

**Transport and Social Exclusion in Medellín.
Potential, Opportunities and Challenges**

by

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Glossary and Abbreviations

AMVA:	Acronym for Area Metropolitana del Valle de Aburrá, meaning Metropolitan Area of the Aburrá Valley
BRT:	Bus Rapid Transit, consists of mass transport system operated with bendy buses running over fully segregated bus lanes stopping at stations which require users to pay before boarding. See (Wright, 2002) (Wright & Hook, 2007) for further information.
Comuna:	Local administrative division of Medellín, similar to the Borough/District figure in London or elsewhere
EDU:	Acronym for Empresa de Desarrollo Urbano, or Urban Development Institution
ETMVA:	<i>Empresa de Transporte Masivo del Valle de Aburra, Medellín's "massive transport company of the Aburrá Valley</i>
Gondola Lift:	The technical term is fully detachable-grip monocable gondola lift. Synonyms: Aerial cable-car, ropeway.
Pomagalski:	French provider of funiculars, cable cars, gondola lifts and similar technologies. Some literature refers to the company as "Poma".
POT:	<i>Plan de Ordenamiento Territorial</i> or land-use plan.
PUI:	Acronym for proyecto urbano integrado, or Integrated Urban Project.
SIT-VA:	Sistema Integrado de Transporte del Valle de Aburrá, or Aburrá Valley Integrated Transport System.

1. Introduction

What role does transport play in reducing social exclusion? If a transport project that connects residents of a poor and densely populated hillside in the global south is complemented by a parallel process of urban regeneration in the same area, *can this be considered a successful case reducing social exclusion?* While there is a significant body of literature showing the academic interest in analysing the role of transport in reducing social exclusion, there are few case studies in the Global south that follow the same interest. This dissertation aims at bringing forward the relation of social exclusion and public transport to the Colombian transport perspective as an alternative that could allow a better understanding of the potential that recently undertaken, transport-centred urban redevelopments have to address the social problems of traditionally deprived areas.

The city of Medellín (Colombia) has been recognized internationally for having successfully used gondola lift systems –traditionally linked with ski resorts- to address transportation problems on poor, dense and hilly urban areas. The opportunity to assess the social impact of recently the introduced gondola-lift systems in Medellín (Colombia) provides an interesting laboratory of research in which theoretical frameworks linking social exclusion, mobility and transport can contribute to the knowledge in the field of mobility-related exclusion. To do so, I begin by bringing forward an analytical framework that explores the concepts of access and mobility-related exclusion. With this I argue that transport accessibility should be considered not only as a transport-provision exercise; instead, it should take into account wider issues such as cognitive and linguistic barriers, the availability of information, and issues of personal safety and security, among others.

Studying a recent transport case study solely by using secondary research had limitations. For the case of Medellín, it has to be said that there is not much documentation assessing the studied intervention besides official figures and promotional publications. Regarding technical analyses done by the local transport authority, things did not get any better in terms of availability of information. Taking these considerations into account, the second part of my dissertation studies the components of the transport-centred urban regeneration project that took place in Medellín between 2004 and 2007.

Finally, I propose the case of the London DLR research on the impacts of a new transport link as a useful example that can be taken into consideration when conceptualizing a methodology to evaluate the social impacts in the Medellín case. I finalize by suggesting that further research on the topic should aim at testing methodologies in Medellín as the one I suggest as a way of advancing

towards a better understanding of the impact that gondola-lift projects has had on the local residents.

This dissertation, however, is *not* about explaining in detail the planning process behind the Medellín case study. Neither is this research about other projects that were undertaken in Medellín during the 2004-2007 administration. My research is about exploring ways in which the impact of the gondola-lift projects can be better researched. To do so, I propose the case of the London DLR Woolwich extension research as a useful example for the case of Medellín. I finalize by suggesting that further research on the Medellín case should aim at testing methodologies as the one suggested as a way of advancing towards a better understanding of the impacts that gondola-lift projects have on local residents.

2. Theoretical Framework:

2.1 As Means of Introduction: Transport Considerations

“Ask a professional planner to describe how he or she carries out the planning process, and the odds are that you will hear some version of the rational model (...) Much like the creatures in horror movies, rationality is dead –but keeps showing up in public places. Despite its purported flaws, rationality is still the dominant paradigm in planning practice, and therefore continues to deserve careful scrutiny”

(Brooks, 2002, p.81)

Public transport plays an undisputable key role in the way modern urban societies are shaped. Modal distribution analyses¹ reflect that typically, in most cities of the world more than 30 per cent of the daily journeys are either made by public transport, non-motorized transport or a combination of both (Vasconcellos, 2001). In cities of the global south in which car ownership is much low, the percentage increases to more than 60 per cent (Vasconcellos, 2001; GTZ, 2002). In these cities, however, the “urban transport problem” appears to be one of the major causes of reduced opportunities and quality of life (Dimitriou, 1990). Following this reflection, it is widely recognized that transport policies –especially in the Global South- play decisive role in promoting the economic and social development of cities (Banister, 2002; Cole, 2005; Social Exclusion Unit, 2003; The World Bank, 2002; Vasconcellos, 2001).

Urban transport policies are highly influenced by transport planners (Ardila, 2004). Traditionally, transport planning practice has been dominated by technical analysis, linked primarily to engineering, economics and land-use planning. In this context, the four stage Transport Planning Model² -TPM has been the key tool widely used by transport planners around the world to determine the specific needs for transport in cities³. In this same rationale, Cost Benefit Analysis – CBA- is the tool of analysis by which transport investments are prioritized⁴ (Banister, 2002).

¹ Indicates which percentage of daily trips is made by public transport, car, bicycle, and so on.

¹ The four stage TPM is composed by an analysis of trip generation, trip distribution, modal split and trip assignment. For a detailed description see (Banister, 2002, p.24)

² The four stage TPM is composed by an analysis of trip generation, trip distribution, modal split and trip assignment. For a detailed description see (Banister, 2002, p.24)

³ It also applies for inter-urban road and rail transport.

⁴ As Cole (2005) clearly states, “a CBA for public transport assesses the revenues generated (or costs saved) and cost incurred (capital and operating costs)” (Cole, 2005, p.243).

Typically, CBA allows governments to undertake a transportation project when the expected benefits of making such project exceed the economic costs associated to required investment (Cole, 2005). CBA uses the notion of time-saving⁵ to quantify the associated costs and benefits of a specific project (Banister, 2002; Munk, 2009).

The apparent problem observed on TPM and CBA studies is that they exclude a range of different social impacts which are of importance to society and cannot be effectively or accurately quantified in terms of the amount or the duration of journey times (Cole, 2005; Munk, 2009; Vasconcellos, 2001). The weaknesses of this traditional technical approach have raised heavy criticism against the model, leading to radical changes in the last 40 years of practice (Banister, 2002; Vasconcellos, 2001). Transport planning has been under transformation: it has changed from being an essentially technical activity based on supply & demand and time savings to a much more complex approach that needs to address environmental questions, as well as congestion, accidents and accessibility issues (ibid). As a result of this transformation, the analysis of travel patterns on TPMs needs to incorporate the perceived disconnection between existing travel demand and actual mobility needs; namely, if other conditions are made present, other trips can be registered (Vasconcellos, 2001). Together with this, CBA is advancing towards including social and environmental impacts, and it is leading to a decision making process which opens spaces for political participation on areas which were traditionally dominated by top-down structures (ibid).

The increased awareness of the importance of public transport on the cities' economy and citizen's wellbeing is reflected on the fact that transport, although relying heavily on technical analysis and arguments, is ultimately a matter of political decisions (Ardila, 2004; Banister, 2002; Flyvbjerg, 1998). But being political is to be seen more as an opportunity than a limitation. Political agendas shift naturally from term to term, and the key issues addressed by candidates can be heavily influenced by informed research and community pressure. Therefore, what seems as externalities not linked directly to transport demand, such as ensuring people have appropriate levels of accessibility to jobs, services and facilities (Cole, 2005) can be integrated into transport planning by political will. An example of this situation occurred in the UK after the Labour Party created the Social Exclusion Unit in 1997. The SEU addressed directly the relation between mobility and transport exclusion, bringing forward the debate to current political agendas in the country (Social Exclusion Unit, 2003). As a

⁵ Time savings are associated with reduction in journey times either for users of the proposed system or for users which benefit indirectly from the proposal, such as drivers which see a reduction in their journey times due to the replacement of buses for an underground system.

result of similar situations on different countries, the planning process has become more holistic and broad based, involving a wider range of stakeholders, governmental institutions and affected parties (Banister, 2002).

It has been suggested that one of the key issues that require further analysis within this emerging new approach to transport planning is how barriers of access to transport services operate (Munk, 2009). That is, it is important to study how, for specific individuals or groups, different types of physical, economic, social and political barriers constitute a considerable disincentive to travel. In other words, there is still much research to be done on the reasons by which segments of the population are unable to make use of the opportunities offered by the existence of public transport services. This is directly related to the fact that availability of public transport does not necessarily reduce the conditions that make transport inaccessible for certain individuals or groups (Church et al., 2000). To summarize: physical accessibility is just a fraction of the mentioned problem.

Following this rationale, I argue that one of the key concepts that are to be understood and included in accessibility studies is the notion of social exclusion. Several authors sustain that social exclusion is one of the key entry points to understand access to transport (Bocarejo & Oviedo, 2010; Lucas, 2004; MacDonald, 2006; Mackett et al., 2008; Social Exclusion Unit, 2003; Solomon & Titheridge, 2009; Urry, 2002). The following section will discuss the concept of social exclusion as part of other key theoretical concepts by which access to public transport can be discussed and possibly evaluated on specific case studies.

2.2 Social Exclusion

Social exclusion is a concept commonly used in policy and social research, particularly over the past decade following the incorporation of the term to government discourses (Beall & Piron, 2005).

There is a current trend in policy to operationalize social exclusion frameworks aimed at addressing the challenges posed to people when trying to actively participate as citizens and claim their correspondent rights, such as healthcare, employment and basic education (Burchardt et al., 2002).

Social exclusion, understood as a multidimensional and dynamic process, relates to the social characteristics and organizational traps that inhibit the attainment of livelihoods, active citizenship and human development (Beall & Piron, 2005). As this theoretical framework shows, social exclusion is closely related to poverty, participation opportunities and social justice.

2.3 Social Exclusion and Social Inclusion in Policy and Practice

The origins of the modern concept of social exclusion are associated with Lefebvre's (1974) and Lenoir's⁶ (1974) notions of socio-spatial exclusion within their Marxist critique to capitalism (Preston & Rajé, 2007). However, first attempts to mainstream the term are associated to the 1980 French socialist policy agenda (Allen et al., 1998; Berghman, 1995; Burchardt et al., 1999; Room, 1995; Walker and Walker, 2000; Whelan and Whelan, 1995), cited in (MacDonald, 2006, p.9), mainly concerned with the state's failure to 'insert' certain groups on the periphery of French society into the mainstream economic system -Mandanipour et al, 1998, cited in (Lucas, 2004, p.39).

From the mid- 1990s onwards, the concept of Social Exclusion has broadened poverty analyses in current development debates. The concept has been used to describe the co-existence and co-development of commonly identified social problems related to unemployment, poor education, poor housing, health and transport provision (MacDonald, 2006). Although the Social Exclusion debate is being promoted by government agencies like the Social Exclusion Unit (UK), the European Commission (EU), and international organizations in the line of the World Bank and the International Labour Organization, it appears that specific policies that look at social exclusion have only been incorporated by European countries (Beall & Piron, 2005; Lucas, 2004).

The main argument underpinning the EU's policy focus acknowledges that although there is a relation between the distribution of income on society and social exclusion, the quality and availability of public services and institutions tends to make personal income levels less relevant in certain key activities of society (Barry, 1998). Thus, the possibility of tackling social problems by making the quality of public services to be uniform and high enough to make such services be used by the majority of the population appears as an important policy objective (Barry, 2002, p.27). Consequently, research shows that the main policy focus regarding social exclusion has concentrated broadly on employment, education, housing, health and public service delivery (Lucas, 2004, p.40).

The literary review suggests that although social exclusion remains a *contested term* between academics (Burchardt et al., 2002), there is a degree of agreement on what the concept encompasses, especially on policy grounds. On practical matters, social exclusion comprehends aspects of well-being that are relevant to public policy and that are not adequately synthesized by traditional discourses of material poverty (MacDonald, 2006). The incorporation of the concept of

⁶ Published in "*Les exclus: Un Français sur dix*" (Lenoir, 1974)

social exclusion into European policy in the 1990s reinforced the importance of the term within social research⁷. (Lucas, 2004) and (Marlier et al., 2007) mention that the main policy focus of the 1992-1993 European Commission committed specifically to tackle the social problems present in areas with poor health, poor housing conditions, low educational achievement, high levels of unemployment and exposure to high levels of crime (Lucas, 2004, p.40). Nevertheless, social exclusion remains as a concept without a unique definition or measuring methodology. Current debates around the characteristics, assumptions and dynamics of social exclusion offer a diverse panorama from which a specific definition for this case study will be adopted.

2.4 Social Inclusion

Social Inclusion is a term used widely within the debate of social exclusion. It constitutes an important area of research, and it is widely used in public policy (The World Bank, 2007). Although social exclusion and social inclusion must not be considered perfect antonyms, nor social inclusion is to be seen as the only solution to social exclusion, various authors relate social inclusion to processes looking at reducing exclusion (Marlier et al., 2007). Preston & Rajé refer to social inclusion to make reference at processes which encourage participation in civil society, arguing that social inclusion is understood as a reverse process to social exclusion (Preston & Rajé, 2007). For practical purposes and taking into account these perspectives, this document will not develop a framework that explores substantially the debate around the origins and definition of social inclusion. Instead, it builds on the mentioned arguments and adopts the definition used and accepted by the European Union. This definition states that social inclusion

“...is a process which ensures that those at risk of poverty and social exclusion gain the opportunities and resources necessary to participate fully(...) and to enjoy a standard of living and well-being that is considered normal in the society in which they live”

(The World Bank, 2007, p.4).

