibility (Geurs and Van Wee 2004). The cable car's objective is to increase transit access for poor peripheral residents, but ticket fares exceed the amount that some intended users are able to pay for public transit. Quantitative research substantiates what participants in my case study told me: For most TransMiCable users, the cost of travel did not change with the addition of the cable car (Socha 2019), and peripheral residents still spend a high percentage of their household income on public transit (Bocarejo and Hernandez 2012, 142). Therefore, the current cable car policy misses a key component of accessibility.

The good news is that a potential solution already exists. In 2014, Bogotá city government rolled out a public transit subsidy for low-income users in consultation with the World Bank. As Rodríguez et al. explain, the fare subsidy program built upon two prior developments: [1] The *Tu llave* electronic fare card was adopted on all public buses and cable cars operated under the authority of the TransMilenio S.A. (Appendix 7). Similar to a Chicago

Ventra card, the *Tu llave* electronic fare card could be programmed to store the cardholder's information and grant subsidies to target beneficiaries (Rodríguez et al. 2016). [2] Colombia built a robust database (the *Sistema Nacional de Selección de Beneficiarios* or SISBEN) to identify potential beneficiaries of social welfare programs. Essentially, "SISBEN is a proxy means testing system that classifies people from poor to rich on a score scale" (Castañeda 2005). The database uses several socio-economic indicators such as household demographics, marital status, education, employment, income, owned asset value, and residential location to give each citizen an index score ranging from 0 to 100. Citizens are also classified into one of SISBEN's six poverty levels, with *estrato* 1 being the poorest and *estrato* 6 being the wealthiest. This should sound familiar to the reader.

Citizens who live in Bogotá and have a SISBEN score of 30.56 or less can opt-in to request a subsidized fare card that automatically grants a 28% discount per trip, capped at 30 trips per month. As of March 2020, beneficiaries of the public transit subsidy pay 1800 COP instead of 2500 COP to ride the TransMilenio-TransMiCable network, and 1650 COP instead of 2300 COP to ride the SITP ("Tarjeta SISBEN" 2020). The subsidy makes the city's transit system more affordable to users who might otherwise be priced out.

Unfortunately, two-thirds of eligible low-income residents do not take advantage of the subsidy. Rodríguez et al. found that 900 thousand low-income residents were eligible for the program (Rodríguez et al. 2016). As of 2019, 388 thousand discounted fare cards were issued, and only 301 thousand were in use ("Número de Tarjetas" 2019). Potential beneficiaries have to opt-in to receive a discounted fare card by going to a local government center or TransMilenio depot. Women, full-time workers, and low-income individuals who heard about the program through word-of-mouth were more likely to claim their benefits than other eligible individuals (Rodríguez et al. 2016).

The aerial cable car offers new opportunities for Bogotá city government to increase the impact of its fare subsidy program. Policy-makers should take advantage of them. For instance, widespread efforts to publicize the TransMiCable mobilized a grassroots effort through peripheral community leaders and residents. These same contacts could help to raise awareness about the discount fare card, and inform residents how to apply. Further, most of the locations

where people can apply for the discount fare card are located in the urban core or semi-periphery. But now, a few places like Mirador-Paraíso have TransMiCable stations that could and should allow peripheral residents to apply for and pick up the discount fare cards in their own *barrio*. Lastly, just as the TransMiCable stations feature bright billboards advertising the aerial cable cars (Appendix 16), high-traffic public spaces like these should also target low-income residents with ads encouraging them to claim their subsidy if they are eligible. Information about the subsidy, eligibility requirements, and how to apply could be included on public infographics posted in public spaces in Ciudad Bolívar.

Of course, one downside of the proposed efforts to increase utilization is that it would cost the Bogotá city government more money. Each subsidized TransMilenio trip effectively charges the government 700 COP (US\$0.20), and if more users have discounted fare cards, then the total costs of the program will increase. However, I argue that the benefits of targeted fare discounts are worth the expense. Historically, the city government prioritized cost recovery for its transit system; fare prices are high, because they are designed to cover the costs of operating the routes. But there is a trade-off between cost recovery and transit accessibility. Low-income residents mainly experience the downsides of mobility such as long travel times to work, but not the benefits, such as physical access to social and leisure activities throughout their city. Policies like the fare subsidy program and the aerial cable cars illustrate the city government's evolving priorities and modern concerns around transit equity.

My ethnographic research incorporates the personal stories, experiences, and voices of possible beneficiaries of the program. It provides compelling evidence of why a fare subsidy is necessary to improve public transit accessibility in *barrios* like Paraíso and Mirador. Models also demonstrate the possible impacts of a fare discount from a more theoretical perspective: For example, Bocarejo and Hernandez found that “Depending on the population, its location and purchasing power, the impact of a [discounted] fare with respect to accessibility to the labour market can be greater than the expansion and improvement of the public transport network.” (Bocarejo and Hernandez 2012, 142). In other words, the fare subsidy can sometimes have an even greater impact on access to new employment opportunities than direct public transit infrastructure investments. Rodríguez et al. concluded that the fare subsidy card helped informal

workers access better job opportunities, which increased their hourly wages by a statistically significant amount just one year (2015) after the program was introduced (Rodríguez et al. 2016).

20. Transit-oriented Development

Although poor transportation exacerbates poverty and social exclusion, land use is also an important dimension of accessibility. Therefore, proposals to build aerial cable cars would be remiss without complementary policies to change land use, particularly the distribution of jobs and housing. Before I discuss my policy recommendations, it is helpful to ask a basic question: What would it mean for an urban structure to be spatially equitable? One response offered by Guzman and Bocarejo is “when the location of people, regardless of their income level, does not affect their access to opportunities of the city and the cost of reaching such opportunities is proportional to their income” (Guzman and Bocarejo 2017, 4993). To reach toward the ideal of equitable access, I offer final policy recommendations in three categories: transportation, jobs, and housing.

20.1 Transportation

As mentioned in 18. Mass Transit and Cable Car Capacity, there is a great need to increase mass transit capacity in the urban core. In October 2019, former Mayor Peñalosa signed a \$4.3 billion contract to build the capital city’s first elevated Metro train. The 25 kilometer Metro line will connect poor peripheral neighborhoods in Bosa and Kennedy to the north-central urban core (Appendix 21). As shown on the map in Appendix 21, the route will begin in Bosa, passing through Kennedy, and all the way east to the historic district of La Candelaría. From there, the Metro line will run north along Avenue Caracas (*Railway Technology* 2020). It will transport up to 70,000 passengers per hour per direction, and significantly reduce users’ commute times. Construction is expected to begin in early 2021, and will take at least five years to complete (Fieser 2019; *Railway Technology* 2020). The Metro train will add rapid mass transit capacity and connect historically underserved localities to the urban core. Therefore, it not only provides a solution to the overcrowded mass transit problem identified in the previous section, but like the TransMiCable, it also aims to increase vertical transit equity.

My research found that TransMiCable brought significant benefits including travel time savings, increased safety and comfort, and social inclusion to Paraíso and Mirador. These two *barrios*, and other communities in localities like Ciudad Bolívar, have been historically passed over for public transit investments. The TransMiCable represents a new front of innovation and investment in Bogotá, through policies designed to improve mobility and public transit access in poor peripheral regions. Moreover, aerial cable cars are relatively cheap to construct, and uniquely fit to serve mountainous regions where more traditional modes of transit are too costly or inefficient. Therefore, the opportunity to open other TransMiCable routes should be embraced with open arms—and a critical eye to the potential impacts and feasibility, of course. Although more research is needed to better understand the full scope and scale of the TransMiCable's impacts, early research including mine shows that the cable cars significantly improved users' daily lives and commutes.

In fact, the Bogotá city government is already eager to expand the TransMiCable network. The new mayor of Bogotá, elected in October 2019, grew up in Ciudad Bolívar (Emblin 2020). Shortly after taking office in January 2020, Mayor Claudia López promised to build two more TransMiCable routes. Like the original route in Ciudad Bolívar, the new aerial cable car projects will link with the TransMilenio at existing bus depots. The cable cars are expected to serve impoverished communities on the outskirts of southern Bogotá: The planned route in San Cristóbal would connect the Altamira *barrio* to the Portal 20 de Julio station. And, the Usme aerial cable car would begin at Portal de TransMilenio and ascend to the Arrayanes *barrio* (Supúlveda 2020).

Lastly on the topic of transportation, the city government should make complementary investments in road and walking infrastructure near the TransMiCable stations. Prior research conducted in 2014 found that most of the roads in Paraíso and Mirador were unpaved (Agudelo and Maldonado 2014; Zambrano 2014). Five years later, when I visited the *barrios*, this was still the case. As discussed in 14.2.3 Last Mile Problem, the distance between TransMiCable stations is a major limitation inherent to cable cars. Because there are only four stations along the current route, some participants in my research reported walking up to 20 minutes to access the cable cars (Interviews 6; 7; 13). To make their journey on foot easier and faster, the city government

should consider adding paved roads with sidewalks, pedestrian bridges, stairways, and paths to traverse the mountainsides within a one-mile radius of the stations. These would serve the dual purpose of helping residents get around their *barrios*, where foot travel is the most common method of travel (Zambrano 2014), and connecting them to the TransMiCable stations which are often the fastest way to reach the urban core.

20.2 Employment

The city government should encourage the development of local jobs in peripheral regions. Loo and Chow indicate that employment is “the” activity, the source of income, that enables all other activities that individuals can pursue (Loo and Chow 2011). Therefore, Guzman and Bocarejo claim the city should prioritize “businesses [located] within the proximity of residential developments, particularly in the most disadvantaged areas of the city, as well as to improve the transport infrastructure (Guzman and Bocarejo 2017, 4504).

I argue further that the government should enable and protect locally-owned businesses, so that the benefits of increased economic activity accrue to peripheral residents more than outside entities. Fortunately, my research revealed a strong entrepreneurial spirit in Ciudad Bolívar. Lacking opportunities to apply for local jobs, some of the residents I spoke with started their own businesses including a tourist agency, water delivery service, and neighborhood shops and cafes (Interviews 3; 9) (Observation 3). These businesses allowed entrepreneurs like Andrea and Mauricio to provide for their households, but they told me that it was difficult to escape the informal economy (Interviews 3; 9).