2.5 Theoretical Considerations on Social Exclusion

According to the UK's Department for International Development –DFID-, most of the published authors relate social exclusion to a *process* related to “alternative (but related) lenses of equity, inequality and vulnerability” (Betts et al., 2010, p.1). In a similar way, Atkinson states that there are

⁷ To read the definition of social exclusion adopted by the EU, see (The World Bank, 2007, p.4). This definition, although not introduced properly on this framework, is congruent with the definitions discussed here.

four common elements in the vast majority of the discussions around social exclusion: “multiple deprivation, relativity, agency and dynamics” (Atkinson (1998) cited in (Richardson & Le Grand, 2002, p.498). Multiple deprivations encompass not only monetary poverty, but also absence of community or social interactions. Relativity, in its turn, considers that there is no “absolute” social exclusion, since people are excluded from particular society, in a particular time-space frame (ibid). Agency, on the other hand, acknowledges that exclusion is an act, therefore excluders and excluded are actors in society (ibid). Finally, the dynamics component refers to how current exclusion situations operate and their effect on the (lack of) prospects for the future of the excluded (ibid), implying that individuals can move in or out of situations of social exclusion (Atkinson and Hills (1998) cited in (Church et al., 2000, p.197) .

Social exclusion is multidimensional (it incorporates social, political and material dimensions), dynamic (contemplating current and future circumstances, options and opportunities), and relational, meaning that it is located on specific socio-economic contexts (Abrahams et al., 2007). Equally, the process and state of social exclusion implies agency: social exclusion is created in society, leaving people excluded by actions of institutions or other people (ibid). Consequently, social exclusion is understood as a phenomenon distinct from poverty and also distinct from economic inequality (Barry, 1998, p.20), although several different theoretical approaches to social exclusion share common insights with poverty dynamics (Silver, 2007). Nevertheless, the concept of *multidimensionality of social exclusion* clearly establishes differences from the concept of poverty.

Silver considers social exclusion as “a dynamic process of progressive multidimensional rupturing of the social bond at individual and collective levels” (Silver, 2007). Multidimensionality, being especially concerned with social relations, explains why social exclusion “encompasses but transcends poverty” (Silver, 2007, p.4). In other words, social exclusion takes into account material and non-material factors –dimensions- that conceptualize social disadvantages beyond economic factors. More importantly, poverty does not necessarily lead to social exclusion, hence this exclusion can occur without being in material poverty (Levitas, 1998; Oppenheim, 1998, cited by (Kenyon et al., 2002). The relevance of the discussion around social exclusion and its relation with social problems on the line of unemployment and poor educational, health and housing conditions legitimate the relevance of this argument.

Approaching to a Definition of Social Exclusion

In their seminal work, (Burchardt et al., 1999) proposed a working definition⁸ for social exclusion that has extensively quoted and used by academics and practitioners during the last decade, such as (Abrahams et al., 2007; Church et al., 2000; Richardson & Le Grand, 2002; Stanley & Vella-Brodrick, 2009). The initial definition (see footnote 8) was refined in 2002 while developing set of criteria that would allow social exclusion in the UK to be quantified (Abrahams et al., 2007). Burchardt et al (2002) restated that

“An individual is socially excluded if he or she does not participate in the key activities of the society in which he or she lives.”

(Burchardt et al., 2002, p.31)

According to the definition, the “key activities” correspond to the identified dimensions of social exclusion, and are stated in terms of *consumption, production, political engagement and social interaction*. Similarly, the 2005 DFID report on social exclusion (Beall & Piron, 2005) defines the term in a similar way to Burchardt et al (2002), incorporating agency in their definition by making reference to relationships based on power:

“Social exclusion is a process and a state that prevents individuals or groups from full participation in social, economic and political life and from asserting their rights. It derives from exclusionary relationships based on power.”

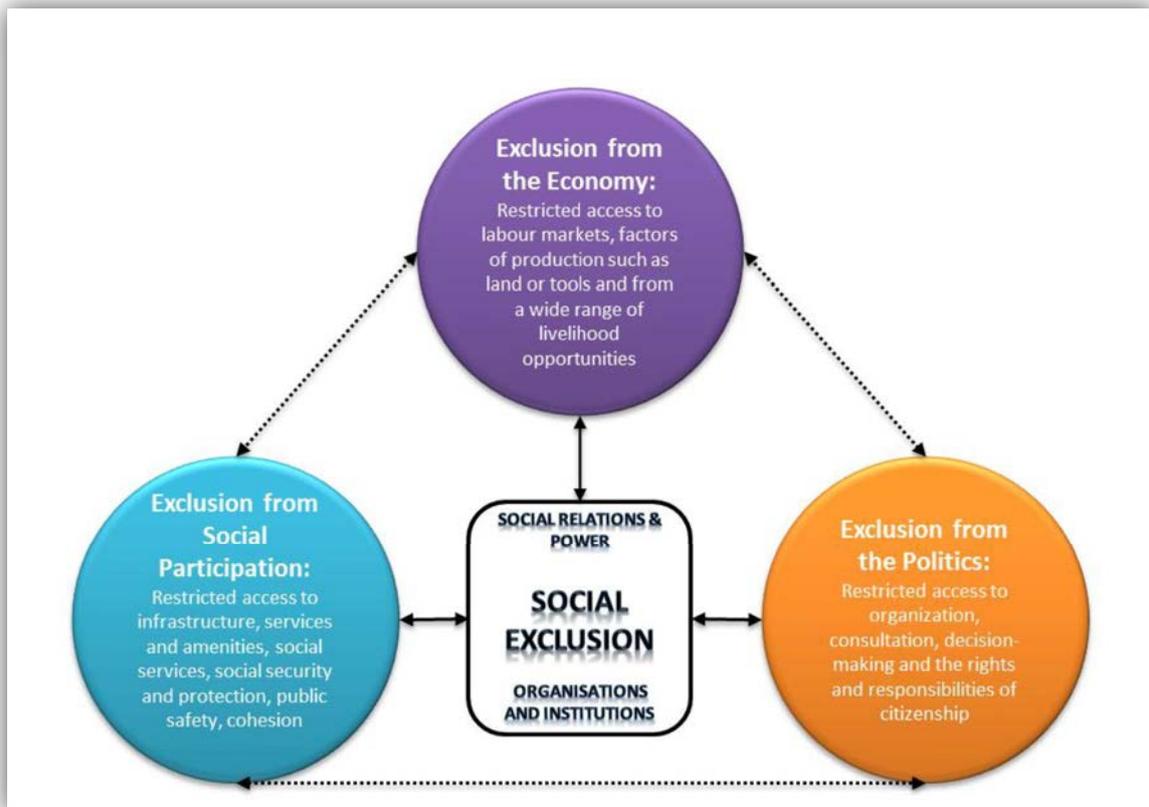
(Beall & Piron, 2005, p.9)

This second definition shares some important aspects with the one proposed by Burchardt et al (2002), however, by incorporating agency, complements the concept of social exclusion. Regarding the multidimensionality of the concept, (Beall & Piron, 2005) relate social exclusion to three spheres

⁸ The 1999 definition stated that an individual is socially excluded if: a) He or she is geographically resident in a society, b) he or she cannot participate in the normal activities of citizens in that society, and c) he or she would like to participate, but is prevented from doing so by factors beyond his or her control” (Burchardt et al., 1999, p.229).

of social development. These spheres agree with the “key activities” encountered by (Burchardt et al., 2002). However, by grouping consumption and production within a same “economic” dimension, the spheres of development proposed by (Beall & Piron, 2005) contemplate (i) the economy (encompassing consumption and production), (ii) social participation and (iii) politics. The relationship between social exclusion and its three dimensions is presented on Figure 2.1

Figure 2.1 – Social Exclusion and the Spheres of Development



Source: Own elaboration, based on (Beall & Piron, 2005, p.9)

This document adopts the three dimensions proposed by (Beall & Piron, 2005), considering they are congruent with Burchardt et al.’s key dimensions, but also acknowledging that the economic, political and social spheres that are much recognized as pivotal elements of analysis on other social theories (Burchardt et al., 2002).

A third useful definition for social exclusion coined by Kenyon is presented by after considering the key processes and characteristics that define social exclusion and differentiate from material poverty (Kenyon et al., 2002). In this case, one of the main entry points for exploring the characteristics of

social exclusion is that individuals do not usually choose to be socially excluded (Church et al., 2000, p.197). This definition takes into account the three dimensions associated with the concept, and identifies direct consequences for the socially excluded. Thus, for this case social exclusion is defined as:

“The unique interplay of a number of factors, whose consequence is the denial of access, to an individual or group, to the opportunity to participate in the social and political life of the community, resulting not only in diminished material and non-material quality of life, but also in tempered life chances, choices and reduced citizenship.”

(Kenyon et al., 2002, p.209)

As stated before, this definition places emphasis on *the powerlessness* and *denial of choice* as fundamental parts of the social exclusion debate, arguing against the extension of the concept to cases of voluntary self-exclusion, or, as other authors call it, “social isolation” (Richardson & Le Grand, 2002). As explained, cases of voluntary social isolation do not fall within the concept of social exclusion since the voluntary process implies that the individual is exercising the power of choice, which is denied to individuals experiencing social exclusion according to the latter definition (Kenyon et al., 2002). Additionally, it is important to mention that there is not a directly proportional measure between the extent of social exclusion and the number of dimensions on which the person experiences exclusion (Stanley & Vella-Brodrick, 2009). This implies that it should not be suggested that the dimensions of exclusion should have additive properties, by which it could be said that one person is less or more excluded than other according to the number of dimensions of exclusion they experience (Kenyon et al., 2002). Moreover, field research provides no evidence of people experiencing exclusion from all four dimensions (Burchardt et al., 2002).

Key issues regarding the initial definition of social exclusion proposed by (Burchardt et al., 2002) have been discussed by (Orr, 2009) and (Barry, 1998) among others. Although the mentioned definitions and key dimensions offer an adequate approach to defining social inclusion, it is important to understand social exclusion in the light of the principle of equal opportunity that underpins the many definitions of the concept of *social justice* (Barry, 1998, p.12). This means that while social exclusion can be linked to conditions that which individuals or social groups of participating in the key activities, it is the lack of equal opportunities to participate that ultimately configures a social system by which unequal opportunities generates social exclusion. This also restates the fact that individuals are involuntarily socially excluded when they experience unequal

opportunities (Orr, 2009). A combination of the mentioned arguments allows the author to generate a definition of social exclusion that includes the prevailing concepts found on the literature review:

- **Dynamics:** social exclusion being a process and a state
- **Agency:** social exclusion occurring because of social relations based on power
- **Relationship with Social Justice:** powerlessness, denial of choice, unequal opportunities that lead to social exclusion
- **Multidimensionality, scale and relativity:** considered in the key social, economic and political dimensions of society that shape social exclusion

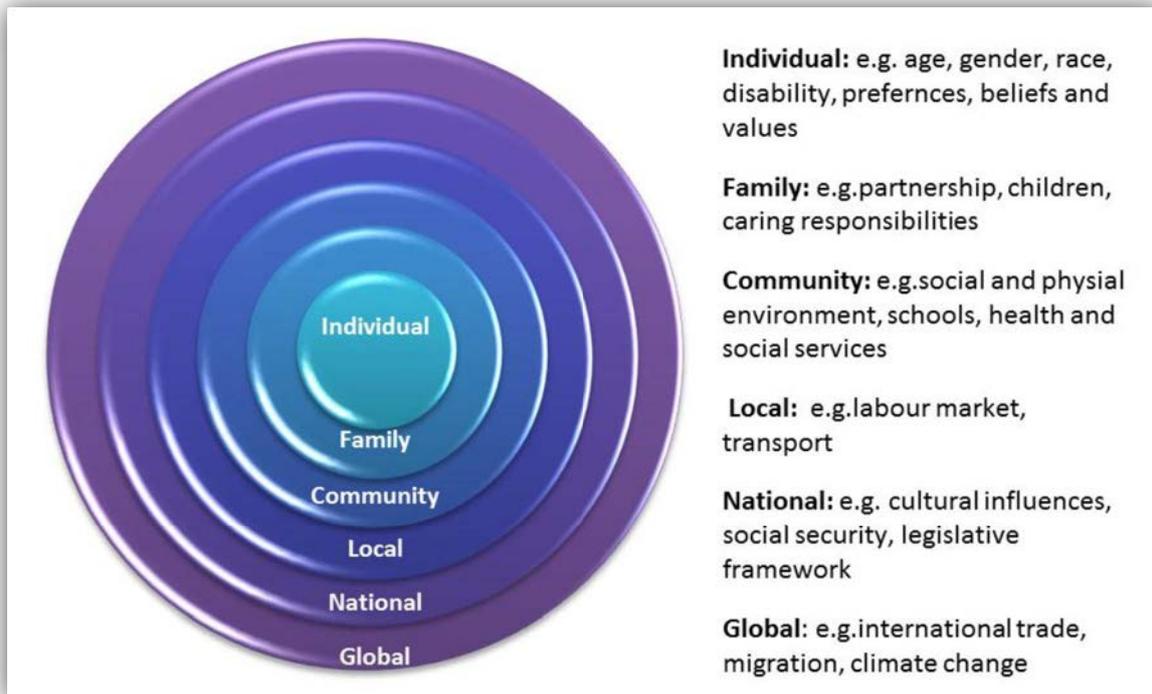
Such definition is stated as follows:

Social exclusion is a process and a state derived from powerlessness and denial of choice experienced by individuals or groups which operate under social relations based on power and unequal opportunities. Social exclusion limits individuals or groups from asserting their rights and participating in the key social, economic and political dimensions of society.

Scale in the dimensions of Social Exclusion

Regarding the scale of interaction of the mentioned dimensions of social exclusion (Burchardt et al., 2002) state that the adopted three dimensions of social exclusion (Beall & Piron, 2005) operate at scale in the sense that individual's condition of social exclusion can be influenced by family, community, national forces and, ultimately, the global context (Burchardt et al., 2002). At the same time, social groups (the community) are influenced by broader levels –national and global- but is also characterised by the families and individuals who constitute it (ibid). The obviousness of this clarification seems to contrast with analysis which treats personal, family circumstances operating at disconnected levels (ibid). Figure 2.2 illustrates the mentioned scales at which the dimensions of social exclusion operate.

Figure 2.2 - Scales of Social Exclusion



Source: Based on (Burchardt et al., 2002)

Indicators and Relativity in Social Exclusion

Social exclusion is linked to different set of indicators -or thresholds- by which numerous academics outline the basic characteristics of individuals or groups experiencing social exclusion. To develop such indicators, (Richardson & Le Grand, 2002) acknowledge the need to bridge the traditional academic approach with participatory research when characterising social exclusion. Based on research done with individuals and groups from specific case studies, indicators for the dimensions of the above discussed definitions have been suggested by several authors (Burchardt et al., 2002), (Kenyon et al., 2002), (Beall & Piron, 2005). These indicators⁹ relate directly to each of the suggested dimensions of each definition. Indicators vary from author to author and in any case they are presented as exhaustive or unique. They are presented in many cases for illustrative purposes (Kenyon et al., 2002).

⁹ Also understood as *potentially exclusionary factors* (Kenyon et al., 2002, p.209)

Table 2.1 was created by grouping relevant indicators found on the work of (Richardson & Le Grand, 2002) and (Kenyon et al., 2002) which are directly related to the three main dimensions proposed by (Beall & Piron, 2005). Each of the mentioned dimensions operates at interdependent scales –as discussed previously-, and should be monitored and measured over time. The indicators presented here correspond to deprivations, risks and limitations that are considered as problematic for individuals living in societies. Mobility related indicators are introduced in Table 2.1 as cross-cutting and directly related to the three previously described dimensions. A further discussion on mobility related social exclusion (and specifically regarding accessibility¹⁰ issues) is presented later on this chapter.

The indicators presented on Table 2.1 show the multiple links that mobility-related indicators have with the indicators of the three principal dimensions of social exclusion. This links illustrate the key role that public transport policy has as an enabling process that allows individuals to access and participate in the key dimensions of society (Barry, 2002) thus creating conditions that effectively relate to welfare delivery (Lucas, 2004). However, it also contemplates that social exclusion is a cause by which mobility-related problems can become manifest. To further explore this, the next part of the theoretical framework will focus on the fundamental causal relationship between mobility-related problems and social exclusion, or vice versa.

¹⁰ It is important to note that the term encompasses time-space, physical and economical dimensions.

Table 2.1 – Indicators of social exclusion

Dimension	Potentially Exclusionary Factors
Economic	income poverty
	unemployment
	lack of access to 'safety net' credit facilities
	lack of access to technology
Social	family, neighbourhood and city dynamics
	crime
	poor education
	lack of social rights
	loneliness
	isolation
	lack of information
	impairment gender
	ethnicity religion
	culture sexuality
	skill levels
	Political
restricted choices	
disenfranchisement (low turnout/registration)	
low participation in groups and organizations	
denial of citizenship rights and freedoms	
lack of representation	
inability to participate in the exercise of authority	
Mobility	(cross-cutting all dimensions)
	lack of/reduced access to:
	appropriate health and social care
	local services including transport and education
	social networks, facilities, goods and services
	geographical isolation

Source: Own elaboration based on (Kenyon et al., 2002) and (Richardson & Le Grand, 2002)

2.6 Mobility-related Social Exclusion: Relating Mobility and Social Exclusion

This section of the framework presents a summary of key theoretical developments that link social exclusion, mobility and public transport. The concepts of mobility and *motility* will be explored before focusing directly on the relationship between transport and social exclusion. The theoretical framework presented here argues that mobility-related problems and patterns of social exclusion are reciprocally related.

Mobility

Over the past decades, contemporary societies have experienced considerable increase in levels and forms of mobility of people, information and goods (Ohnmacht et al., 2009). This pattern has reinforced the vision of mobility as key component of the actual social order. In other words, mobility is a highly valued social condition to be attained (Dávila, 2010; Ureta, 2008). *Mobility studies* consider the mobile aspects of social life, offering a much relevant insight on the interplay between society, space and mobility (Ohnmacht et al., 2009). To clarify, the notion of mobility – understood as *mobilities* by some authors- implies various forms of movement, modes of transportation and information exchange (Urry, 2007, cited in (Ohnmacht et al., 2009, p.7).

I will refer to mobility as a desirable condition required to access opportunities to participate in society's key dimensions. In the same way, this concept implies that lack of access to (means of) mobility is a contributory factor to social exclusion related problems (Barry, 2002; Cass et al., 2005; Kenyon et al., 2002).

Motility as a capacity of Mobility

Motility is a term originally used in biological sciences to describe the potential capacity for movement that a unit of analysis¹¹ has (Flamm & Kaufmann, 2006). In a similar way for the case of social research, various authors¹² have used the term to explain the potential capacity that social individuals have to become mobile in space (*ibid*).

As defined, Motility refers to the capacity to relocate both *geographically* and *socially* (Flamm & Kaufmann, 2006); that is, motility refers not only to the potential capacity to move in space but also

¹¹ Could be cells, organs –an eye- or an organism –a mammal or a fish.

¹² (Kaufmann et al., 2004; Ohnmacht et al., 2009; Ureta, 2008); for Bauman's *Liquid Modernity* (2000), and Mol and Law, (1999).

to the potential capacity to move –or change- an individual’s position within the social, economic and political context by which he or she relates to society. Motility is therefore a key concept to analyse the relationship between mobility, transport and social exclusion (Kaufmann, 2002, in (Ureta, 2008, p.272). The adopted definition that encompasses this key relationship defines *motility* as:

“The capacity of entities (i.e. goods, information or persons) to be mobile in social and geographical space, or as the way in which entities access and appropriate the capacity for socio-spatial mobility according to their circumstances.”

(Kaufmann et al., 2004, p.750)

Motility: Factors influencing Mobility

Different factors define the above mentioned *potential capacity* to be mobile in space. This includes physical capacities, motivations to be sedentary or mobile, existing transportation and telecommunication services, the accessibility¹³ to these services, and the individual’s acquired “useful” knowledge -i.e. driver’s license, literacy and communication ability- (Flamm & Kaufmann, 2006, p.169). Concretely, mobility is determined three main groups of factors, defined¹⁴ as follows (Flamm & Kaufmann, 2006; Kaufmann et al., 2004):

- **Access:** Refers to the range of possible mobilities according to place, time and other contextual constraints, and may be influenced by networks and dynamics within territories. Access is constrained by options and conditions. The options are related to the concept of service, and refer to the entire range of means of transportation and communication available, and the entire range of services and equipment accessible at a given time. The conditions refer to the accessibility of the options in terms of location-specific cost, logistics and other constraints. Obviously, access depends on the spatial distribution of the population and infrastructure (e.g. towns and cities provide a different range of choices of goods and services), existing spatial policies (e.g. transportation and accessibility), and socio-economic position of the individual (e.g. purchasing power, position in a hierarchy or social network).

¹³ Accessibility encompasses, but is not limited to, financial capabilities of the individual. Refer to the previously mentioned multidimensionality of the term (footnote 9, p.7).

¹⁴ Also cited by (Ohnmacht et al., 2009) and (Ureta, 2008).

- **Competence:** Includes skills and abilities that may directly or indirectly relate to access and cognitive appropriation. Three aspects are central to the competence component of motility: a) physical ability, (the ability to transfer an entity from one place to another within given constraints); b) acquired skills (relating to rules and regulations of movement, licenses, permits, specific knowledge of the area); and c) organizational skills (planning and synchronizing activities including the acquisition of information, abilities and skills). Competence is multifaceted and interdependent with access and appropriation.
- **Cognitive Appropriation:** Is what actors do with Access and Skills. Appropriation is shaped by needs, plans, aspirations and understandings, and it relates to strategies, motives, values and habits. Appropriation describes how agents consider, deem appropriate, and select specific options¹⁵.

The concept of Access mentioned above has particular importance for further discussion on this document. It is important to note that the notion of motility focuses on the transformation of potential mobility into manifest mobility. Similarly, motility can be conceptualized as a form of potential capital which can be mobilised and transformed into other types of capital, i.e. economic or social (Ohnmacht et al., 2009). Linking back with the three mentioned dimensions in which social exclusion operates, it is important to note that “all three elements of motility are fundamentally linked to social, cultural and political processes and structures within which mobility is embedded and enacted” (Kaufmann et al., 2004, p.750). Moreover, there are financial, physical, organisational, attitude-driven, spatial and temporal components that transform motility into mobilities which depend on distinctions of gender, age, ethnicity and so on (Ohnmacht et al., 2009).

The above reasoning implies that changes on individual’s own motility can either drive him or her towards or away from patterns of social exclusion, according to the case. As means of clarification, mobility must be understood as both a result of *and* a contributing factor to social exclusion (Ohnmacht et al., 2009). Understanding particular mobility trends on individuals using the lens of *motility* and its characteristic multidimensionality indicates that accessibility analyses looking at pricing and travel costs (technically known as generalized cost of transport) should be considered only as partial factors limiting individual’s access to transport (Banister, 2002, p.141). Consequently, the importance transportation is understood not solely as lack of mobility, but as lack of access to

¹⁵ Especially for the case of transport, standards, values and habits make reference to what users consider acceptable, commonly-used or cost-worthy in terms of distances, travel times and pricings among others, relating specifically to the socio-spatial context in which the individual is placed.

opportunities to move away from social exclusion, such as employment, education, health and so on (Lucas, 2010).

Mobility-Related Exclusion: Mobility, Public transport and Social Exclusion

As mentioned before, it is suggested that a) social exclusion can favour patterns of reduced mobility and b) reduced mobility can result in individuals falling into social exclusion. In this order, mobility-related problems will be understood as relating directly to social exclusion, either as a cause or as a consequence of it. Public transport in urban societies is a *means* to be mobile and access basic services and amenities¹⁶. Transport is frequently visualized as an obstacle to overcome, especially when considering the high proportion of individuals who do not own private means of mobilization (Dávila, 2010). The author argues in favour of considering *public transport services* a basic human necessity required to attain mobility (Lucas, 2004), especially on urban settings where walking is not considered practical due to long distances and ever increasing time limitations.

Relating to this argument, several authors have discussed the various ways in which transport and social exclusion relate to each other. This has resulted in the term *mobility-related exclusion*. The definition of the term proposed by Kenyon et al. (2002) is widely used in literature - (Cass et al., 2005; Lucas, 2010; Ohnmacht et al., 2009; Ureta, 2008). For these authors mobility-related exclusion is defined as follows:

“[t]he process by which people are prevented from participating in the economic, political and social life of the community because of reduced accessibility to opportunities, services and social networks, due in whole or in part to insufficient mobility in a society and an environment built around the assumption of high mobility.”

(Kenyon et al., 2002, p.210)

The definition of mobility-related exclusion has been widely accepted in transport studies mainly because it manages to capture the notion of relativity within mobility-related social exclusion; that is, that increasing levels of mobility within population –especially those groups with higher *motility*– affects the social conditions of individuals or groups which lower potential capacity to be mobile

¹⁶ Or as Vasconcellos clearly states: “[t]ransport is not an end in itself. The ‘end’ has to be the equitable appropriation of space and the corresponding access to social and economic life.” (Vasconcellos, 2001, p.79)

(Lucas, 2010), which limits their ability to fulfil social participation and to attain goods and services (Ohnmacht et al., 2009).

Dimensions of Mobility-related Exclusion

Regarding the specific importance of the public transport system, Church et al (2000) described seven specific and multidimensional features¹⁷ that contribute –or are related- to the exclusion of specific population groups (Lucas, 2010), especially those without access to private motorized means of transport (Vasconcellos, 2001). In a similar way, Graffron et al (2001) - cited in (MacDonald, 2006)- and (Hine & Mitchell, 2001) propose five main dimensions of transport related exclusion: *Physical, Economic, Temporal, Spatial* and *Psychological*. According to MacDonald (2006), the above mentioned dimensions reconcile the ideas put forward by the UK's Department for Transport -DfT, (2000a), and by Church (2000). Therefore, the author presents Hine and Mitchell's five dimensions articulated with the precise notions of exclusion that Church explains. This summary also incorporates ideas from (Lucas, 2010, p.7). The resulting five dimensions of mobility-related exclusion are:

1. **Physical Exclusion:** based on **physical barriers** –i.e. vehicle, streetscape and station design, as well as cognitive or linguistic barriers –i.e. timetable and station information-
2. **Economic Exclusion:** based on the **cost** of transport services; in the case of public transport, based on the cost of fares, where integration between different modes –i.e. bus and underground- can substantially increase or reduce cost, depending on the case.
3. **Temporal Exclusion:** based on service schedules and conflicts or incompatibilities between them, i.e. for workers doing nightshifts, as well as on time demands i.e. time of journey takes too long-
4. **Spatial Exclusion:** based on (i) inappropriate or inconvenient location of transport interchanges and other services, (ii) the location of these facilities in relation to other facilities such as shops, schools and medical centres, and (iii) on shortcomings of transport service provision, i.e. routes or services not connecting key facilities
5. **Psychological Exclusion:** based on concerns or fears for **personal safety and security** associated with the access to and use of public transport services, i.e. fear of crime, discrimination and accidents.

¹⁷ For the full description of these seven components see (Church et al., 2000, pp.198-99). Lucas (2010), Ohnmacht et al. (2009) and Ureta (2008) adopt this work.

It is important to bring forward at this point the “coupling” notion for factors related to mobility related exclusion. This concept contemplates the fact that different expressions of the dimensions of mobility-related exclusion might result in the constituting as an important *barrier of access* for a given individual. Munk (2009) explains such situations occur, for example, in cases where poor economic and social participation opportunities within a specific urban “couple” with deprivations related to social identity –gender, ethnicity, knowledge-. The situation of “coupling” of dimensions of exclusion offers an alternate view to the typical interpretations of access barriers as solely an economical decision-making issue (Munk, 2009). The next section will elaborate on barriers of access and the measurement of accessibility.