Some of the policies to consider to help entrepreneurs like Andrea and Mauricio include:

- **Amnesty policies**, to ensure that informal businesses are not punished for their dubious legal status if their owners or affiliates choose to access the following services.
- **Microgrants**, to support small businesses owned by peripheral residents, especially those which provide paid employment opportunities to others in the community.
- **Technology access policies**, to provide vital business amenities like bookkeeping software, tax and legal information, computers, and Internet access.

- **Legal consultation services**, to advise and assist entrepreneurs through the legal processes necessary to register an official business, hire employees, etc.
- **Transit infrastructure**, to allow entrepreneurs to transport and sell their goods and services in other parts of the city, particularly wealthier markets.

Although it is way beyond the scope of my ethnographic research to recommend specific job policy interventions that the city government should implement, my research revealed both the need for local jobs in Paraíso and Mirador, and the existence of entrepreneurs wanting to create them. Therefore, further research is needed to evaluate policies like providing amnesty, microgrants, technology access, legal consultation, and of course, transportation to local businesses.

20.3 Housing

Finally, the priority some peripheral residents placed on informal housing³⁴ issues cast light on an additional set of policies that could be complementary to the aerial cable car project in Ciudad Bolívar (Interviews 3; 6; 9). For example, the Bogotá city government should consider:

- **Formalization policies**, to grant property rights to peripheral residents who occupy uncontested land, but do not have legal ownership.
- **Rent and utility controls**, to prevent housing costs near the TransMiCable route from increasing in a way that pushes peripheral residents out of their homes.
- **Resettlement policies**, to help displaced persons find safe and dignified housing.
- **Social housing**, to build affordable housing both in Ciudad Bolívar for residents who wish to stay there, as well as in other parts of the city that were historically inaccessible to them.

Again, these policies require more research, but are worth considering based on my findings. Bocarejo et al. also notes that housing policies can be a complement *or* an alternative to public transit development:

Considering a priori that the [transit] project must be developed may be missing the larger picture. In the case of cable cars, trying to force accessibility to a zone with a high risk of natural disasters or prioritizing the project above more basic

³⁴ Informal housing refers to constructed dwellings or plots of land that are not legally owned, rented, or otherwise occupied by the people who live there.

infrastructure may not be suitable. Promoting better and more secure living conditions may include relocating communities instead of providing them with better transport systems (Bocarejo et al. 138).

In conclusion, these policy recommendations respond to a need to address the barriers to accessibility (jobs, housing, and transit) through coordinated urban planning and mobility policies. First, to *enable* the lasting success of the TransMiCable, city bureaucrats should increase mass transit capacity, create priority boarding lanes for peripheral residents, and encourage eligible beneficiaries to take advantage of the fare subsidy program. Then, to *build upon* the new aerial cable car route, policy-makers and academics should identify, research, prioritize, and implement (in that order) transportation and land use policies that encapsulate a more holistic transit-oriented development approach.

Conclusion

This ethnographic case study reveals the impact of aerial cable cars on urban mobility and public transit accessibility in Mirador and Paraíso, two peripheral *barrios* in Ciudad Bolívar, Bogotá. TransMiCable users' commutes to the urban core are faster, safer, and more comfortable than before. The TransMiCable also inspires pride and a sense of inclusion for some residents of Paraíso and Mirador. Aerial cable cars are often promoted as a method to increase peripheral residents' access to economic, educational, and social activities. However, respondents generally agreed that the new route does not increase their frequency or propensity to access opportunities in the urban core. TransMiCable users in my research explained that while the time savings are significant, budget constraints still prevent them from enjoying better mobility despite the new TransMiCable route. Moreover, the uneven distribution of employment and housing interact with the transportation network to produce an unequal landscape of opportunity.

In light of these findings, transit policy-makers should seek to improve the implementation of aerial cable cars as a form of public transit. Overall, the limitations associated with the TransMiCable do not indicate policy failure, but rather emphasize the persistent, unmet needs of peripheral residents. These unmet needs with respect to public transit access are precisely what the aerial cable cars were designed to address. Therefore, the aerial cable cars represent a promising, but insufficient, step toward greater accessibility. Future measures could include a more holistic, transit-oriented development approach that transforms both transportation and land use, as well as fare subsidies designed to make the transit system more affordable to low-income users.

The aerial cable cars are a welcome change in Paraíso and Mirador, but not an earth-shattering one. But perhaps, therein lies their promise. Subjugated to the more mundane purposes of public transportation, aerial cable cars become *essential*, not spectacular. Thus, the TransMiCable becomes integrated into the daily lives and ongoing concerns of its users, sometimes in predictable but often in unexpected ways.

Bibliography

- “Abecé de TransMiCable.” 2018. Bogotá, D.C.: TransMilenio S.A.
<https://www.transmilenio.gov.co/publicaciones/151067/abece-de-transmicable/>.
- Acevedo, Jorge, Juan Miguel Velásquez, and Juan P. Bocarejo. 2013. “The Presidential Promise of an Aerial Cable-Car: Institutional Limitations and Political Realities.” In *Urban Mobility and Poverty: Lessons from Medellín and Soacha, Colombia*, 136–42. Medellín: Development Planning Unit & Department of Architecture, Universidad Nacional de Colombia.
- Agudelo, Estefanía Gómez, and Diana Marcela Córdoba Maldonado. 2014. “Recomposición Urbana en Torno al Cable Aéreo de Ciudad Bolívar.” Bogotá, D.C.: Universidad Piloto de Colombia, Facultad de Arquitectura y Artes.
- Alsema, Adriaan. 2020. “Construction Hasn’t Even Started and Bogota Already Lost Metro Funds: Comptroller.” *Colombia News | Colombia Reports*, January 8, 2020.
<https://colombiareports.com/construction-hasnt-even-started-and-bogota-already-lost-metro-funds-comptroller/>.
- Alshalalfah, Baha, Amer Shalaby, and Steven Dale. 2014. “Experiences with Aerial Ropeway Transportation Systems in the Urban Environment.” *Journal of Urban Planning and Development* 140 (1). [https://doi.org/10.1061/\(ASCE\)UP.1943-5444.0000158](https://doi.org/10.1061/(ASCE)UP.1943-5444.0000158).
- “Así es el sistema de TransMiCable que le cambia la cara a Bogotá.” 2018. Newspaper. El Tiempo. December 27, 2018.
<https://www.eltiempo.com/cifras-y-detalles-del-sistema-de-transmicable-en-ciudad-bolivar-en-bogota-309398>.
- “Así Fue El Viaje Del Primer Usuario Del Transmicable En Bogotá.” 2018. Bogotá, D.C.: Noticias RCN. <https://www.youtube.com/watch?v=RauEBnfy8JY>.
- “Bab El Oued – Z’ghara Cable Car.” 2019. The Gondola Project. Toronto, Canada: Creative Urban Projects.
<http://gondolaproject.com/category/installations/bab-el-oued-zghara-cable-car/>.
- Baddour, Dylan. 2019a. “Colombia Sees New Migrant Wave from Venezuela amid US Sanctions.” *Al Jazeera*, August 13, 2019.
<https://www.aljazeera.com/news/americas/2019/08/colombia-sees-migrant-wave-venezuela-sanctions-190813201741399.html>.
- . 2019b. “This Country Is Setting the Bar for Handling Migrants.” *The Atlantic*, August 16, 2019.
<https://www.theatlantic.com/international/archive/2019/08/colombias-counterintuitive-migration-policy/596233/>.

- “Balance de operación del primer trimestre de TransMiCable.” 2019. Bogotá, D.C.: TransMilenio S.A.
<https://www.transmilenio.gov.co/publicaciones/151190/balance-de-operacion-del-primer-trimestre-de-transmicable/>.
- BBC News*. 2018. “Colombia Profile,” August 8, 2018, sec. Latin America & Caribbean.
<https://www.bbc.com/news/world-latin-america-19390164>.
- Belko, Mark. 2020. “Gondolas to Work? Pittsburgh Parking Authority Could Have New Focus in Coming Years, Mayor Says.” *Pittsburgh Post-Gazette*, January 27, 2020.
<https://www.post-gazette.com/business/development/2020/01/27/Pittsburgh-Downtown-Parking-Authority-Gondolas-Incline-autonomous-vehicles-Bill-Peduto/stories/202001270098>.
- Bello, Nelson Javier Moyano, Ariana Daniela Prieto Pérez, and Flor Marina Martínez Guevara. 2018. “Evaluación de los impactos sociales proyectados para Transmicable en torno a la estación Juan Pablo II de la Localidad Ciudad Bolívar.” Universidad Católica de Colombia, Programa Especialización en Gerencia de Obras, Facultad de Ingeniería.
<https://repository.ucatolica.edu.co/handle/10983/22383>.
- Bliss, Ashley, Alexandra Clarke, and Peter Myers. 2013. “Northeast Comunas.” Medellín, Colombia: A Case Study for Healthy Cities. November 2013.
<http://healthymedellin.weebly.com/northeast-comunas.html>.
- Bliss, Laura. 2016. “Visualizing the Brutal Commutes of Colombia’s Poorest.” *CityLab*, October 19, 2016.
<http://www.citylab.com/commute/2016/10/visualizing-the-brutal-commutes-of-columbias-poorest/504632/>.
- Bocarejo, Juan Pablo, Daniel Escobar, Daniel Oviedo Hernandez, and Diana Galarza. 2016. “Accessibility Analysis of the Integrated Transit System of Bogotá.” *International Journal of Sustainable Transportation* 10 (4): 308–20.
<https://doi.org/10.1080/15568318.2014.926435>.
- Bocarejo, Juan Pablo, Ingrid Joanna Portilla, Juan Miguel Velásquez, Mónica Natalia Cruz, Andrés Peña, and Daniel Ricardo Oviedo. 2014. “An Innovative Transit System and Its Impact on Low Income Users: The Case of the Metrocable in Medellín.” *Journal of Transport Geography* 39 (July): 49–61. <https://doi.org/10.1016/j.jtrangeo.2014.06.018>.
- Bocarejo, Juan Pablo S., and Daniel Oviedo R. Hernandez. 2012. “Transport Accessibility and Social Inequities: A Tool for Identification of Mobility Needs and Evaluation of Transport Investments.” *Journal of Transport Geography* 24 (September): 142–54.
<https://doi.org/10.1016/j.jtrangeo.2011.12.004>.