A Traditional Approach to Measurements of Accessibility

Transport planning theories view mobility as a derived demand, meaning that people travel in order to hold economic, social and political activities not available to them at their location (Banister, 2002; Bocarejo & Oviedo, 2010; Vasconcellos, 2001). This is a restatement of the previously mentioned statement which relates transport with access to opportunities to participate in the key social dimensions of society. Modernist approaches to transport planning take into account three main factors to measure accessibility: Land Use, Transport Facilities, and characteristics of individuals¹⁸ (Bocarejo & Oviedo, 2010). Modernist planning contemplates different methodologies that measure accessibility using these three main components. The variety of approaches to conventional methodologies used to measure accessibility can be classified in three main groups¹⁹ as follows: (Bocarejo & Oviedo, 2010; van Wee et al., 2001):

Infrastructure related approaches: principally concerned on transport supply, this approach focuses on characteristics of the installed infrastructure, takes into account length of roads, density of networks and travel times. Because of this, infrastructure accessibility is suitable mainly for car users and inter-urban transport. (van Wee et al., 2001)

Activity oriented approaches: according to Bocarejo & Oviedo (2010), this approach uses indicators to describe the level of access to activities distributed in urban space, i.e. number of jobs within time radius of 30 minutes. Other refined approaches take into account potential number of job vacancies available or tickets available for an event (Bocarejo & Oviedo, 2010).

¹⁸ Bocarejo & Oviedo (2010) mention time availability and available budget, inferring they play an important role.

¹⁹ See (van Wee et al., 2001, p.201) for a comprehensive list relating commonly known accessibility approaches and application possibilities.

Mixed approaches: takes into account the existing connections a specific location has to transport systems, i.e. distance to bus stops or subway station. These approaches are convenient “if access and egress times are important” (van Wee et al., 2001, p.201).

Using Mobility-related Exclusion to Measure Accessibility

Although the above summary is by no means attempting to encapsulate the whole concept of accessibility in traditional planning, it serves as a good example to illustrate common trends currently present in the field. This trend makes visible an apparent problem the above approaches present. In general terms, traditional approaches fail short in considering the barriers of access which are specifically centred on *individual perceptions* and are more related to the five dimensions of exclusion brought forward by MacDonald (2006) (Lucas, 2004; Munk, 2009). In this framework I suggest that the dimensions of mobility-related exclusion are made manifest as *barriers of access* that limit individuals’ possibilities of being mobile.

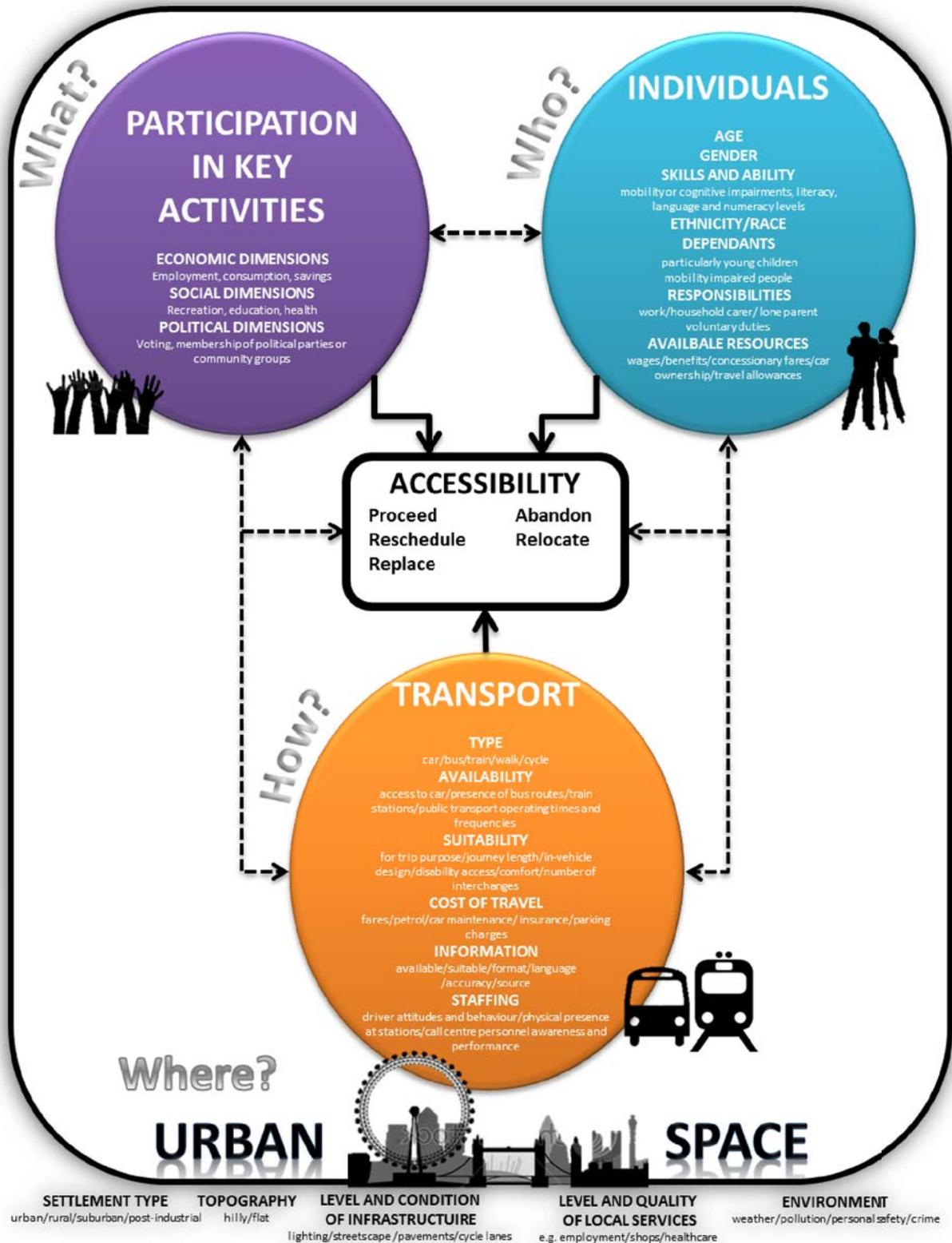
In contrast with the traditional approaches mentioned above, I adopt a methodology that understand the uses the five dimensions of mobility-related exclusion to understood and measure access (Ureta, 2008). In this situation, the dimensions of mobility-related exclusion are made manifest through *barriers of access* that limit individuals’ possibilities of being mobile and benefitting from existing public transport facilities. To bring forward a methodology for measuring access for this case, Lucas (2004) focuses on the factors that affect accessibility from the individual’s perspective. This approach, named *accessibility planning*²⁰, aims at determining **why** individuals experience lack of accessibility.

Building on the work Lucas (2004), I argue that to answer the above question it is fundamental to incorporate participatory research to take into account the factors looking at **who** experiences lack of accessibility, **for what** does he or she travel for, **how** does he or she travel, and **where** does the individual intend to travel. These factors consider specifically the interactions between people, transport and key activities related to participation and well-being. Based on Lucas’ (2004) work, Figure 2.3²¹ is presented to explain the existing relation between the above mentioned questions and accessibility studies:

²⁰ As argued by Lucas (2004, p.44)

²¹ The figure is a modification to Lucas’ elaboration on factors affecting accessibility (Lucas, 2004, p.43)

Figure 2.3 - Individuals, Transport and Participation



Source: own elaboration, based on (Lucas, 2004, p.43)

Figure 2.3 presents the interaction between people, transport and participation within urban space. It suggests that lack of access is determined by the outcome of the interaction between the three components within urban space. Consequently, the “accessibility” box in the diagram identifies the possible choices that are left to an individual when his or her personal circumstances and/or participation opportunities and/or transport options prevent access to the key dimensions of social life (Lucas, 2010). In other words, the diagram explains the underlying causal relation that leads to continued exclusion of the individual (ibid). More importantly, Figure 2.3 is useful when identifying policy attention or possible project interventions needs to be focused (ibid). By establishing the possible causal relations between individuals, transport and participation, specific accessibility issues can be identified using a methodology that incorporates participatory research, such as the one I illustrate on the DLR case at the end of the next chapter.

Recapping Theoretical Concepts into Practice

This theoretical framework relates the concepts of social exclusion and mobility by introducing the concept of mobility-related exclusion. The main argument that distillates from this relationship highlights the importance of including individual centred, mobility-related exclusion analyses as an additional way of assessing the impacts of transport systems. Furthermore, I suggest that it is necessary to evaluate the barriers that prevent individuals from obtaining the benefits derived from increased mobility opportunities offered by public transport provision. This approach highlights the importance of public transportation as a means by which social exclusion can be addressed on urban environments. Consequently, the conceptual framework raises the question of whether transport policy should direct greater attention –and budgets- towards analysing possible barriers of access to public transport to within broader discourses of social inclusion/cohesion/integration. The case study presented on the next part of this document relates the theoretical framework to the Medellín gondola lift project, where poverty, geographical disconnection and lack of access have traditionally excluded men and women from the key social, economic and political dimensions of urban life.

3. Case Study: The Medellín Metrocable-PUI Projects

As a means of introduction

In July 2004, the Medellín Metro opened the *Metrocable* –gondola lift²²- extension to the steep hill of *Santo Domingo Savio*, in one of the most deprived districts of Medellín. In the meanwhile, the 2004-2007 Medellín administration started a comprehensive process of urban regeneration in the same area; namely, the PUI.²³ These two projects introduced important changes to the deprived area in terms of public transport integration and urban infrastructure upgrading and provision. This chapter presents more details related to context, characteristics and results of the Metrocable-PUI projects.

3.1 Context

Medellin is a city of 2.2 million inhabitants at the centre of the Metropolitan Area of the Aburrá Valley,²⁴ encompassing nine other municipalities which add up to a total population over three million -Dane (2005) in (Alvarez Castaño et al., 2010). The city has a distinct culture shaped by a strong regional identity²⁵, and is currently a bustling dynamic industrial centre with some of the highest rates of utility provision in Latin America (Brand, 2004). After Bogotá, Colombia's capital, Medellín is the second most populated city. The city is located in a hilly countryside of the Colombian Andes at 1500 metres above the sea level and some 450 kilometres by road to the northwest of the capital (Brand, 2004).

Figure 3.1 shows the sixteen administrative subdivisions, or *comunas*²⁶ that compose Medellín, as well as the lines of the metro system. Traditionally, popular neighbourhoods have been dispersed towards Medellín's north-east and peripheral west –*comunas* 1 to 7 and 13, respectively-, and the elite's neighbourhoods and CBD²⁷ are concentrated in *El Poblado* -14- *comuna* (Restrepo, 2006). Central Medellín is located above the east of River, in *La Candelaria* *comuna*. The highlighted region

²² I chose to use the term gondola lift in accordance with the terminology adopted by manufacturer and ETMVA. 'Aerial cable-car' or 'ropeway' (Government of the Hong Kong, 2002; Seeber, 2009) refers to the same system in the case of Medellín. See Annex No. 1 for technical characteristics of the Medellín gondola lift.

²³ Integrated Urban Project.

²⁴ Abbreviated as AMVA for its Spanish name.

²⁵ Reflected in some authors daring to call Medellín "the Manchester of Colombia" (Hylton, 2007, p.75)

²⁶ In administrative terms, *comunas* are the equivalent local authorities to the London's boroughs.

²⁷ Central Business District

on the map shows the area in which the Metrocable-PUI projects were developed. The intervened neighbourhoods are at the core of comunas *Popular – 1-* and *Santa Cruz -2-* of Medellín.

Migrants from rural areas, neighbouring towns and other parts of Medellín began the urbanization of these comunas in the late 1960s (Ballesteros et al., 2009). This urbanization was characterised by informality, spontaneity and lack of state presence in the provision of housing, road or basic services (Rueda-García, 2003). These citizen-led developments in the city's eastern hillsides lead to an "organic" urban fabric which contrasts with the predominantly reticular structure characteristic of the city (Municipio de Medellín, 2009b). Due to its topography and lack of state intervention, this comunas have endured low connectivity to the city's public transport system and street network since its beginnings (Ballesteros et al., 2009).

Figure 3.1 - Map of Medellín

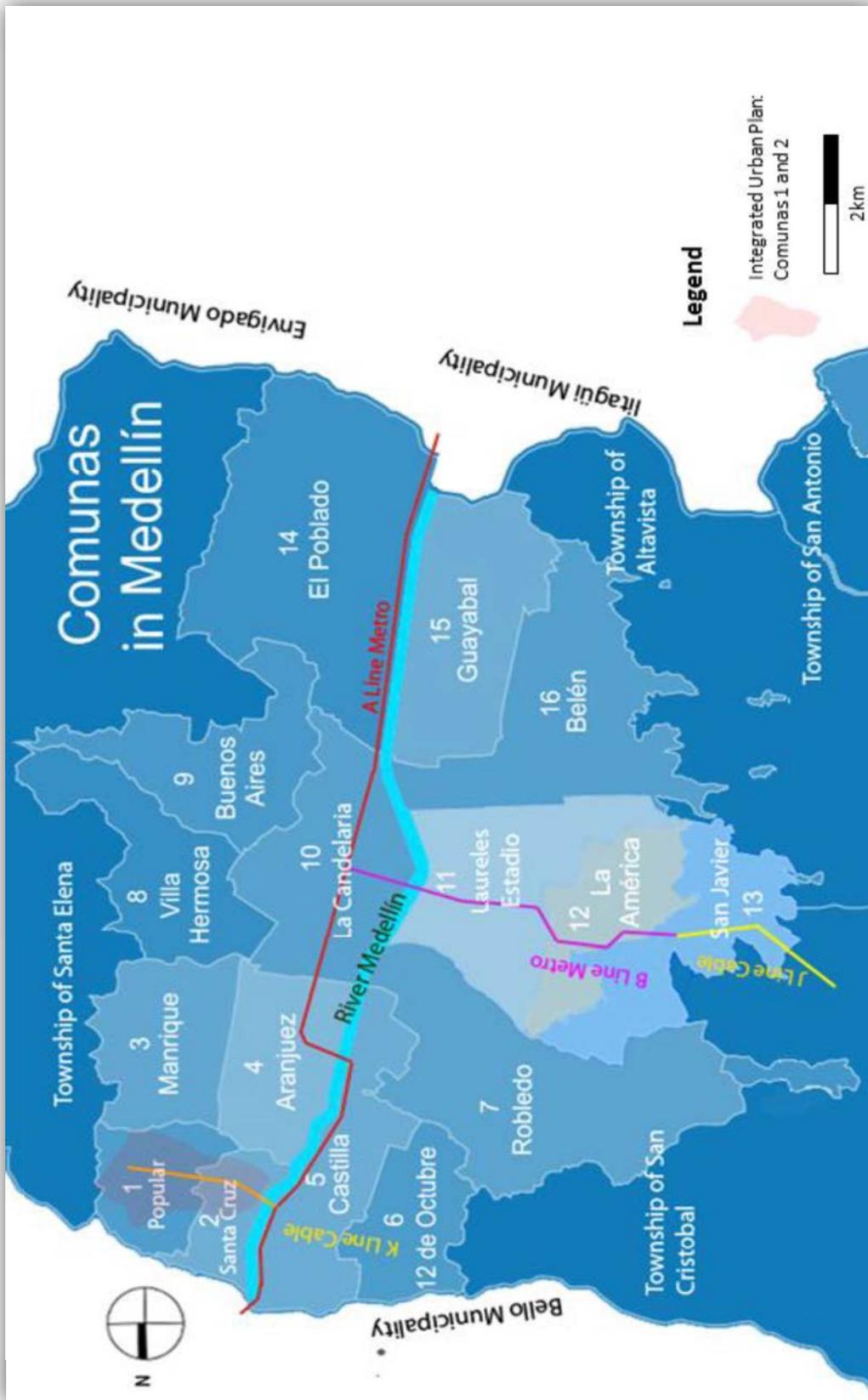


Figure 3.2 – Map of Medellín

Source: own elaboration, based on (Restrepo, 2006)