- Bocarejo, Juan Pablo, Juan Miguel Velásquez, and Diana Carolina Galarza. 2014. "Challenges of Implementing à La Mode Transport Projects: Case Studies of Bus Rapid Transit and Cable Cars in Colombia." *Transportation Research Record: Journal of the Transportation Research Board* 2451 (1): 131–38. <https://doi.org/10.3141/2451-15>.
- Brand, Peter, and Julio D. Dávila. 2011. "Mobility Innovation at the Urban Margins: Medellín's Metrocables." *City* 15 (6): 647–61. <https://doi.org/10.1080/13604813.2011.609007>.
- Buckley, Ed. 2013. "The SITP Explained." *The City Paper Bogotá*, March 14, 2013. <https://thecitypaperbogota.com/news/sitp-explained/2642>.
- . 2016. "TransMilenio, SITP Fare Hikes Cost Bogotá Commuters." *The City Paper Bogotá*, January 21, 2016, sec. Bogota. <https://thecitypaperbogota.com/bogota/bogota-hikes-fares-for-public-transportation/>.
- Burnett, Victoria. 2016. "Near Mexico City, Cable Car Lets Commuters Glide Over Traffic." *The New York Times*, December 28, 2016. <https://www.nytimes.com/2016/12/28/world/americas/mexico-city-mexicable.html>.
- "Cable aéreo de Ciudad Bolívar, una realidad que empieza a tomar vuelo." Boletines de Prensa (Press releases). 2014. *Alcaldía de Bogotá, Instituto de Desarrollo Urbano* October 22, 2014. <http://www.idu.gov.co/blog/boletin-de-prensa-idu-1/post/cable-aereo-de-ciudad-bolivar-una-realidad-que-empieza-a-tomar-vuelo-1026>.
- "Cable Aéreo de Manizales." n.d. City Government Website. Asociación Cable Aéreo Manizales. Accessed April 19, 2020. <https://www.cableaereomanizales.gov.co/index.php/en/>.
- Cain, Alasdair, Georges Darido, Michael R. Baltes, Pilar Rodriguez, and Johan C. Barrios. 2006. "Applicability of Bogotá's TransMilenio BRT System to the United States." Washington, D.C.: Federal Transit Administration, U.S. Department of Transportation.
- "Caracas Metrocable." 2010. The Gondola Project. Toronto, Canada: Creative Urban Projects. <http://gondolaproject.com/caracas/>.
- Carvajal, Natalia Gómez. 2013. "El reto del SITP: sacar los buses viejos y multiplicar su operación." *El Tiempo*, November 1, 2013. <https://www.eltiempo.com/archivo/documento/CMS-13154138>.
- Castañeda, Tarsicio. 2005. "Targeting Social Spending to the Poor with Proxy-Means Testing: Colombia's SISBEN System." Discussion Paper. Social Protection Discussion Paper Series. World Bank, Social Protection Unit. https://www.researchgate.net/publication/254456316_Targeting_social_spending_to_the_poor_with_proxy-means_testing_Colombia's_SISBEN_system.

- Castilla, José David. 2019. “¿Se puede sancionar a los usuarios y conductores de Uber o Cabify?” *Asuntos Legales*, June 11, 2019. <https://www.asuntoslegales.com.co/actualidad/se-puede-sancionar-a-los-usuarios-y-conductores-de-uber-o-cabify-2872333>.
- Cerdá, Magdalena, Jeffrey D. Morenoff, Ben B. Hansen, Kimberly J. Tessari Hicks, Luis F. Duque, Alexandra Restrepo, and Ana V. Diez-Roux. 2012. “Reducing Violence by Transforming Neighborhoods: A Natural Experiment in Medellín, Colombia.” *American Journal of Epidemiology* 175 (10): 1045–53. <https://doi.org/10.1093/aje/kwr428>.
- Cerón, John. 2019. “¿Qué sigue para el metro de Bogotá y qué tan blindado está?” *El Tiempo*, June 29, 2019, sec. bogota. <https://www.eltiempo.com/bogota/que-sigue-para-el-metro-de-bogota-y-que-tan-blindada-esta-la-licitacion-382142>.
- Church, A, M Frost, and K Sullivan. 2000. “Transport and Social Exclusion in London.” *Transport Policy* 7 (3): 195–205. [https://doi.org/10.1016/S0967-070X\(00\)00024-X](https://doi.org/10.1016/S0967-070X(00)00024-X).
- “Conozca los mapas del Sistema.” 2019. City Government Website. Metro de Medellín. 2019. <https://www.metrodemedellin.gov.co/viajeconnosotros/mapas>.
- “Constantine Telepherique.” 2017. The Gondola Project. Toronto, Canada: Creative Urban Projects. <http://gondolaproject.com/category/installations/constantine-telepherique/>.
- Coupé, Françoise, and Juan Guillermo Cardona. 2013. “Impact of MetroCable on the Local Economy.” In *Urban Mobility and Poverty: Lessons from Medellín and Soacha*, 89–103. Medellín: Development Planning Unit & Department of Architecture, Universidad Nacional de Colombia.
- “Cultura METRO.” 2014. City Government Website. Metro de Medellín. October 28, 2014. <https://www.metrodemedellin.gov.co/cultura-metro>.
- Dávila, Julio. 2011. “Aerial Cable-Car Systems for Public Transport in Low-Income Urban Areas: Lessons from Medellín, Colombia.” July, 18.
- Delbosc, Alexa, and Graham Currie. 2011. “Using Lorenz Curves to Assess Public Transport Equity.” *Journal of Transport Geography* 19 (6): 1252–59. <https://doi.org/10.1016/j.jtrangeo.2011.02.008>.
- Dörrbecker, Maximilian. 2019. *TransMilenio Bogota Map.Png*. OpenStreetMaps. Own work, using OpenStreetMap data for the background. https://commons.wikimedia.org/wiki/File:TransMilenio_Bogota_Map.png.
- Doyle, Caroline. 2016. “Explaining Patterns of Urban Violence in Medellín, Colombia.” *Laws* 5 (1): 3. <https://doi.org/10.3390/laws5010003>.

- Duncan, Dustin T., Jared Aldstadt, John Whalen, and Steven J. Melly. 2013. "Validation of Walk Scores and Transit Scores for Estimating Neighborhood Walkability and Transit Availability: A Small-Area Analysis." *GeoJournal* 78 (2): 407–16.
<https://doi.org/10.1007/s10708-011-9444-4>.
- Economic Confidential*. 2019. "Operator Demands \$50m For Lagos Cable Car Project," November 14, 2019, sec. Monetary.
<https://economicconfidential.com/2019/11/50m-lagos-cable-car-project/>.
- "Ecuador Struggles to Advance Flagship PPP Projects." 2020. Market Research. *BNamericas.Com* (blog). February 21, 2020.
<https://www.bnamericas.com/en/features/ecuador-struggles-to-advance-flagship-ppp-projects>.
- El Espectador*. 2018. "Transmicable en Ciudad Bolívar: el nuevo orgullo de Bogotá," December 27, 2018.
<https://www.elespectador.com/noticias/bogota/transmicable-en-ciudad-bolivar-el-nuevo-orgullo-de-bogota-video-831288>.
- El Tiempo*. 2019a. "Metrocable Picacho de Medellín recibe \$50.000 millones de la Nación," September 1, 2019.
<https://www.eltiempo.com/colombia/medellin/cable-picacho-de-medellin-recibira-50-mil-millones-de-gobierno-nacional-407474>.
- El Tiempo*. ———. 2019b. "Mire aquí si su casa subió o bajó de estrato en Bogotá," September 19, 2019.
<https://www.eltiempo.com/bogota/predios-que-bajaron-y-subieron-de-estrato-en-bogota-en-la-actualizacion-de-la-estratificacion-414328>.
- El Tiempo*. ———. 2020. "Desde ya, el Metro de Medellín se alista para operar otros 20 años," February 16, 2020.
<https://www.eltiempo.com/colombia/medellin/desde-ya-el-metro-de-medellin-se-alista-para-operar-otros-20-anos-462462>.
- Emblin, Richard. 2018. "Bogotá Gets High-Flying Public Transportation with TransMiCable." *The City Paper Bogotá*, September 14, 2018.
<https://thecitypaperbogota.com/bogota/bogota-gets-high-flying-public-transportation-with-transmicable/20652>.
- . 2020. "Claudia López's Inauguration Picnic Outlines Sustainable Future for Bogotá." *The City Paper Bogotá*, January 2, 2020.
<https://thecitypaperbogota.com/bogota/claudia-lopezs-inauguration-picnic-highlights-sustainable-future-for-bogota/23631>.

- “Encuesta de Movilidad 2019 - Indicadores Preliminares.” Bogotá, D.C., December 18, 2019. *Alcaldía de Bogotá, Secretaría de Movilidad*. Presentation delivered by Juan Pablo Bocarejo, Bogotá District Secretary of Mobility. https://www.movilidadbogota.gov.co/web/encuesta_de_movilidad_2019.
- “Encuesta de Percepción Ciudadana 2014.” 2014. Bogotá, D.C.: Bogotá Cómo Vamos. <https://bogotacomovamos.org/encuesta-de-percepcion-ciudadana-2014/>.
- “Encuesta de Percepción Ciudadana 2019.” 2019. Bogotá, D.C.: Bogotá Cómo Vamos. <https://bogotacomovamos.org/encuesta-de-percepcion-ciudadana-2019/>.
- Fieser, Ezra. 2019. “Congested Bogota Brings in China to Build \$4 Billion Metro Line.” *Bloomberg.Com*, October 18, 2019, sec. Business. <https://www.bloomberg.com/news/articles/2019-10-18/congested-bogota-brings-in-china-to-build-4-billion-metro-line>.
- Foda, Mohamed, and Ahmed Osman. 2010. “Using GIS for Measuring Transit Stop Accessibility Considering Actual Pedestrian Road Network.” *Journal of Public Transportation* 13 (4): 23–40. <https://doi.org/10.5038/2375-0901.13.4.2>.
- Freedman, David H. 2019. “How Medellín, Colombia, Became the World’s Smartest City.” *Newsweek*, November 18, 2019, sec. World. <https://www.newsweek.com/2019/11/22/medellin-colombia-worlds-smartest-city-1471521.html>.
- García, Nicolás Rueda, and Luis Hernán Sáenz. 2013. “Soacha, the Cazucable, and Bogotá D.C.: A Difficult Relationship.” In *Urban Mobility and Poverty: Lessons from Medellín and Soacha, Colombia*, 126–35. Medellín: Development Planning Unit & Department of Architecture, Universidad Nacional de Colombia.
- Garcia-Suarez, Carlos, Andres L. Rivera-Perez, and Alvaro Rodriguez-Valencia. 2018. “Defining TransMilenio Users’ Value and Satisfaction through the Lean Thinking Approach.” *Transportation Research Record* 2672 (8): 455–63. <https://doi.org/10.1177/0361198118787363>.
- Gaviria, Danny Andrés Osorio. 2015. “The Northeastern Urban Integration Project [PUI].” Government. Medellín: Urban Development Agency [EDU]. https://issuu.com/dannyandresosoriogaviria/docs/the_northeastern_urban_integration_.
- Geurs, Karst T., and Bert Van Wee. 2004. “Accessibility Evaluation of Land-Use and Transport Strategies: Review and Research Directions.” *Journal of Transport Geography* 12 (2): 127–40. <https://doi.org/10.1016/j.jtrangeo.2003.10.005>.
- Gilbert, Alan. 2008. “Bus Rapid Transit: Is Transmilenio a Miracle Cure?” *Transport Reviews* 28 (4): 439–67. <https://doi.org/10.1080/01441640701785733>.

- González, Carlos A. 2011. “Proyectos de transporte e infraestructura y su contribución a la movilidad sostenible y la gobernabilidad local: el caso de Cali, Colombia.” *Entorno Geográfico*, no. 7–8 (January): 24–46.
- Greiff, Mónica de, Jorge Mario Díaz Luengas, and Luis Ángel Guzmán. 2017. “Balance de Movilidad 2007-2016.” Reporte Annual de Movilidad 2016 10. Bogotá, D.C.: Universidad de los Andes y Cámara de Comercio de Bogotá.
- Guzman, Luis A., and Juan P. Bocarejo. 2017. “Urban Form and Spatial Urban Equity in Bogota, Colombia.” *Transportation Research Procedia*, World Conference on Transport Research - WCTR 2016 Shanghai. 10-15 July 2016, 25 (January): 4491–4506. <https://doi.org/10.1016/j.trpro.2017.05.345>.
- Guzman, Luis A., Daniel Oviedo Hernandez, and Carlos Rivera. 2017. “Assessing Equity in Transport Accessibility to Work and Study: The Bogotá Region.” *Journal of Transport Geography* 58 (January): 236–46. <https://doi.org/10.1016/j.jtrangeo.2016.12.016>.
- Halais, Flavis. 2019. “Rio’s Defunct Gondola Tells a Tale of Transit Style Over Substance.” *Wired*, October 2, 2019. <https://www.wired.com/story/rio-de-janeiro-favela-cable-car-gondola/>.
- Heinrichs, Dirk, and Judith S. Bernet. 2014. “Public Transport and Accessibility in Informal Settlements: Aerial Cable Cars in Medellín, Colombia.” *Transportation Research Procedia* 4: 55–67. <https://doi.org/10.1016/j.trpro.2014.11.005>.
- Hernandez, Camila Rodriguez, and Mauricio Cuellar. 2018. “Project Appraisal Document on a Proposed Loan in the Amount of US \$70 Mullion to the Bogota Metro Company with the Guarantee of the Republic of Colombia for the Support to the Bogota Metro Line 1 Section 1 Project – (Series1).” PAD2760. World Bank, International Bank for Reconstruction and Development.
- Hernandez, Daniel Oviedo, and Julio D. Dávila. 2016. “Transport, Urban Development and the Peripheral Poor in Colombia — Placing Splintering Urbanism in the Context of Transport Networks.” *Journal of Transport Geography* 51 (February): 180–92. <https://doi.org/10.1016/j.jtrangeo.2016.01.003>.
- Hernandez, Daniel Oviedo, and Helena Titheridge. 2016. “Mobilities of the Periphery: Informality, Access and Social Exclusion in the Urban Fringe in Colombia.” *Journal of Transport Geography* 55 (July): 152–64. <https://doi.org/10.1016/j.jtrangeo.2015.12.004>.
- Hörmann, Felix. “Mobility and Social Exclusion in Megacities. An explorative investigation with the example of Transmilenio in Bogotá, Colombia.” *Ludwig-Maximilian-University*. 2008.
- Inostroza, Luis. 2017. “Informal Urban Development in Latin American Urban Peripheries. Spatial Assessment in Bogotá, Lima and Santiago de Chile.” *Landscape and Urban Planning* 165 (September): 267–79. <https://doi.org/10.1016/j.landurbplan.2016.03.021>.

- Jaffe, Eric. 2015. "What Does Living 'Close' to Transit Really Mean?" *CityLab*, January 12, 2015.
<http://www.citylab.com/cityfixer/2015/01/what-does-living-close-to-transit-really-mean/384421/>.
- Kash, Gwen, and Dario Hidalgo. 2014. "The Promise and Challenges of Integrating Public Transportation in Bogotá, Colombia." *Public Transport* 6 (1): 107–35.
<https://doi.org/10.1007/s12469-013-0083-7>.
- Kiersz, Andy. 2014. "Here Are The Most Unequal Countries In The World." *Business Insider*, November 8, 2014.
<https://www.businessinsider.com/gini-index-income-inequality-world-map-2014-11>.
- Kraas, Frauke. 2013. "Bus Rapid Transit: The Answer to Transport Problems in Megacities? The Example of TransMilenio (Bogotá, Colombia)." In *Megacities: Our Global Urban Future*, 179–92. New York: Springer.
- Leibler, Laure, and Peter Brand. 2012. "Movilidad e inclusión social : la experiencia desde la periferia de Medellín y el primer Metrocable." *Bulletin de l'Institut français d'études andines*, no. 41 (3) (December): 363–87. <https://doi.org/10.4000/bifea.147>.
- Loo, Becky P. Y., and Alice S. Y. Chow. 2011. "Spatial Restructuring to Facilitate Shorter Commuting: An Example of the Relocation of Hong Kong International Airport." *Urban Studies* 48 (8): 1681–94. <https://doi.org/10.1177/0042098010375319>.
- Lotero, Laura, Rafael G. Hurtado, Luis Mario Floría, and Jesús Gómez-Gardeñes. 2016. "Rich Do Not Rise Early: Spatio-Temporal Patterns in the Mobility Networks of Different Socio-Economic Classes." *Royal Society Open Science* 3 (10): bo.
<https://doi.org/10.1098/rsos.150654>.
- Martens, Karel. 2015. "Accessibility and Potential Mobility as a Guide for Policy Action." *Transportation Research Record: Journal of the Transportation Research Board* 2499 (1): 18–24. <https://doi.org/10.3141/2499-03>.
- Martínez, José Luis. 2020. "Población Vulnerable No Tendrá Aumento En Tarifa de TransMilenio." Bogotá, D.C.: TransMilenio S.A.
<https://bogota.gov.co/mi-ciudad/movilidad/transmilenio/tarifa-de-transmilenio-2020>.
- Mazzanti, Giancarlo. 2008. "España Library / Giancarlo Mazzanti." Architectural Project. Medellín: Arch Daily.
<http://www.archdaily.com/2565/espana-library-giancarlo-mazzanti/>.
- "Medellin Breaks Ground on Sixth Urban Gondola." Medellín MetroCable. *The Gondola Project*. Toronto, Canada: Creative Urban Projects, March 9, 2018.
- "Medellin MetroCable." 2018. The Gondola Project. Toronto, Canada: Creative Urban Projects.
<http://gondolaproject.com/category/installations/medellin-metrocable/>.