Medellín in the last 50 years

For over half a century, Medellín's "exceptional modernity" was example of national development far beyond Colombia's borders²⁸. In the 1960s, Medellín was known as a prosperous town of 360,000 inhabitants, rapidly expanding due to rural migration and the consolidation of its prosperous agro industrial²⁹ economy (Rozema, 2007). By the end of the 1980s, Medellín was the first city in Colombia to start building a public mass-transport system.³⁰ Despite the vibrant economic haven Medellín was during decades a strong industrial recession increased the severity of accumulated socioeconomic problems and detonated into economic stagnation, widespread impoverishment and accentuated spatial segregation -Medellín Metropolitan Planning Department, 1985 cited in (Brand, 2004). The uprising drug cartels raised violence levels up to catastrophic peak homicide rates of 381 per 100,000 inhabitants in 1991³¹ (Gómez et al., 2009; Hylton, 2007). The complex situation of violence in the city got worse in the end of the 1990s with the territorial clashes between guerrilla and urban right-wing paramilitary groups derived from the long-lasting Colombian internal conflict (Moser & McIlwaine, 2000; Rozema, 2007).

The disproportionate deterioration of the living conditions in Medellín was brought to a halt by two multi-stage strategies envisaged by the national and local governments. Firstly, the national government coordinated a politico-military offensive aimed at repressing drug cartels and establishing pacts between contending factions in the marginalized areas of the metropolitan area (Brand, 2004). Secondly, the local government designed a plan aiming at increasing investment in those popular areas of the city with the objective of improving the living conditions of its residents (ibid). On this study I focus primarily on the latter strategy due to its visible socio-spatial character, of much relevance to the concepts explained on the theoretical framework. On the following sections I outline some specific characteristics of comunas 1 and 2, to later make a comment on the main components of the regeneration projects that took place between 2004 and 2007 in the area.

²⁸ Medellín was considered a 'capitalist paradise' of the Cold War (ibid)

²⁹ Hylton (2007) mentions textiles, tobacco, beer and chocolate.

³⁰ Medellín is the only city in Colombia with rail transit. Operations began in 1994. Due to complex, expensive and time-consuming financial disputes between the city and private foreign constructors, the country discarded rail plans for other cities, and opted years later to build BRT systems in Bogotá and other Colombian cities instead. A complete case study on the financial disaster of the Medellín Metro is presented by (Acevedo et al., 1993). See Contraloría General de la República (2004) for information on Colombia's BRT programme on 6 cities.

³¹ Although this is perhaps one of the most repetitive facts in literature about Medellín, I couldn't help mentioning it for a dully millionth time.

An overview of Comunas 1 and 2

On their study on Urban Poor in Colombia, Moser & McIlwaine (2000) identified violence as the main manifestation of poverty *and exclusion* perceived by communities such as the ones of comunas 1 and 2³². Different types of violence identified by communities -in Medellín and elsewhere- were grouped into three main categories: social violence, economic violence, and political violence (Moser & McIlwaine, 2000). These categories relate directly to the dimensions of social exclusion mentioned I mentioned earlier on the framework. This allows me to present the categories and causes of violence presented by Moser & McIlwan as evidence of the existing conditions of social exclusion in the area of study, supporting the argument in favour of using a multidimensional analysis social-exclusion as the main concept to explain mobility-related exclusion. This, once more, is a strong argument in favour of understanding the present issues as *transcending poverty*.

Using the interrelation between people, places and activities is useful to describe the conditions of social exclusion made present in north-eastern Medellín. For this, I chose to summarize Moser & McIlwan's (2000) types and causes of violence to illustrate the how social exclusion is made present, as follows:

Social Exclusion, Social Violence and households: permeating the spectrum of social relations within poor communities, intrafamily violence is linked to lack of leisure opportunities, alarming rates of unemployment and alcohol and drug use as cause and consequence of violence.³³ (Moser & McIlwaine, 2000, p.31).

Social Exclusion, Economic violence and drug consumption: Causes for widespread drug use include the lack of organized recreational opportunities, namely sports, leisure and cultural facilities or events. Drug consumption is perceived as one of the leading factors that lead to situations of school drop-outs, unemployment, drug dealing and robbery in many cases. Fear of addict-related violence often results in people staying at home on the evenings (Moser & McIlwaine, 2000, p.43). High unemployment levels have led to a vicious circle by which employment prospects were reduced by employers' prejudice towards people coming from a comunas known for its violence problems.

³² Although not based solely in Medellín, I consider that the mentioned study provides an initial useful insight to understand the prevailing conditions associated to living in comunas 1 and 2 during the late 1990s. See (Dale Lamb, 2010) for a 677-page compendium specifically on Medellín's violence dynamics between 1984 and 2007

³³ The authors mention that this particular condition is also reflected in children spending long periods of time in the local streets playing with their friends, putting them at potential risk of traffic accidents due to the lack of play-safe public space.

Unemployment and stigma ultimately influenced many people into getting involved in violent crimes³⁴ as a means of survival (Moser & McIlwaine, 2000, p.71).

Social Exclusion, Political Violence and armed groups: there is a prevalent fear of participating in political arenas –voting, community organizations, and so on- due to the existence of Marxist guerrilla and right-wing paramilitary groups, as well as for the lack of presence from the state (Moser & McIlwaine, 2000).

Comunas 1 and 2: Some facts

Neighbouring Comunas 1 and 2 have historically shared similar demographic, spatial and economic characteristics³⁵ related to their common history of development and social problems. Table 3.1 shows that the two comunas are very densely populated³⁶ by primarily by low income citizens; with over 40 per cent them being young adults in the 15 to 39 age bracket. Table 3.2 shows the motorization rate³⁷ in the area is low if compared to the city average, and very low in comparison with other cities. This low motorization rate implies that residents from the area experience high dependency on public transport in terms of mobility.³⁸

Figure 3.2 - Housing Tenure, 2004 Figure 3.2 shows the distribution of housing tenure from households located on comunas 1 and 2, together with the same statistic for the Medellín average of households belonging to economic layers 1 and 2. From the preliminary data used for Figure 3.2 it has to be said that there is an important percentage of owners who still have a financial debt³⁹, either with the governments' social housing programme or with community savings groups (Rueda-García, 2003). It is more common to find households living on rented units on comuna 2, possibly due to its residents being predominantly in the second economic level. The extent of informal or irregular tenure existing between owners and renters is not clearly reflected on the figure. However, it appears that at the moment informal house tenure situations are controlled, principally due to

³⁴ Drug cartels played an important role in this situation, often paying to people working to their criminal organizations as hit men and so on (Moser & McIlwaine, 2000).

³⁵ For a detailed report on socioeconomic indicators from comunas 1 and 2 (2005 to 2008), see (Alcaldía de Medellín, 2010a; Alcaldía de Medellín, 2010b)

³⁶ London Borough of Hackney had a population density of 10,674/km² in 2006 (Borough of Hackney, 2006, p.20). Together with comunas 6 and 13, comunas 1 and 2 also have the highest population density in Medellín (Torrejon-Cardona, (no year)) .

³⁷ Measured in vehicles per 1,000 population -2005 data, (AMVA, 2006). See Banister (2002, p.11) for EU and US indicators.

³⁸ For detailed mobility indicators by comuna see the 2005 Origin-Destination (AMVA, 2006)

³⁹ Original data distinguishes between owners with and without mortgage-type credits. See (Dávila et al., 2006, p.32) .

historic processes of legalization of land propriety – i.e. the Primed programme, 1996⁴⁰ - which benefited especially households on the second economic level (Dávila et al., 2006). Nevertheless, this situation needs further analysis due to the high risk of displacement renters in comuna 2 would face if their conditions (or the prices of the rent) changed due to urban interventions like the ones discussed.

⁴⁰ The Primed was a slum upgrading programme started in 1996 in Medellín aimed at improving housing and living conditions on dwellers of several comunas. See (Blanco & Kobayashi, 2009; Calderón-Arcila, 2008; Dávila et al., 2006; DNP, 2010; Rendón-Colorado, 2007)

Table 3.1 - Basic Demographic indicators - Comunas 1 and 2

Indicator (2005 data)	Comuna 1	Comuna 2
Total Population	116,312	89,943
Population aged between 15 and 39 years	42.5%	42.9%
% Pop with low Income (2 economic layer)	75.4%	96.6%
% Pop with very low income (1 economic layer)	24.6%	3.5%
Population Density (inhabitants/ km ²)	34,900	40,900
Unemployment (PUI area, 2005) 11 neighbourhoods in comunas 1 and 2		60%*
Unemployment (Medellín Average, 2005)		13%*

Source: Own Elaboration using data from DANE (2005) cited in (Comuna Popular, 2010) and (Comuna Santa Cruz, 2010)

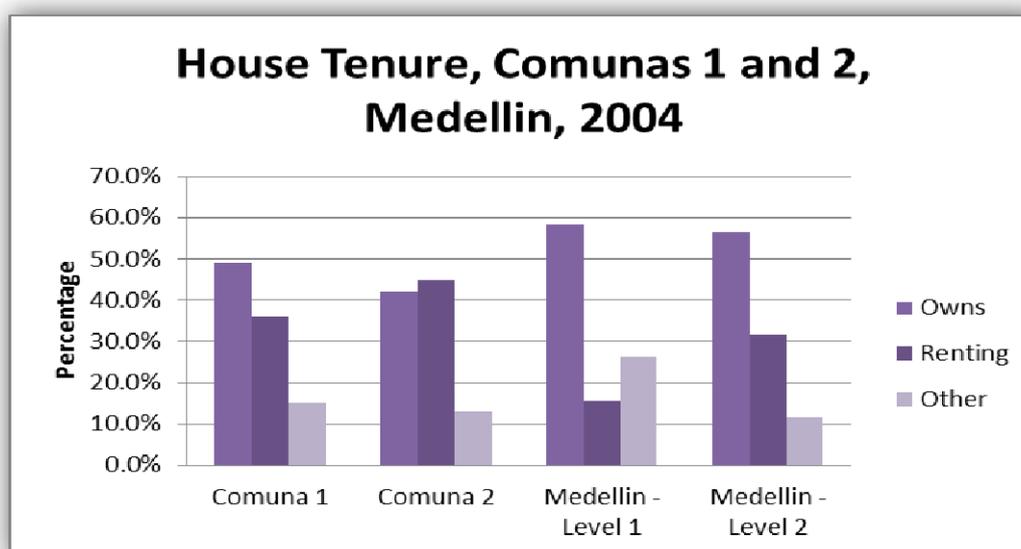
*:EDU – Medellín, in (Blanco & Kobayashi, 2009)

Table 3.2 - Average Motorization Rate - Comunas and Selected Cities

Location (year)	veh/1,000hab
Medellín Comuna 1 (2005)	6.7
Medellín - Comuna 2 (2005)	6.8
Medellín Comuna 14* (2005)	434
Medellín - average (2005)	54
Bogotá - average (2001)	141
Mexico City - average (2001)	200
Sao Paulo - average (2001)	388

*: Medellín Highest

Source: Own Elaboration using Medellín data from (AMVA, 2006) and other cities from (Figueroa, 2005)

Figure 3.2 - Housing Tenure, 2004

Source: Own Elaboration. Data in comunas 1 and 2: (Alcaldía de Medellín, 2006) ; for Levels 1 and 2: (Dávila et al., 2006)

Planning in Medellín

It is argued that most of the urban regeneration projects undertaken in Colombia over the last two decades on cities such as Medellín have been possible partly because of the 1990s decentralization process undertaken by the central government (Dávila, 2009). Although Medellín had institutionalized some form of urban planning in 1899 (Hylton, 2007) national political reforms have shaped and legitimized urban and transport planning in the city. The public election of city mayors in 1986 began the decentralization trend in Colombia, which was later reinforced by the new Constitution of 1991 (Gómez et al., 2009). This constitution made city governments legally responsible for the planning and management of social and economic development in their jurisdiction (Gómez et al., 2009). Additionally, the 1991 Colombian constitution calls for local administrations to prepare development plans which are to be discussed with civil society and presented to the legislature for approval, integrating participatory budgeting and planning methodologies to the process (ibid). In the Medellín context, Laws 128 of 1994 and 99 of 1993 govern the Valle de Aburrá Metropolitan Area, which was originally created in 1980 with Medellín at its heart (AMVA, 2010).

3.2 Change in Medellín: The Metrocable-PUI case

On July 2004, five years after the planning process began in 1999, the ETMVA⁴¹ began operating the first⁴² *Metrocable* gondola lift extension to comunas 1 and 2. The Metrocable K line, as it is known, provides a 7 minute service⁴³ connecting residents from neighbourhoods in the hillsides of north-eastern Medellín to the *Acevedo* metro station in the north of the city, on the A line, allowing access to the metro with the same ticket. Besides reducing ticket expenses, the system contrasts with the previously existing minibuses which took over an hour to do the same journey to the metro station. Three new stations are located on the extension: Santo Domingo, Andalucía, and Popular.