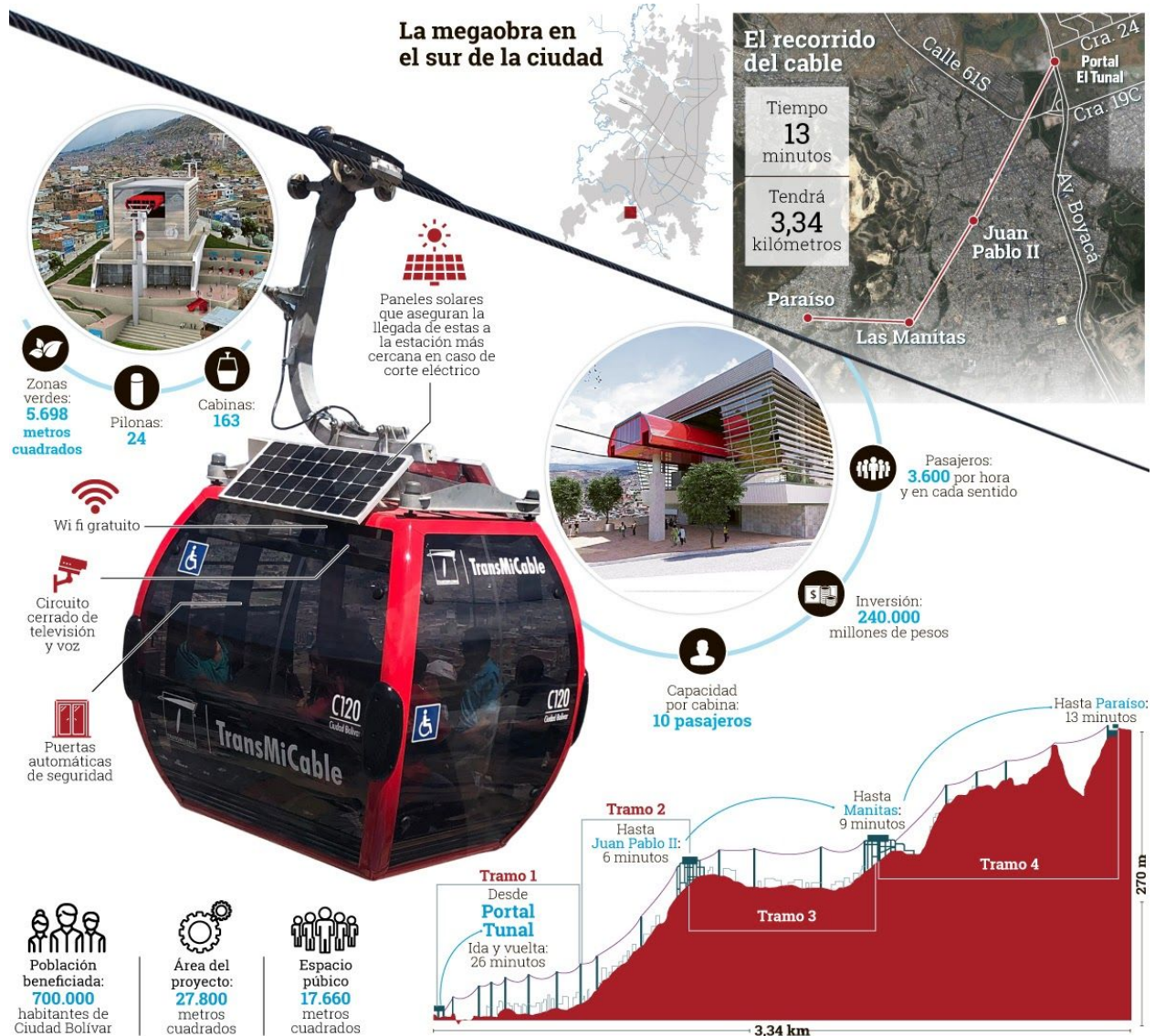
- “Medellín: transformación de una ciudad.” 2008. Medellín: Alcaldía de Medellín.
<https://acimedellin.org/wp-content/uploads/publicaciones/libro-transformacion-de-ciudad.pdf>.
- Mejoramientos Integral de Barrios (Proyecto Juan Bobo y La Herrera)*. 2012. Medellín: Empresa de Desarrollo Urbano (EDU).
<https://www.youtube.com/watch?v=yU09oCdO7jg>.
- Milan, Blanca Fernandez, and Felix Creutzig. 2017. “Lifting Peripheral Fortunes: Upgrading Transit Improves Spatial, Income and Gender Equity in Medellín.” *Cities* 70 (October): 122–34. <https://doi.org/10.1016/j.cities.2017.07.019>.
- “MIOCABLE.” n.d. City Government Website. Metro Cali. Accessed April 19, 2020.
<http://www.mio.com.co/index.php/miocable.html>.
- Miroff, Nick. 2016. “The Staggering Toll of Colombia’s War with FARC Rebels, Explained in Numbers.” *Washington Post*, August 24, 2016, sec. World Views.
<https://www.washingtonpost.com/news/worldviews/wp/2016/08/24/the-staggering-toll-of-colombias-war-with-farc-rebels-explained-in-numbers/>.
- Mojica, Óscar Murillo. 2018. “Este es el mapa del crimen en Bogotá.” *El Tiempo*, March 31, 2018, sec. Bogotá.
<https://www.eltiempo.com/bogota/este-es-el-mapa-del-crimen-de-la-ciudad-199576>.
- Murray, Alan T., and Xiaolan Wu. 2003. “Accessibility Tradeoffs in Public Transit Planning.” *Journal of Geographical Systems* 5 (1): 93–107. <https://doi.org/10.1007/s101090300105>.
- “Número de Tarjetas Con Subsidio Entregadas.” 2019. December.
<https://es.scribd.com/document/443670002/Numero-de-tarjetas-con-subsidio-entregadas>.
- “Plan Maestro de Movilidad.” 2006. Alcaldía de Bogotá.
<https://www.metrodebogota.gov.co/?q=transparencia/informacion-interes/publicacion/estudios/plan-maestro-movilidad-a%C3%B1o-2006>.
- Railway Technology*. 2020. “Bogotá Metro, Colombia,” 2020.
<https://www.railway-technology.com/projects/bogota-metro/>.
- Ramírez, Maritza Alejandra García. 2018. “Participación ciudadana e impacto social frente a la enajenación y/o expropiación de predios para el proyecto Cable Aéreo (Transmicable).” Bogotá, D.C.: Universidad Militar Nueva Granada, Facultad de Ciencias Económicas.
<http://repository.unimilitar.edu.co/handle/10654/17653>.
- Renne, John L. 2016. *Transit Oriented Development: Making It Happen*. New York, NY: Routledge.

- Restrepo, Omar O. 2019. "Preocupa crecimiento de parque automotor en Bogotá." *Bogotá Cómo Vamos* (blog). May 23, 2019.
<http://www.bogotacomovamos.org/blog/preocupa-crecimiento-de-parque-automotor/>.
- Richardson, Clare. 2017. "Rio Hits the Brakes on Controversial Favela Cable Car." *Deutsche Welle*, March 2, 2017, sec. Americas.
<https://www.dw.com/en/rio-hits-the-brakes-on-controversial-favela-cable-car/a-37368291>
- Rivadulla, Maria Jose Alvarez, and Diana Bocarejo. 2013. "The Socio-Economic Context of Soacha's Commune 4: Vulnerability, Confinement, and Stigma." In *Urban Mobility and Poverty: Lessons from Medellin and Soacha, Colombia*, 143–48. Medellin: Development Planning Unit & Department of Architecture, Universidad Nacional de Colombia.
- . 2014. "Beautifying the Slum: Cable Car Fetishism in Cazuca, Colombia." *International Journal of Urban and Regional Research* 38 (6): 2025–41.
<https://doi.org/10.1111/%28ISSN%291468-2427/issues>.
- Rodríguez, Camila, Juan Miguel Gallego, Daniel Martínez, Sergio Montoya, and Tatiana Peralta-Quiros. 2016. "Examining Implementation and Labor Market Outcomes of Targeted Transit Subsidies: Subsidy by Sistema Nacional de Selección de Beneficiarios for Urban Poor in Bogotá, Colombia." *Transportation Research Record* 2581 (1): 9–17.
<https://doi.org/10.3141/2581-02>.
- Rodríguez, Johana. 2019. "Corte tumbaría suspensión de licencia por 25 años a conductores de Uber." *RCN Radio*, September 10, 2019.
<https://www.rcnradio.com/judicial/corte-tumbaria-suspension-de-licencia-por-25-anos-conductores-de-uber>.
- Rubiano, Leonardo Canon, Wenyu Jia, and Georges Darido. 2017. "Innovation in the Air: Using Cable Cars for Urban Transport." *World Bank Blogs* (blog). December 20, 2017.
<https://blogs.worldbank.org/transport/innovation-air-using-cable-cars-urban-transport>.
- "¿Sabe usted cómo funciona la estratificación? Aquí se lo contamos." 2018. Bogotá, D.C.: Departamento Administrativo Nacional de Estadística.
<https://bogota.gov.co/mi-ciudad/planeacion/estratificacion-todo-lo-que-debe-saber>.
- Sanchez, Thomas W. 2008. "Poverty, Policy, and Public Transportation." *Transportation Research Part A: Policy and Practice* 42 (5): 833–41.
<https://doi.org/10.1016/j.tra.2008.01.011>.
- Sandoval, Edgar E., and Dario Hidalgo. 2004. "TransMilenio: A High Capacity - Low Cost Bus Rapid Transit System Developed for Bogotá, Colombia." *Urban Public Transportation System*, Proceedings, , September, 37–49. [https://doi.org/10.1061/40717\(148\)4](https://doi.org/10.1061/40717(148)4).

- Semana*. 2019. “Tumban castigo para conductores de plataformas como Uber o Beat,” September 17, 2019, sec. Justicia.
<https://www.semana.com/nacion/articulo/corte-constitucional-tumba-sancion-para-conductores-de-plataformas-como-uber-o-beat/632258>.
- Socha, Juan Diego Muñoz. 2019. “El impacto del sistema del cable aéreo de Ciudad Bolívar, Bogotá - Colombia, TransMiCable sobre la calidad de vida de sus habitantes en el sector de incidencia de Lucero.” Bogotá, D.C.: Universidad Nacional de Colombia.
- “State of Latin American and Caribbean Cities 2012.” 2012. Rio de Janeiro, Brazil: United Nations Human Settlements Program (UN-Habitat).
- Supúlveda, Fedy Leonardo Daza. 2020. “Claudia López busca construir una nueva línea de TransmiCable.” *RCN Radio*, January 13, 2020.
<https://www.rcnradio.com/bogota/claudia-lopez-busca-construir-una-nueva-linea-de-transmicable>.
- “Tarjeta SISBEN.” 2020. City Government Website. Tu Llave. 2020.
<https://www.tullaveplus.com/web/public/tarjeta-sisben>.
- “Teleférico Da Providência.” 2017. The Gondola Project. Toronto, Canada: Creative Urban Projects.
<http://gondolaproject.com/2017/06/27/system-dossier-teleferico-da-providencia/>.
- “Teleférico de Santo Domingo.” n.d. City Government Website. Teleférico de Santo Domingo. Accessed April 19, 2020. <http://www.telefericosantodomingo.com/>.
- The Guardian*. 2015. “Former Bogotá Mayor Re-Elected after 14 Years, Defeating Colombia’s Left,” October 26, 2015, sec. World news.
<https://www.theguardian.com/world/2015/oct/26/colombia-bogota-mayor-enrique-penaloza-re-elected>.
- Ureta, Sebastian. 2008. “To Move or Not to Move? Social Exclusion, Accessibility and Daily Mobility among the Low-income Population in Santiago, Chile.” *Mobilities* 3 (2): 269–89.
- Wierod, Morten. 2020. “A Better Daily Commute - for People and Planet.” *World Economic Forum*, January 23, 2020, World Economic Forum Annual Meeting edition.
<https://www.weforum.org/agenda/2020/01/a-better-daily-commute-is-possible/>.
- Zahavi, Y. 1974. “Travel Time Budgets and Mobility in Urban Areas.” Washington, D.C.: Federal Highway Administration, U.S. Department of Transportation.
<https://trid.trb.org/view/21195>.
- Zambrano, Sandra Marcela Flechas. 2014. “Proyecto de Renovación Urbana y Residencial Horizonte Cable Aereo Ciudad Bolivar Bogotá.” Bogotá, D.C.: Universidad Católica de Colombia, Facultad de Diseño.

Appendix

Appendix 1. An infographic advertising key statistics and features of the TransMiCable, in addition to the map and topography of its route. Published by TransMilenio S.A., the central authority that manages the integrated public transit system of Bogotá (“Así es el sistema de TransMiCable” 2018).



Appendix 2. Bird's eye view of Ciudad Bolívar, as seen from inside a TransMiCable cabin (photograph by Kimika Padilla 2019).



Appendix 3. The maps below depict spatial mismatch between population density and employment density in Bogotá, based on data from the 2011 Bogotá Mobility Survey. Published as Figure 3 from “Urban form and spatial urban equity in Bogotá, Colombia” (Guzman and Bocarejo 2017).



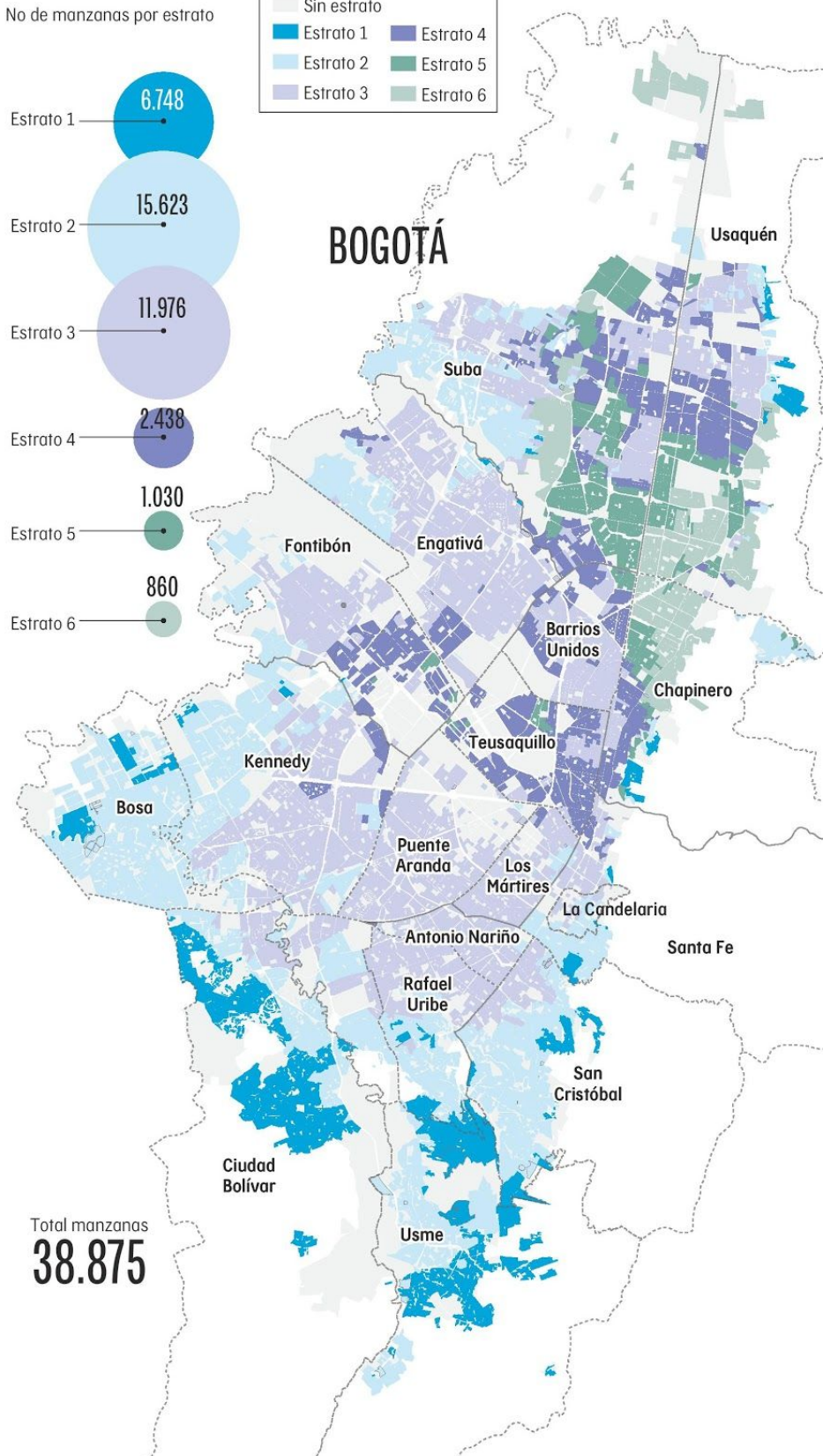
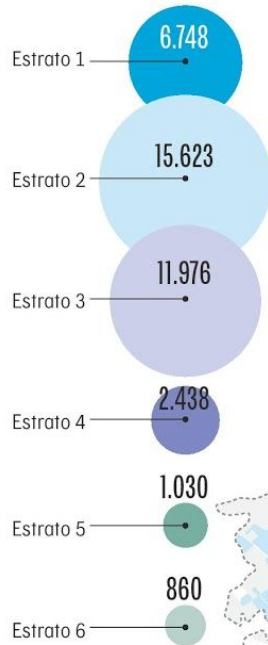
Fig. 3. Population and employment density

Appendix 4: To the right, *Bogotá por estratos* depicts the 19 localities overlaid on a choropleth map of each city block's *estrato*, or strata, designation. Dark and light blue areas make up the “periphery,” while dark purple and dark and light green areas form the urban core (*El Tiempo* 2019b).

Note: The locality to the east of Rafael Uribe, Tunjuelito, is not labeled on the map.

BOGOTÁ POR ESTRATOS

No de manzanas por estrato



Appendix 5. Three maps display car accessibility, bus accessibility, and TransMilenio accessibility per capita (from left to right). As one can see, peripheral regions generally have worse access to cars and public buses than areas within the central business district, which is located on the eastern side of the city in a darker color. The maps and their underlying data include localities in Bogotá Metropolitan Region, which extends farther southwest than official city limits. Published as Figure 4 from “Assessing equity in transport accessibility to work and study: The Bogotá region” (Guzman et al. 2017).

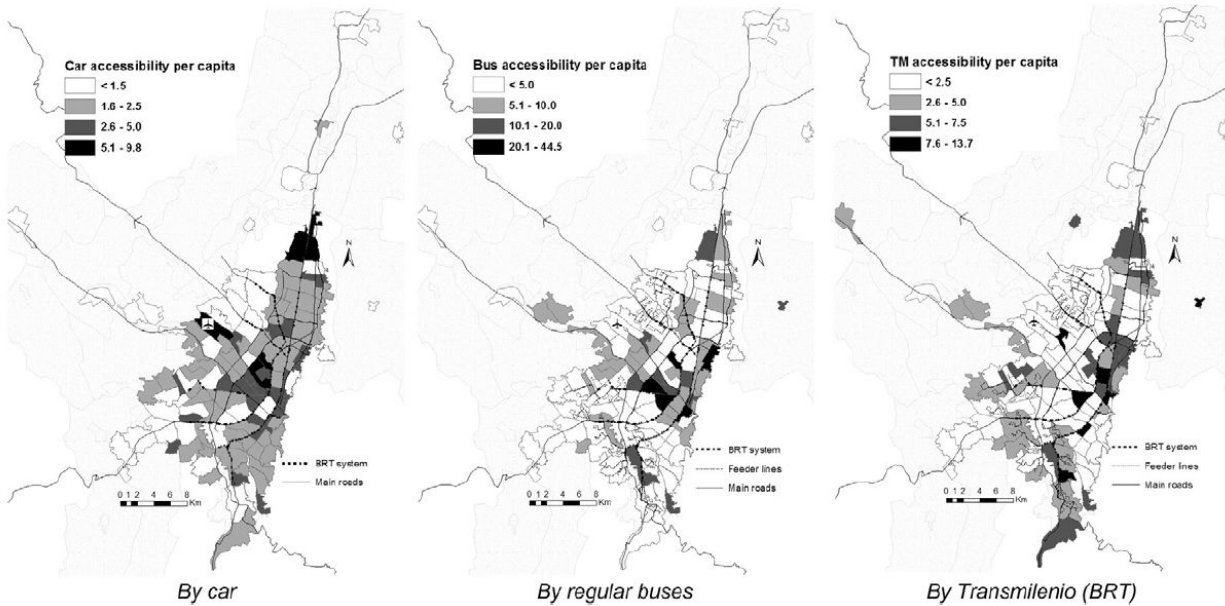
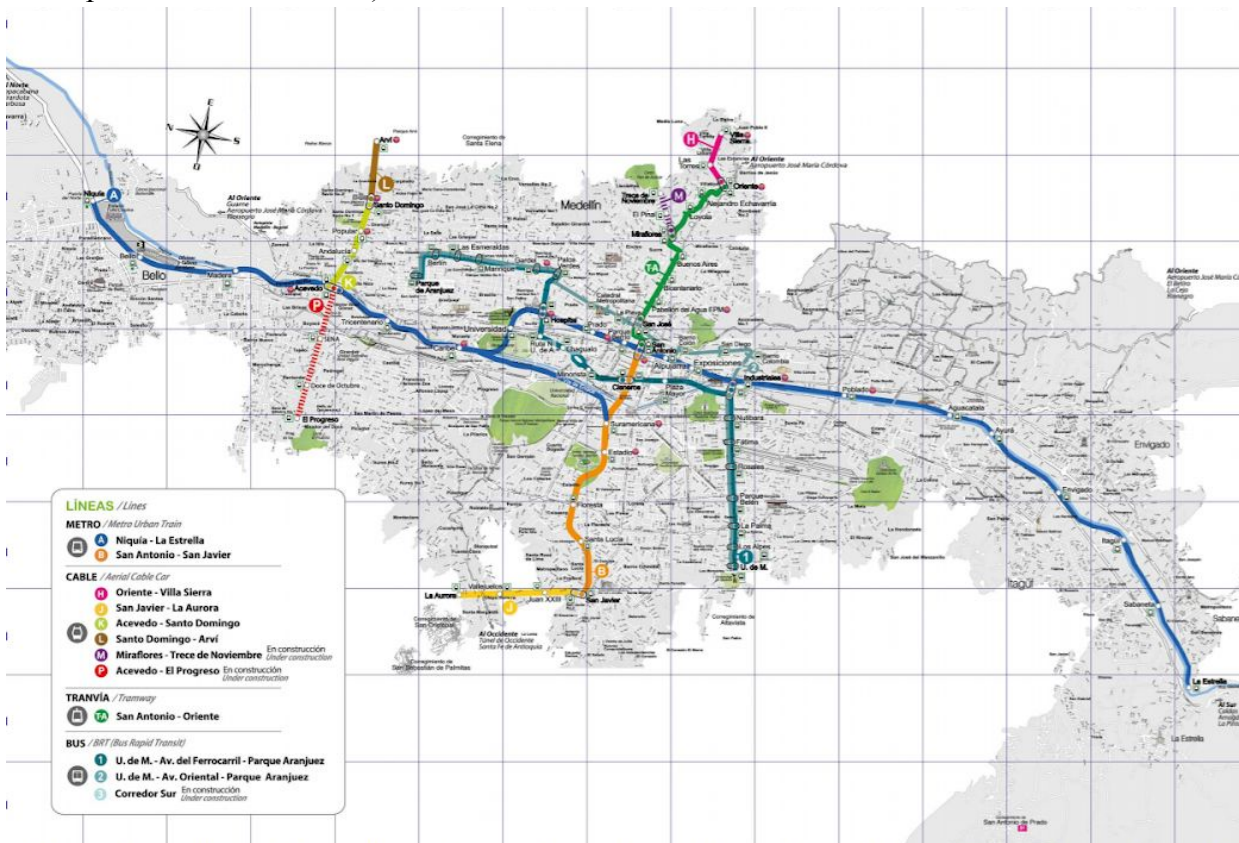