Shortly after the K line began operations, the 2004-2007 Medellín administration began showing the results of a complex process of urban regeneration in the same area, officially known as the North-eastern Integrated Urban Project –PUI⁴⁴. The project was executed as consequence of an initial study of the social and mobility conditions in the area (DNP, 2010). This diagnostic research, commissioned

⁴¹ For acronyms, see glossary

⁴² . The Metrocable J line, a second extension on the western periphery of the city, was opened in March 2008. This case study, however, focuses solely on the K line project.

⁴³ As stated by the gondola-lift manufacturer's ([[18pomalink01]])

⁴⁴ For acronyms, see glossary

by the recently elected Mayor Fajardo⁴⁵ in 2003, recognized the high levels of violence and poverty as the main problems of the area, and attributed to the general *absence of the (local) government*⁴⁶ the deterioration of the physical and social conditions (ibid). The Mayor's discourse coined the term *Social Urbanism* to refer to the set of policies directed at "paying back" the *historical social debt* - owed to the poorest communities (DNP, 2010). Consequently, Social Urbanism is the concept embedded on the urban regeneration programmes⁴⁷ by which traditionally deprived areas are to be integrated to the Medellín in spatial, social and economic terms (Pérez-Fernández, 2010). Accordingly, Social Urbanism is the concept underpinning the urban regeneration project that took place on the area of influence of Metrocable between 2004 and 2007; namely, the *North-eastern Integrated Urban Project –PUI*.⁴⁸

I chose to explain the Metrocable and PUI projects as complementary interventions aimed at regenerating the area of comunas 1 and 2 (Hernandez, 2006). Although both projects were not conceived simultaneously nor its complementarity was planned in the original Gondola-lift Transport project, I consider that analysing both projects in retrospective as complementary interventions offers an important insight to study the outcomes of this regeneration on the light of mobility-related exclusion. Moreover, the fact that the 2004-2007 administration installed a second Metrocable in the context a second-generation PUI reflects the importance given at considering both Metrocables and PUIs as complementary stages of transport-based urban regeneration projects. The following sections will outline (i) the historical, social and demographic city context in which the project occurred, and (ii) the basic characteristics and benefits attributed to the Metrocable-PUI intervention.

Aims of Metrocable-PUI projects

Note: This section focuses on the main characteristics of the Metrocable-PUI projects. Appendix No. 1 contains information about the Metrocable planning process, as well as other information related to the history and present conditions of the Medellín mass transport system. Annexes No. 1 and 2, on its turn, include the diagrams, technical and financial figures associated to the two Metrocable lines

⁴⁵ Mayor of the Medellín municipality during 2004-2007.

⁴⁶ This causal relation was coined as the "historical social debt" that the city has with the residents of the poorest comunas (Alcaldía de Medellín, 2008; Ballesteros et al., 2009; Hernandez, 2006).

⁴⁷ One of the main approaches adopted was the development of massive architectural projects⁴⁷ which were "conceived integrally and executed simultaneously in order to promote profound cultural and social change" at the heart of the "neediest communities" (Alcaldía de Medellín, 2008, p.154).

⁴⁸ See glossary

currently operating in Medellín. A complete overview on the PUI process and outcomes can be consulted in the Book *Medellín: from fear to hope* (Alcaldía de Medellín, 2008, p.in Spanish).

In 1999, ETMVA defined a strategic plan to increase coverage of the system and increase user affluence (Metro de Medellín, 2004). This strategic plan mentions a set of criteria used by ETMVA to evaluate the benefits of the gondola lift transit technology. The chosen gondola lift technology was meant to:

- *Reduce operating costs*
- *Reduce journey times*
- *Increase personal security and safety*
- *Reduce environmental impacts⁴⁹*
- *Be a profitable investment⁵⁰*
- *Promote Social equity*
- *Increase energy efficiency*

Ministerio de Fomento, España, 1996, cited in (Metro de Medellín, 2004, p.9)

On the other hand, the North-eastern Integrated Urban Project –PUI⁵¹- implemented along the main axis of the Metrocable K line Project aimed at:

- *Decreasing the territorial-development differences in the city*
- *Improving the socio-economic conditions of specific areas requiring an inclusive and equitable development*
- *Influencing the definition of public investment priorities*
- *Bringing forward a social urbanism model to the areas most affected by violence and social/territorial exclusion*
- *Contributing to the increase of IDH in the city*
- *Balancing the historical social debt with groups traditionally excluded from development opportunities*

EDU, 2006, in (Rendón-Colorado, 2007)

⁴⁹ The company has always placed in their top interests environmental factors that promote energy efficient and low emission systems (Marquez, 2009).

⁵⁰ Annex No. 1 cites an 18.2 Internal Return Rate for the Project (Metro de Medellín, 2004).

⁵¹ For acronyms, see glossary

To do this, the municipality’s Urban Development Company –EDU⁵²- was designed as to be in charge of the implementation of the PUI designated for the north-eastern area⁵³. As shown in

Table 3.3, the interventions designated by the PUI programme to meet the above requirements were structured around three main dimensions: institutional, social and physical. The institutional component defined EDU’s role as a facilitator bridging together other municipal entities, local organizations and contractors. The social level specified the main actions taken promoted to strengthen community led-organizations. The physical component, on its turn, defined the main intervention fronts that gave shape to the spatial redevelopment of the area. This structure was based on the *Ciudades Amables*⁵⁴ strategy published on the Colombian 2002-2006 National Development Plan (DNP, 2010).

Table 3.3 – Main components of the Integrated Urban Project

Dimensions		Actions
Institutional	Coordination	Inter-institutional coordination Inter-sectorial coordination
Social	Community participation and communication	identifying Validating participation education
Physical	Public space and Transport	construction of new public spaces upgrading of existing public space Improving mobility
	Housing	provision of new housing units Upgrading existing housing Tenure legalization
	Public Facilities	Improvement of local community facilities construction of new community facilities
	Environment	restoration of the natural environment

⁵² Empresa de Desarrollo Urbano - EDU –is a decentralized state institution created in 2002 to manage the urban redevelopment programmes. Before 2002, the institution operated under a different name as municipal real-estate developer (Calderón-Arcila, 2008)

⁵³ For a detailed map of the area and the interventions that took place, see Annex No. 2

⁵⁴ “Friendly Cities”

Source: own elaboration based on EDU - (Calderón-Arcila, 2008, p.66)

Results of Metrocable-PUI projects

Metrocable

Official statistics highlight the following benefits achieved after the implementation of the Metrocable K line:

- *Average daily trips (working day): 40,000 (Metro de Medellín, 2004)*
- *Average daily trips (Saturday) 46,000 (Metro de Medellín, 2004), reflecting the much mentioned unprecedented local tourism the area attracts (Dávila, 2010)*
- *Operation 19 hours a day (Pomagalski, 2006)*
- *Time savings: the entire journey across the K line takes 7 minutes; travelling the same distance using minibus services takes more than 1 hour*
- *Direct beneficial impact on over 150,000 inhabitants from economic layers 1, 2 and 3 (Restrepo-Vélez, 2009)*
- *Nearly 95% of the Metrocable users have saved at least 2 daily tickets with the integration to the metro system (previously they had to pay the minibus and metro tickets separately) (Hernandez, 2006)*
- *Transport savings per household up to USD\$100/month (Metro de Medellín, 2004)*
- *Increased accessibility for people with disabilities in comparison to traditional minibus services (Metro de Medellín, 2004)*
- *Security has improved; people take Metrocable for outings at the weekend. (Pomagalski, 2006)*

Note: Due scope of this document and to the fact that Medellín used the experience obtained in K line project to complete in 2008 the subsequent Metrocable J line, I focus solely on the K line project. Further research, however, might find beneficial to compare both projects together with their respective urban regeneration programmes. As mentioned above, Annex No. 2 includes official technical figures for the Metrocable K and J lines.

PUI

Analysing the results delivered by the “multidimensional” regeneration of the 11 neighbourhoods in comunas 1 and 2 is a more complex process –see Annex 3–, especially if looking at the institutional and social dimensions (DNP, 2010). Regarding the physical outcomes of the North-Eastern PU programme, official figures highlight the following results. These results also include claimed socioeconomic direct benefits promoted by the project (ibid):

- *125,000 metres of generated public space*
- *Cost of investments exceeds over four times the cost of the Metrocable project⁵⁵*
- *92% of the manual labour proceeds from inhabitants of the local area*
- *18 new parks*
- *8 neighbourhoods were given a park for the first time in their history*
- *3,235 metres of pedestrian strips*
- *8 pedestrian bridges and 8 pedestrian underpasses*
- *A 300 per cent increase in “commerce” on the Andalucía High Street*
- *10 entrepreneurial events with total sales of COP\$150 million⁵⁶*
- *25 community events with a total participation of over 300,000 men and women*

(DNP, 2010; Rendón-Colorado, 2007)

Annex 3 includes a schematic map showing the area of intervention and the main projects undertaken by the north-eastern PUI between 2004 and 2007.

Regarding the outcomes of the Metrocable-PUI projects, I found two main aspects worth highlighting:

First, the success of the project in the transport field. This is related to the fact that when the decision to build *Metrocable* was undertaken, there were no mass-transport⁵⁷ public systems in the world relying on cable technology to mobilise commuters from popular neighbourhoods (Restrepo-Vélez, 2009). However, it has to be said that Gondola-lift technology is, by its own means, nor new nor revolutionary. The novelty of the Medellín case lays its spatial application: the Metrocable project proved that Gondola-lift systems can provide a reliable, every-day efficient transport alternative for densely populated hillsides on large cities (Dávila, 2010). Because of this, the K line project has received innumerable best-practice mentions on national and international reviews which catalogue it as the first “real” public transport system in the world⁵⁸ using gondola lift

⁵⁵ \$3.7 billion in housing projects, 1.7b on public space, 9.4b on social and institutional dimension (prices in COP, 1 billion = 1 thousand millions)

⁵⁶ Approximately USD 82,000, 2005 exchange rates.

⁵⁷ Although gondola lifts are not considered mass-transport technologies under Colombian legislation, this sentence makes reference to the integration of the system to the metro system, which is, by all definitions, a mass-transport system.

⁵⁸ The success of the initial gondola lift transit line in terms of acceptance and usage sped up the planning and construction process of a second gondola lift transit line, labelled “Metrocable J line”. This second project was structured financially and technically in a very similar to the “Metrocable K line” project, using once again *Pomagalski* French technology and manufacturing. The Metrocable J line, located on the western limits of the city (comuna 13, see

technology (Idea Generation, 2009; Jausaud, 2007; López-Peláez & González, 2008; Pomagalski, 2008). This international example on innovative transport practice has led to other administrations to opt to build a similar system⁵⁹ (Restrepo-Vélez, 2009).

Secondly, the urban restoration associated to the construction of a new transport branch. By undertaking a process of urban renovation of the area in parallel to the transport project, the administration highlighted the importance of addressing the social problems associated to the lack of infrastructure and community facilities. By doing this it could be argued that the administration opted for an approach which acknowledged mobility-related exclusion not as a transport issue, but as a multidimensional problem which required other improvements to complement the provision of improved connectivity to the city's transport system. Regarding this second approach, it has been suggested that the physical upgrade has improved residents' perception on their neighbourhood status,⁶⁰ which could lead to a better established sense of belonging to their area and to the city as a whole (Dávila, 2010). Besides the benefits for local residents which enjoy modern infrastructure and services, it is also suggested that the rest of the city now access the area due to increased safety and security (Ballesteros et al., 2009; Dávila, 2010). Nevertheless, this tentative benefits, although evident for the government and the wider public opinion in the city, have not been assessed through participatory research, and therefore do not constitute as "empirical evidence" of the improved mobility-related conditions of residents in comunas 1 and 2.

⁵⁹ In Colombia, the cities of Cali and Manizales are building and operating gondola lifts, respectively (Alcaldía de Santiago de Cali, 2010; Seeber, 2009).

⁶⁰ See for example: (Alcaldía de Medellín, 2008; Blanco & Kobayashi, 2009; Restrepo, 2006)

4. 'Measuring' Change: An empirical Analysis

In contrast with broad indicators as the HDI, a specific evaluation of mobility-related exclusion for the Metrocable-PUI case will require the development of a specific methodology aimed at determining, roughly, whether residents without access to private means of transportation can get to where they need to go. This type of methodology, called *Accessibility Planning* by Lucas (2004), is “people-centred, location-specific and evidence-based, thereby catering for the actual activity needs of... socially excluded groups and communities in the transport planning and decision-making process” (Lucas, 2004, p.47). Accessibility planning, in particular, looks at the interrelation between *people*, transport and activities that I illustrated on Figure 2.3 in the theoretical framework (ibid). Furthermore, it is suggested that participatory research should be used to identify social groups experiencing mobility-related exclusion –and possibly structural problems of social exclusion.

4.1 Accessibility Auditing

Lucas (2004) and Solomon & Titheridge (2009) mention that UK Local Transport Plans have implemented a strategy to diagnose accessibility conditions and find ways to improve them (Lucas, 2004). This strategy acknowledges that transport provision is not just about expanding the reach of the service; it is also about reducing fear of crime, providing better information systems and understanding why people who can use the system do not do it (Munk, 2009). The strategy proposed by Lucas (2004) aims at (i) ensuring a clear and consistent process for identifying groups and areas with accessibility problems, and (ii) ensuring that the identified issues are addressed by a specific, within-budget action plan. The four key stages proposed by Lucas (2004) are:

1. *Accessibility auditing: identify whether people can get to key activities within a reasonable time and cost, safely and reliably*
2. *Resources audit: identify the existing resources and potential funding sources that are available to address the problems that are identified*
3. *Action Plan: develop an prioritise solutions and a cross-agency strategy for delivering these*
4. *Implementation and Monitoring plan: ensure the plan meets the initial objectives*

(Lucas, 2004, p.44)

The first stage of this strategy is particularly relevant for my case. Other stages, such as the resource audit and the action plan, are more relevant for documents exploring the role of local transport planners and government institutions in designing comprehensive strategies aimed at identifying

and addressing mobility-related exclusion. Consequently with this reasoning, I will use the following paragraphs to unpack the contents of the first stage of Lucas' (2004) strategy, namely, the Accessibility Audit.