Fig. 4. Potential accessibility per capita. Source: Own elaboration.

Appendix 7. *Tu llave* cards work on all three integrated public transit systems: TransMilenio, TransMiCable, and the SITP. The 2019 design advertises the TransMiCable (photographs by Kimika Padilla 2019).



Appendix 8. A map of the Metro and MetroCable transit network, laid on top of Medellín. On the following page, a simplified map provides the Metro and MetroCable routes only (“Conozca los mapas del Sistema” 2019).



Appendix 8. (Continued from previous page) (“Conozca los mapas del Sistema” 2019).



Appendix 9. Three maps display average trip time, average trip cost, and average percentage of income spent on transportation by zone (from left to right) using 2008 data from the *Secretaría Distrital de Planeación*, a department of the city government. Low-income commuters from darker, peripheral areas spend more time and money on transportation. Published as Figure 3 from “Accessibility analysis of the integrated transit system of Bogotá” (Bocarejo et al. 2016).

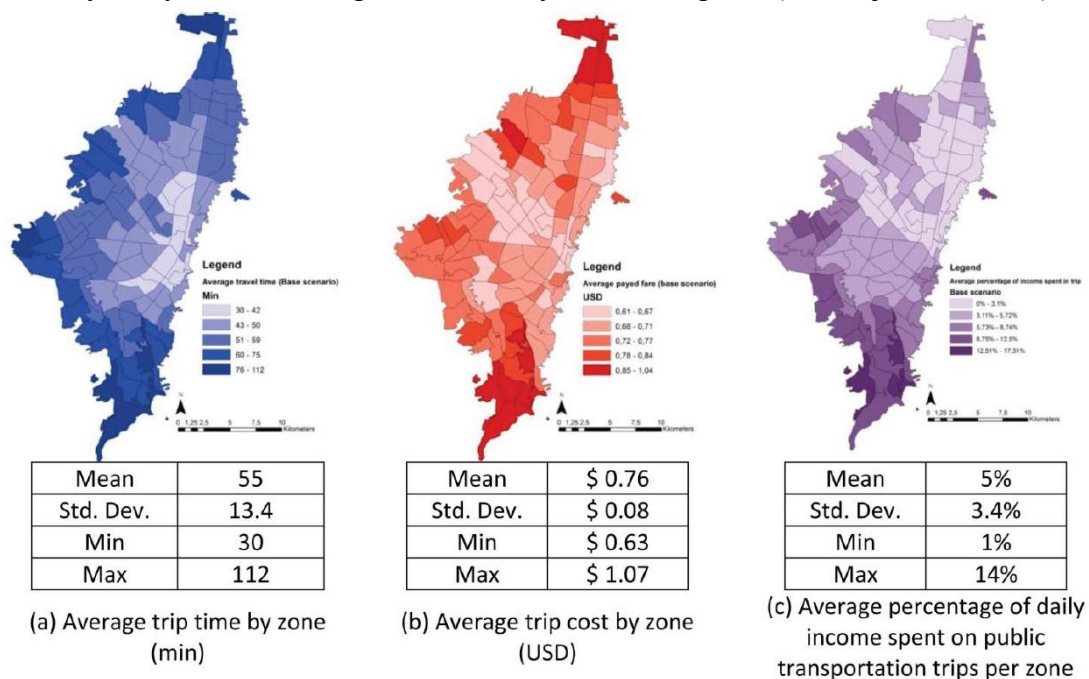


Figure 3. Average travel costs of getting to work via public transport during peak hours in Bogotá—2008.

Appendix 10. A quantitative analysis by Milan and Creutzig used a detailed survey of 187 questions administered by *Medellín Cómo Vamos* between 2009 and 2012, to study the fourteen quality of life indicators in the table below. These indicators increased a statistically significant amount in the sectors recently impacted by transit-oriented development including the MetroCable, compared to non-intervention control sectors (Milan and Creutzig 2017).

Table 1
Topic categories (3) Variables (14) and comparison groups. Group variables are compared with Medellín average. Income levels include low (L), medium (M), and high (H). Zones include the comunas 1,2,3,4,5,6. Gender: female (F), and male (M).

N	Topic category/variable name	No. questions	Description
	Socioeconomic variables	8	
1	Housing	3	Housing affordability and supply
2	Education	3	Enrolment
3	Job	2	Employment, Identification as poor
	Public infrastructures	89	
4	Education (satisfaction)	1	Satisfaction with education
5	Environment	16	Air, water, noise, visual environment
6	Health	3	Quality of health service, satisfaction
7	Public Infrastructure	26	Phone, internet, waste, gas, electricity
8	Public space	27	Access to parks, security, pedestrian streetscapes
9	Transit	16	Commuting time, satisfaction
	Social capita	90	
10	Collective action	6	Own contribution and engagement
11	Groups and Networks	16	Participation in neighbourhood organizations
12	Information & communication	15	Perceived importance of participation
13	Social inclusion	35	Respect given to different social groups
14	Trust	18	Trust in public institutions and security in transport

Appendix 11. The table below compares vulnerability statistics for residents in Soacha and in Ciudad Bolívar. The share of residents without access to basic utilities and primary education is much higher in Soacha, because the Bogotá city government provides these resources to its own localities, but not to independent municipalities like Soacha. These statistics are based on 2005 census data, and the researchers note that some indicators such as access to basic utilities have improved in Soacha, although the majority of the population still lacks access to piped water (Rivadulla and Bocarejo 2013, 145).

Table 1: Soacha's Commune 4, Ciudad Bolívar and Average for Bogotá: Some Indicators of Vulnerability (percentages)

	Share of dwellings without piped water	Share of dwellings without sewerage	Share of dwellings without gas	Incidence of teenage pregnancy*	Share of people over 12 with no primary education
Bogotá	1.4	2.1	20.2	6.8	10.2
Ciudad Bolívar	5.5	6.5	14.1	11.2	17.9
Commune 4	73.9	66.1	63.5	13.1	26.2

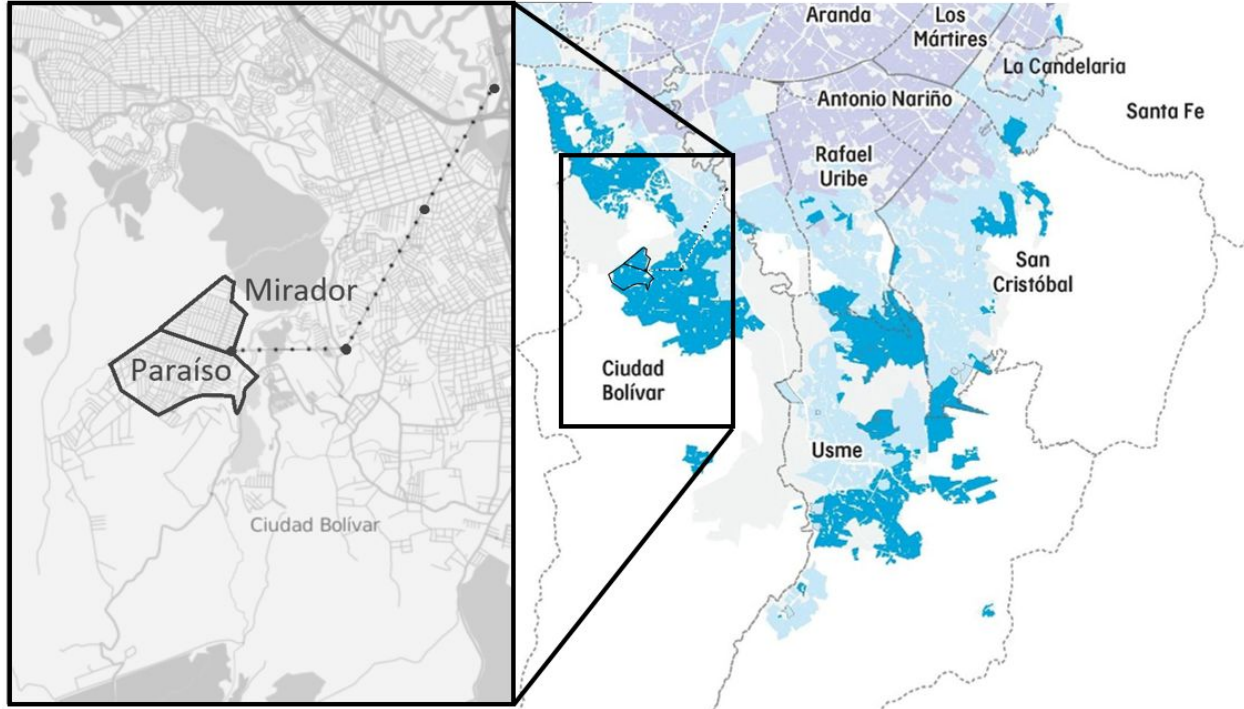
* Share of women aged between 12 and 19 years who have had at least one child born alive.
Source: Own calculations based on DANE, national population census 2005

Appendix 12. Table of international cable car projects built to connect low-income urban sectors to commercial regions in the city. The information is current as of March 2020.

*The two routes in Río de Janeiro were shut down in September 2016.

Cable Cars International Development						
Region	Country	City	Name	Inaugural Year	Number of Routes	Source(s)
Latin America	Bolivia	La Paz	Mi Teleférico	2014	10	(Wierod 2020)
	Brazil	Río de Janeiro		2011*	2*	(Halais 2019; Richardson 2017)
	Colombia	Bogotá	TransMiCable	2018	1	(“Abecé de TransMiCable” 2018)
	Colombia	Cali	MíoCable	2015	1	(“MIOCABLE” n.d.)
	Colombia	Manizales	Cable Aéreo	2009	2	(“Cable Aéreo de Manizales” n.d.)
	Colombia	Medellín	MetroCable	2004	5	(“Medellin MetroCable” 2018)
	Dominican Republic	Santo Domingo	Teleférico	2018	1	(“Teleférico de Santo Domingo” n.d.)
	Ecuador	Guayaquil		Planned		(“Ecuador Struggles” 2020)
	Mexico	Mexico City	Mexicable	2016	1	(Burnett 2016)
	Venezuela	Caracas	Metrocable	2010	1	(“Caracas Metrocable” 2010)
Africa	Algeria	Constantine			1	(“Constantine Telepherique” 2017)
	Algeria	Algiers			6	(“Bab El Oued – Z’ghara Cable Car” 2019)
	Nigeria	Lagos		Planned		(<i>Economic Confidential</i> 2019)

Appendix 13. The left map outlines the borders of Paraíso and Mirador, the two peripheral *barrios* which were the focus of my case study. The aerial cable car route is also plotted on the map, with larger gray circles representing the four TransMiCable stations (map by Kimika Padilla 2019). The right map, shown in full in Appendix 4, illustrates that in September 2019, Paraíso and Mirador were designated in the lowest *estrato* 1 (*El Tiempo* 2019b).



Appendix 14. Summary table of interviews and observations.**Interviews**

Name	Date	Location	Participant(s)	Duration
Interview 1, José	07/26/19	Teusaquillo, Bogotá	1 male, aged over 50	45 min
Interview 2, Daniel	07/26/19	Teusaquillo, Bogotá	1 male, aged mid to late-30s	15 min
Interview 3, Mauricio	07/27/19	Mirador, Ciudad Bolívar, Bogotá	1 male, aged early to mid-40s	30 min
Interview 4	07/27/19	Mirador, Ciudad Bolívar, Bogotá	1 male, aged over 50	30 min
Interview 5	07/27/19	Teusaquillo, Bogotá	1 female, aged mid to late-40s	45 min
Interview 6, Mel	07/30/19	TransMiCable, Ciudad Bolívar, Bogotá	1 female, aged mid to late-40s	20 min
Interview 7, Jefersson	07/30/19	Paraíso, Ciudad Bolívar, Bogotá	1 male, aged over 50	30 min
Interview 8, Jorge	07/30/19	Paraíso, Ciudad Bolívar, Bogotá	1 male, aged over 50	20 min
Interview 9, Andrea	07/30/19	Paraíso, Ciudad Bolívar, Bogotá	1 female, aged early to mid-30s	20 min
Interview 10, Sarah and Evelyn	09/04/19	Paraíso, Ciudad Bolívar, Bogotá	2 females, aged 16 and 13	15 min
Interview 11, Axier	09/04/19	Paraíso, Ciudad Bolívar, Bogotá	1 male, aged early to mid-30s	20 min
Interview 12, Catalina	09/04/19	TransMiCable, Ciudad Bolívar, Bogotá	1 female, aged 19	15 min
Interview 13, Janice	09/04/19	TransMiCable, Ciudad Bolívar, Bogotá	1 female, aged early to mid-30s	15 min

Appendix 14. (Continued from previous page).**Observations**

Name	Date	Location	Participant(s)	Duration
Observation 1, Hector and Sao	07/12/19	Teusaquillo, Bogotá	2 males, one aged early to mid-30s the other aged mid- to late 40s	45 min
Observation 2, Three Young Men	07/30/19	Paraíso, Ciudad Bolívar, Bogotá	3 males, aged early to mid-20s	15 min
Observation 3: Cafe Owners	07/30/19	Paraíso, Ciudad Bolívar, Bogotá	1 female and 1 male, aged over 50	15 min
Observation 4, TransMiCable Passengers	07/30/19	TransMiCable, Ciudad Bolívar, Bogotá	4 adult passengers	15 min
Observation 5, El Trancón	09/04/19	SITP bus, Ciudad Bolívar, Bogotá	27 passengers: 19 sitting, 8 standing	20 min
Observation 6, No Dar Papaya	09/04/19	SITP bus, Ciudad Bolívar, Bogotá	1 woman, aged mid- to late 30s, 3 school-aged boys younger than 18	35 min
Observation 7, Camilo	09/07/19	El Centro, Medellín	1 adult male	30 min
Observation 8, Walter	09/08/19	Comuna 13, Medellín	1 adult male	30 min

Appendix 15. Interview script, provided in English.

Standardized Interview Guide

Introduction

Introduce the research study and ascertain the participant's interest. Answer the participant's questions about the research study. Obtain verbal consent to audio record and write about our interview. Brief introduction about myself.

General information

First I will gather basic information about you. If you do not want to answer a question during our interview, you do not have to.

1. What is your name?
2. How old are you?

Housing

1. Which neighborhood do you live in?
2. How long have you lived there?
3. What do you like and dislike about your neighborhood?

Employment

If the participant is not currently working, skip this section and proceed to "Public transit."

1. Are you currently working? If so, which neighborhood do you work in?
2. How long have you worked there?
3. How do you get to work? How long is your commute?
4. What time do you leave and return?
5. Have you ever wanted to work in a different location or with a different employer, and been unable to? If so, what barriers prevented you from changing your job?

Public transit

If the participant does not use public transit, skip to question 3.

1. How often do you travel to other parts of the city?
2. How often do you use public transit? Please describe if and when you use the following modes of transit: TransMilenio, TransMiCable, SITP bus, and private bus.
 - a. What is your typical destination?
 - b. How far away from your house is the stop that you use? How do you get there?
 - c. How much money do you spend per month on public transit?
3. Do you drive a car or use a motorized bike? If so, do you own a car or motorized bike?
4. Are there any factors that prevent you from using public transit? If so, what are they?
5. Are there any aspects about public transit that you would like to change to make it easier to access other parts of the city?

Conclusion

Thank the participant for their time, reiterate how the interview will contribute to my research, and ask if they have any questions or comments for me.

Appendix 16. Billboards at Portal Tunal station advertised the TransMiCable with slogans like: “*Más tiempo para tí,*” “More time for you” and “*Bogotá mejor para todos,*” “Bogotá better for everyone.” This billboard featured a quote from a 10-year-old boy that said, “How beautiful it is to admire the colors of my mountain and my city with my family, because with the TransMiCable we are closer to everything.” (Photograph by Kimika Padilla 2019).

“Qué lindo es admirar en familia los colores de mi montaña y mi ciudad, porque con TransMiCable estamos más cerca de todo”.
 Jade Castro, 10 años.

#MásTiempoParaTi

TRANSMILENIO

ALCALDÍA MAYOR DE BOGOTÁ D.C.

BOGOTÁ MEJOR PARA TODOS

EQUIPO 7 JUNTOS DEL MISMO LADO

Appendix 17. TransMiCable cable cars arrive at (left) and depart from (right) Paraíso Station (photographs by Kimika Padilla 2019).



Appendix 17. (Continued from previous page).



Appendix 18. On this cloudy day, the TransMiCable cabin passed over homes on the urban periphery. Flat-roofed houses are made of red brick, corrugated metal, and cement slabs which are painted with colors that pop out of the image. In the foreground, a group of men dig a new building foundation (photograph by Kimika Padilla 2019).



Appendix 19. Viewed from inside of the aerial cable car cabin, the dense, sprawling settlement in Ciudad Bolívar gives way to an unpaved road that snakes up the mountainside. In the bottom right quadrant, a pedestrian travels on foot, dwarfed by the landscape (photograph by Kimika Padilla 2019).



Appendix 20. The small plateau that Paraíso Station was built upon overlooks a steep mountainside. Some of the homes pictured below protrude out from the mountainside on stilts; the homes are constructed by peripheral residents using cheap materials like brick, wood, and corrugated metal (photograph by Kimika Padilla).