The accessibility audit aims at understanding existing barriers of use through participatory research. To understand the perspectives of men and women towards the availability and convenience of public transport, Lucas (2004) suggests accessibility audits should contemplate the actual conditions and interrelations between the three key elements portrayed in Figure 2.3: people, transport and activities within urban space. As I mentioned on the theoretical framework, barriers of exclusion are often related to the “coupling” of different factors that represent an issue towards accessing or using public transport (Munk, 2009). In other words, accessibility audits will often find that surveyed individuals might experience mobility-related exclusion due to various “small” factors which couple to form an important barrier of exclusion.

This audit can typically be done by surveying residents of the area to study. This is important since transport studies usually survey users of their systems, leaving outside consideration those men and women who can use the system but decide not to travel due to specific barriers (Munk, 2009). In terms of methodology, Munk (2009) suggests that information should not be collected using specific formats contemplating preconceptions or scales; it should allow participants to tell their own stories in order for specific concerns or problematic situations to arise and be taken into consideration.

4.2 The DLR approach to Accessibility Auditing

Different research studies commissioned by London's Docklands Light Railway –DLR- in 2004 and 2008 constitute an interesting case study that illustrates methodologies which incorporate accessibility studies as part of a broader impact assessment research (SRA, 2008; Munk, 2009).

Looking at the cases in which DLR has conducted accessibility-related studies might provide useful information to be taken into account in the Medellín case. This type of research focuses mainly on

- i) *Specific insights and circumstances of the people in the area under consideration*
- ii) *The type of activities that people in the area under consideration undertake*
- iii) *Availability of transport facilities*

(Lucas, 2004; Munk, 2009)

By researching the above mentioned key aspects that determine individuals' access opportunities, planners gained an understanding of the specific constraints which impact travel behaviour on specific areas (Munk, 2009). A summary of the key findings of the 2004 and 2008 studies is presented on the following paragraphs.

Tower Hamlets

In his research, Munk (2009) mentions key approaches that allowed DLR to better understand the processes of “coupling” of disadvantages leading to mobility-related exclusion. Munk (2009) indicates that besides conducting semi-structured interviews that allow the inclusion of individual perspectives related to the three factors cited above, DLR's⁶¹ provides key approaches that set a difference from traditional transport planning research. A summary of the key DLR approaches highlighted by Munk (2009) includes:

Micro-level research: interviews on 500 families living around each station's area of influence (or catchment area) allowed researchers to grasp very specific perceptions concerning accessibility to the DLR system. From these interviews, it was found that *crime* and cost were the most significant barriers of access. Although the stations were not found to be perceived as dangerous, men and women mentioned the risks involved in walking to the stations. This observation might result of particular relevance for the case of comunas 1 and 2, where fear-based violence still plays a key role in social relations, even after the Metrocable-PUI project (Ballesteros et al., 2009). Regarding cost, DLR research found again that the “coupling” of exclusion dimensions plays a significant role in households. For example, in cases in which household income limits the financial resources available for purchasing tickets, wives and/or children might be deterred from travelling as needed because of financial factors coupled with feelings of insecurity of walking to the stations.

Walking Audits: researchers conducted anonymous walking audits on the routes interviewees reported as risky or dangerous in terms of safety and security. This includes areas either with poor illumination, bad street design (dead-ends, narrow alleys) or frequently used as gathering points by gangs or threatening individuals/groups. The walking audits involved transport/road planners which perceived the existing situations and were able to provide input regarding what was feasible in terms of traffic engineering and street design (Munk, 2009).

⁶¹ The 2004 and 2008 DLR research studies were carried out by the firm Social Research Associates:DLR (2004), cited in Munk (2009), and DLR (2008).

North Woolwich's Input for the Medellín Case

The 2008 North Woolwich report was commissioned by DLR in order to track down changes in perceptions from residents of the area two years after the DLR London City- North Woolwich extension opened in 2005 (SRA, 2008). An initial study of the impacts of the system had been undertaken in 2006, shortly after the system began operations. This initial study looked at issues such as the self-image residents have on their neighbourhood, residents' expectations in relation to employment or educational opportunities, and citizen's perception on the state of community cohesion. In 2008, two years after this initial study, DLR undertook a second similar study aimed at determining if there had been any changes on people's perception around the above mentioned aspects.⁶² The 2008 study presents a methodology that combines traditional "desktop" –statistical- research with "survey" –participatory- research, offering two types of data, namely, statistical tendencies (i.e. deprivation indexes, house price indexes and crime levels) and participatory research qualitative data (i.e. perceived image of neighbourhoods, recurrent problems and reasons that influence neighbours to move into the area). It is important to note that DLR (2008) placed important attention in trying to replicate the characteristics and size of the 2008 sample according to the original 2006 survey. In the next paragraph I summarize some of the key factors that the North Woolwich case explores which I consider useful for the Medellín context, especially when analysing possible cases of involuntary displacement or gentrification due to the dynamics introduced by the Metrocable-PUI projects. These key factors are presented according to the type of research DLR makes reference to. Finally, I present some tentative indicators based on DLR's experience that serve as illustration for future analysis of the conditions in comunas 1 and 2.

Desktop research:

Traditional indicators: population, type of employment, income, existing community and transport facilities. Apart from these statistics, the DLR research collected data related to:

Changes in house prices: explores reasons explaining price changes related to availability of private/public sector developed housing, quality of furnishings, and availability of housing units to rent or buy. As DLR points out: "This is a key point to note, as it illustrates why it is critical to combine desk research with qualitative work: merely looking at the figures shows that 'on average' things are getting better. It is necessary to work with the people who were socially excluded at the

⁶² This methodology of tracking down changes by using similar surveys every two years might result of particular relevance as a policy recommendation for recently opened Medellín Metrocable J line or other systems currently in planning stages.

start to ensure that they are gaining from the general increase, rather than being left behind or moved out” (SRA, 2008, p.15). The research also compared changes in housing price indexes in the area of interest with the city average, giving a useful point of reference to analyse price changes in the area⁶³.

Crime: using data provided by the Metropolitan police, DLR compared changes in crime levels in the area in relation to the same trends observed in other areas of the city. This procedure disaggregates “global” statistics related to the improvement of security and provides more detailed information specifically for the area.

Participatory research:

Participatory qualitative research offers the most useful reference regarding the type of information that can be obtained in accessibility audits through participatory research. To illustrate DLR’s case I show a series of components of analysis and an indicator related to each component. It is important to note the important possibilities of analysis offered by having information from 2006 and 2008. This allowed DLR to observe trends in the consolidation of the transport system and its role promoting accessibility, contribution to the improvement of general conditions and the persisting concerns of the residents and businesses.

It is also worth mentioning the particular importance that the DLR report places in bringing forward specific testimonies/comments from individuals surveyed in the area. These comments are provided as a complement to the summary of results presented by graphs/tables in each component.

The 2008 DLR study presents its results using a series of objects of study. These objects of study contain the most significant results and comments obtained from the surveys conducted on individuals residing or working in the area, as well as with members of businesses operating in North Woolwich (DLR, 2008, pp.26-41). A key summary of this objects of study and its broad indicators are presented on Table 2.1 in the following page.

⁶³ SRA presents graphs illustrating changes in the house Price index for North-Woolwich and London. See (DLR, 2008, p.18)

Table 4.1 - Objects of Study - DLR research

	Object of Study	Indicator
1	General Views about the neighbourhood	Main reasons Living/working in the area
2	Aspirations to move away	Would/wouldn't like to move away. Reasons for wanting to leave.
3	The characteristics of those wishing to move	Household structure i.e. Families, couples, loners
4	Views about the future of the area	The area will/will not improve - Why it will not: i.e. crime, dirty, isolation
5	The role of DLR (the transport system) in contributing to improvement of the area	DLR has improved/made worse/made no difference
6	Perceptions of accessibility in the Neighbourhood	Area is/isn't good to access facilities i.e. health, employment, leisure
7	The difference the transport system has made to individuals	what difference has DLR made to you personally - improved things/made things worse/made no difference Has DLR played a part in my decision to live/work here? (includes info on no. of years person living here)
8	Use of the transport system – main reasons	main reasons for using/not using DLR more compared to a year ago
9	Variation in use of the transport system(by journey-purpose and frequency of use)	what do you use DLR for/how frequently you use it for that activity
10	Travel by DLR compared to other modes	modal distribution as understood in traditional transport planning, but incorporating Individual's reasons for electing a particular mode i.e. safety, information, cost
11	Who uses the transport system most? (characteristics of the most frequent users)	not an indicator - characterizes who are the most frequent users of the system, can reflect those groups who less access the system

Source: Own elaboration with information from (DLR, 2008)

Note: I chose to present a more detailed explanation of some the considerations that each of this components evaluate in Appendix No. 2 for practical reasons related to the total length of my document and due to the purely documental nature of the text.

5. Discussion & Conclusions

5.1 Discussion

The research conducted by DLR in 2004 produced a document which placed⁶⁴ great emphasis on the personal security factor towards deterring individuals from accessing the transport system. Graffiti, litter, vandalism, lack of order and lighting were mentioned as key factors to be watched. As solutions, DLR suggested working together with local councils to: improve lighting, control homeless and unleashed dogs; increase police presence and/or install CCTV cameras. Road design considerations were also brought forward, including keeping parks tidy and illuminated at night; “designing out” potential hiding places, and make station entrances more welcoming and attractive (Munk, 2009).

This type of research and its subsequent results are of particular relevance for the Medellín case, in which a history of violence still affects the way in which individuals consider safety and security as barriers which discourage them from travelling. Furthermore, the recommendations incorporated by DLR can serve as an example on how accessibility research provides useful feedback from residents regarding what they perceive as unsafe or not correctly designed. This offers the opportunity for the Medellín administration to track down possible problems related specifically to the PUI interventions. By addressing people’s concerns regarding barriers of access related to safety and security –among others-, the PUI interventions can effectively deal with the mobility objectives contemplated originally.

In the case of Medellín, based on UNDP’s procedures and experiences⁶⁵, the Municipality of Medellín used ICV and HDI evaluations⁶⁶ during the 2004 diagnosis stages to measure the impact of violence and poverty on the living conditions of residents⁶⁷ (Alcaldía de Medellín, 2008). After the initial HDI baseline was calculated, HDI and ICV constituted the most important methodological tools used by the 2004-2007 Fajardo administration to measure the improvement of the living conditions of

⁶⁴ See DLR, 2004, in Munk (2009).

⁶⁵ According to Marlier et al. (2007), the UNDP Human Development Index –HDI- is the most widely known composite indicator⁶⁵ used to measure poverty and social exclusion (Marlier et al., 2007, p.183)

⁶⁶ Human Development Index –HDI- and Quality of Life –ICV . I use the acronym ICV for the Spanish Índice de Calidad de Vida.

⁶⁷ For a published definition used by the Medellín government, see (Alcaldía de Medellín, 2008, p.32)

*Paisas*⁶⁸ in each comuna (Alcaldía de Medellín, 2008; Restrepo, 2006). The existing documentation I had access to in relation to impact assessment focuses primarily in discussing the benefits of the Metrocable-PUI project in terms of positive changes to the area's HDI and ICV indicators.

In Medellín, the evolution of above mentioned indexes was measured in each comuna by official surveys. The administration reported an increase in both indexes after the Metrocable-PUI programme: In terms ICV, this increase means that the surveyed residents of the area reported to have better housing, public services and access to sanitation; while in terms of HDI, residents reported a perceived higher standard of living, better knowledge of common issues, better family relationships and better education for its younger residents especially⁶⁹. Besides the rough transport statistic facts⁷⁰ calculated by ETMVA, the increase in ICV and HDI indexes has been the principal indicators used to illustrate the positive impacts of the Metrocable-PUI projects⁷¹ (Rendón-Colorado, 2007).

I didn't come across any evidence suggesting there are additional, more specific methodologies or indicators by which mobility-related exclusion has been taken into account or measured within the impact monitoring strategies. This obeys duly to the fact that for the Colombian case⁷² there is an evident lack of research focused in accessibility and its relation with and social exclusion or similar concepts (Lucas, 2010). The only research relating social exclusion in Colombia that Lucas (2010) and I know of is Bocarejo & Oviedo's (2010), which is based on the Bogotá BRT case. In a similar way to what I found, Bocarejo & Oviedo (2010) state that

“although the concept of social equity seems to be ubiquitous in most mobility plans of major Latin American cities, when evaluating transport projects for financing an prioritization there are no specific and solid indicators to measure social impacts and how they can contribute to promote better access to opportunities, particularly for the most vulnerable segments of population.”

(Bocarejo & Oviedo, 2010, p.2)

⁶⁸ *Paisa* is the adjective given to people from the Medellín area, although it also applies to people living in the whole Antioquia Department, of which Medellín is Capital.

⁶⁹ According to the variables measured by the municipality. See (Municipio de Medellín, 2006) for specific data. There is not enough information to determine if all the components that make up the HDI presented increases.

⁷⁰ Related to number of daily passengers, time savings, number of users saving on transport expenses because of the Metrocable-metro integration, mainly.

⁷¹ HDI is a persistent indicator used by the 2004-2007 Medellín administration to measure the positive effects of its urban redevelopment programmes. See (DNP, 2010; Restrepo, 2006).

⁷² As in other countries of the Global South.

The study done by Bocarejo & Oviedo focuses primarily on the Hansen accessibility equation⁷³ – Hansen, 1959, cited in Bocarejo & Oviedo (2010, p.6). Bocarejo & Oviedo’s research, although seminal for the advance towards investigating social exclusion & transport in Colombia, does not look at the same factors that I consider best explain barriers of access in terms of mobility-related exclusion in Medellín. This does not suggest that either approach is incorrect or not useful. I consider both perspectives can provide complementary evaluations of “hard” –econometric, statistical- and “soft” –participatory-research based- information of a same phenomenon. These complementary approaches can possibly provide planners and policy makers more and better information to be used as evidence when bridging transport rationality with political power in decision-making processes which led to policy formulation⁷⁴.

Adding to Bocarejo & Oviedo’s findings, I argue that the secondary research done on the Medellín case suggests *there is a clear gap in literature aiming at thoroughly assessing the changes promoted by Metrocable-PUI projects in Medellín*. Although I cannot cite evidence to discourage the use of HDI and similar indicators to evaluate the performance of broad policies in terms of impact on the standard of living of the population, I argue that evaluating transport-related policies in the light of social exclusion requires specific methodologies that incorporate the notions of barriers of access and mobility-related exclusion. I further argue that the indicators used to date in Medellín, although useful for general purposes, tend to reduce a specific, multidimensional phenomenon to a single number (Marlier et al., 2007, p.182). Following this argument, I will present a short case study which gives useful insights on how other transport projects have looked at individual perspectives of mobility-related exclusion.

5.2 Conclusion

Undoubtedly, Medellín’s has experienced significant changes over the last decade. In general, the Metrocable-PUI integrated approach has received much praise surrounded by the discourse that speaks about Medellín’s “positive and profound social and spatial transformation⁷⁵” after the implementation of the previously mentioned multi-stage strategy of politico-military intervention in

⁷³ This equation takes into consideration three main factors: (i) generalized travel cost, (ii) travel time cost between two locations, and (iii) the percentage of individual income spent on travelling (Bocarejo & Oviedo, 2010, p.9)

⁷⁴ This goes back to the political nature of decision making in transport which I commented in the introduction (Flyvbjerg, 1998).

⁷⁵ Authors cite as examples the amount of transnational enterprises placing their Colombian Headquarters in the city, as well as the city’s leading position in the Latin American fashion and medical industries (Hylton, 2007).

conjunction to the local regeneration strategies (Pérez-Fernández, 2010; Hylton, 2007). Regarding the city's social transformation, official figures showcase a reduction of the homicide rate to 28 per 100,000 residents in 2007 as well and the increase of the UNDP Human Development Index –HDI– from 74.3 in 2001 to 79.3 in 2004, and up to 80.3 in 2006 –Controller's Office of Medellín (2008) cited in (Gómez et al., 2009, p.11) and (Restrepo, 2006, p.16). Such figures putting in manifesto Medellín's outstanding recuperation are abundant, but none of them focus precisely on the dimensions of exclusion present on comunas 1 and 2. Therefore, little would be done by compiling the city's positive indicators one more time.

Lastly, although the Metrocable-PUI projects appear to be a success case that further promotes Medellín's "transformation", I strongly argue that there is not enough research or information around the impact on the social, economic and political dimensions of citizens under direct area of influence of the projects. Therefore, claims about the same level of success cannot be on an academic research that takes into account the multidimensional factors related to social exclusion. A more serious evaluation of the multidimensional positive or negative impacts such as the one conducted on south-east London by DLR appears as necessary if the way in which accessibility to existing and future gondola-lift projects is to be analysed and possibly improved. Lastly, I argue that the high potential for replicability that these types of programmes have due to the convenient symbolism attached to them⁷⁶, would be further benefited if a thorough accessibility analysis was undertaken by looking at the dimensions of mobility-related exclusion through participatory research. Ultimately, identifying causes of lack of access leads to acknowledging the existence of the five dimensions of mobility-related exclusion, relating directly to wider, more rhetorical discourses of social exclusion. This might allow public policy in Medellín to use specifically targeted tools aimed at reducing mobility-related exclusion to effectively bridge social exclusion discourses and practice. The first step forward, however, is to undertake an exercise of participatory research aimed at evaluating the barriers of access experienced by the *Paisas* of comunas 1 and 2.

⁷⁶ Both governments and media have portrayed urban gondola lift projects as modernizing, and have associated them with progress, social equity and highly touristic (Alcaldía de Medellín, 2008; Idea Generation, 2009; Pomagalski, 2008)

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AI. Appendix 1 – past, present and future of EMTVA

(Marquez, 2009)

Emtva

The Empresa de Transporte Masivo del Valle de Aburra -ETMVA- is the most important transport authority in the metropolitan area⁷⁷. It is a state company owned in equal parts by the Departamento de Antioquia and the Municipality of Medellín. ETMVA is responsible for the regulation, planning, operation and maintenance of rail and cable lines on Medellín and the other 9 municipalities of the metro area (Metro de Medellín, 2007).

Medellín Transport Today

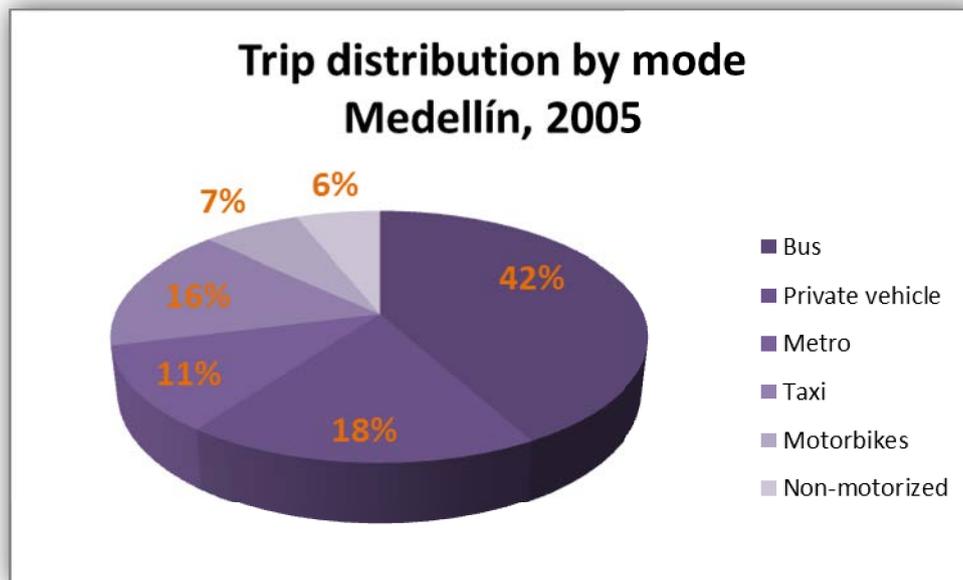
ETMVA began transport operations in 1995. Its network is presently composed by two elevated rail lines and three cable lines, one of them serving as a tourist line leading to a natural park and requiring a premium fare. Its network spans over 25 kilometres and 31 stations (Marquez, 2009). Annex 1 contains a map of the system and a description of each of the lines, as well as an estimate of daily trips done in the system. The metro system operated by ETMVA contemplates a system of discounted rates for students, disabled and senior citizens. A special, higher discount is also offered for students registered on schools of the metro area located outside the Medellín municipality. See Annex 2 for details.

ETMVA does not control the metropolitan area's traditional and problematic⁷⁸ bus system, known locally the *collective public transport system*. Many times ETMVA has raised its concerns about the existence of different transport authorities, and is working its way towards the consolidation of a unique central transport authority that will control all mobility modes and aspects in the metro area (Restrepo Velez, 2006). In the Metropolitan Area of the Aburra valley secondary transport authorities, named "transit and transport secretariats", regulate the collective public transport service in each municipality of the metro area, including Medellín. The collective transport system

⁷⁷ The complete hierarchical structure of the transport authorities operating on the AMVA can be consulted in (Restrepo Velez, 2006, p.9)

⁷⁸ For a detailed description of the perverse conditions in which privatized collective transport operates in Colombian cities –including Medellín–, see (Ardila, 2005)

mobilises 42% of the daily journeys done in Medellín, reflecting its importance in transport matters. In contrast, the metro system mobilises 11% of the daily journeys, whereas the remaining journeys are done by private car, taxi, bicycle or walking (Martinez, 2009).



Source: Martinez, 2009

Etmva's Plans

ETMVA is taking part in the planning, construction and operational control of *Metroplús*, a BRT system⁷⁹ due to start operations soon. ANNEX 1 contains a map with the BRT corridors currently under planning/construction. Finally, an ambitious and revolutionary plan is restructuring the existing collective public transport system on the entire metro area as part of the new Integrated Transport System –SIT-VA⁸⁰ (Marquez, 2009). The objective of this plan is to integrate the collective service financially, spatially and administratively to the Metroplús and Metro system under ETMVA's authority (Metro de Medellín, 2007). These structural reforms appear as an important window of opportunity for transport planners, academics and policy-makers to bring forward the debate on how transport planning practice operates in the Colombian context. This suggests, in other words,

⁷⁹ For information about this mass-transport system see (Lloyd Wright, 2007)

⁸⁰ See glossary.

that it is a crucial moment in the city's history to incorporate, among others, accessibility indicators into the future planning and monitoring & evaluation phases of the future integrated transport system.

History Of Metrocable

According to Hernandez (2006), the transport masterplan developed for the 1993 Medellin Land Use Plan⁸¹ suggested to take into consideration as gondola lift system as an alternative to integrate to the metro system the deprived neighbourhoods in north-eastern Medellín. This was proposed as part of a “new mobility model which rationalizes the number and duration of journeys, supported by mass and medium capacity public transport, thus modifying the existing radial patterns used to access the city centre, allowing it to cater to its citizens’ mobility needs in an agile, comfortable, safe and reliable manner” (Hernandez, 2006, pp.3, translation is mine).

In 1999, ETMVA defined a strategic plan to increase coverage of the system and increase user affluence. This strategic plan mentions a set of criteria to evaluate possible investment alternatives for its public transport system (Metro de Medellin, 2004) . The company has always placed in their top interests environmental factors that promote energy efficient and low emission systems (Marquez, 2009). A shortlist of criteria used by ETMVA to select a particular technology requires for the alternative to:

- *Reduce operating costs*
- *Reduce journey times*
- *Increase personal security and safety*
- *Reduce environmental impacts*
- *Be a profitable investment*
- *Promote Social equity*
- *Increase energy efficiency*

Ministerio de Fomento, España, 1996, cited in (Metro de Medellin, 2004, p.9)

⁸¹ Land use plans are known in Colombia s POTs. See glossary.

Besides being an attractive alternative for sites with steep topography such as the Aburrá Valley hillsides, gondola lift transit systems are considered cheap according to industry standards. The benefits and characteristics that make gondola lift transit technology suitable for public transport scenarios have been described extensively by fabricants and clients (Jaussaud, 2007; Metro de Medellín, 2004; Reconnecting America, 2007). A list of the most important features identified in the above mentioned sources mention that this alternative offers:

- *[T]he cheapest transport system among motorized modes except electrically aided bikes, which is not a collective transport*
- *High adaptability to steep hillside topography*
- *Installation only requires short and small perturbation of the general traffic*
- *Simplified administrative procedures, low staff (i.e. no drivers on the gondolas)*
- *Higher safety and security, less accidents*
- *A reliability up to 99.8%*
- *The smallest energy consumption*
- *Low operating costs and the smallest annual maintenance costs : from .3 to .5% of the investment*
- *Easily integration with other modes of transport*
- *Financial charges much smaller than for other modes*
- *No waiting time, comfort and silence*
- *Anti-cheating watching very easy*
- *The safest and the most pleasant transport mode for users.*
- *A large area for green activities under it*
- *The greenest of all collective motorized transports*
- *Technology is highly transferable*
- *Increase in well-being and quality of life of benefited citizens*

(Jaussaud, 2007; Metro de Medellín, 2004; Reconnecting America, 2007)

ETMVA's planners confirmed with technology providers that it was possible to adapt a system typically used on ski resorts to public transport specifications, and decided to carry on with a study which selected the gondola lift alternative for the hillside transport project (Restrepo-Vélez, 2009). As a result, ETMVA submitted the *Proyecto Metroplús* proposal to the Medellín 2001-2003 land use plan, which included the "107th street gondola lift transit corridor" for the north-eastern area of the city (comunas 1 and 2) (Hernandez, 2006). Once approved by the land use plan, ETMVA contracted

the necessary transport and demand modelling studies⁸² that determined the financial feasibility of the project in terms expected daily passengers. These results convinced the Government of Medellín to pay 55% of the costs of the project if EMTVA assumed the remaining amount (Marquez, 2007).

With the budget secured, the following stages of planning, design and construction were executed by contracts awarded to different specialized firms. The final construction stage of the entire system was in charge of a French-Colombian consortium led by the *Pomagalski*⁸³ (France), *ConConcrete* and *Termo Cotécnica* (Metro de Medellín, 2004). The project, labelled “Metrocable K line”, began operations on July 2004, with few schedule delays or considerable budget overruns⁸⁴ (Hernandez, 2006). In 2008, a second gondola lift transit line, labelled “Metrocable J line”, began operations on the western periphery of the city (comuna 13, see Figure 3.2). This second project was structured financially and technically in a very similar to the “Metrocable K line” project (Marquez, 2009).

⁸² Studies forecasted an estimated daily demand for the cable line of 27,000 users (Metro de Medellín, 2004; Hernandez, 2006).

⁸³ See glossary.

⁸⁴ The total cost of the Project was approximately USD 25 million (68 billion COP, 2001 exchange rates) (Marquez, 2007). This corresponds roughly to USD12.5 million per kilometre.

All. Appendix 2 – Objects of Research – DLR North Woolwich Study (2008)

The DLR 2008 study highlights the following results: (SRA, 2008, pp.26-41):

- **General views about the neighbourhood:** incorporates perceptions on what individuals value, like and dislike from the area. It allows distinguishing the views from long-time residents from those that recently moved in, allowing a sensibility analysis to determine which conditions from the area new-comers value most.
- **Aspirations to move away:** incorporates percentages of interviewees declaring they want to move to another area of the city, as well as the main reasons behind the thought. For the case of North Woolwich, individuals commented about the deterioration of the area, housing issues (space, quality), crime, and facilities to raise children, such as nearby education facilities, community centres and parks.
- **The characteristics of those wishing to move:** in a similar way to the first component, this segment evaluates how long have the individuals willing to move away lived in the area, as well as who are they going to live with –partner, parents, alone-
- **Views about the future of the area:** is related to the question if the individuals consider the conditions of the area will improve, get worse or remain the same. In the case of the 2008 North Woolwich research, a higher percentage of individuals considered the area would improve in the future in comparison with the 2006 survey.
- **The role of DLR (the transport system) in contributing to improvement of the area:** related to questions around the importance of the transport system for residents of the area in regard to the “added value” that transportation puts into living in North Woolwich.
- **Perceptions of accessibility** in the area: reflects the activities that individuals reach by using the transport system. For example, most of the interviewees in North Woolwich consider the system a key factor to access jobs or employment opportunities, but in the case of shopping and accessing health facilities, most consider the transport system less important, since shopping and health facilities are reachable by walking distance.
- **The difference the transport system has made to individuals:** this aspect specifically targets the question “what difference has DLR made to you personally?” In the case of North Woolwich, individuals explained that the transport system cut down journey times to work,

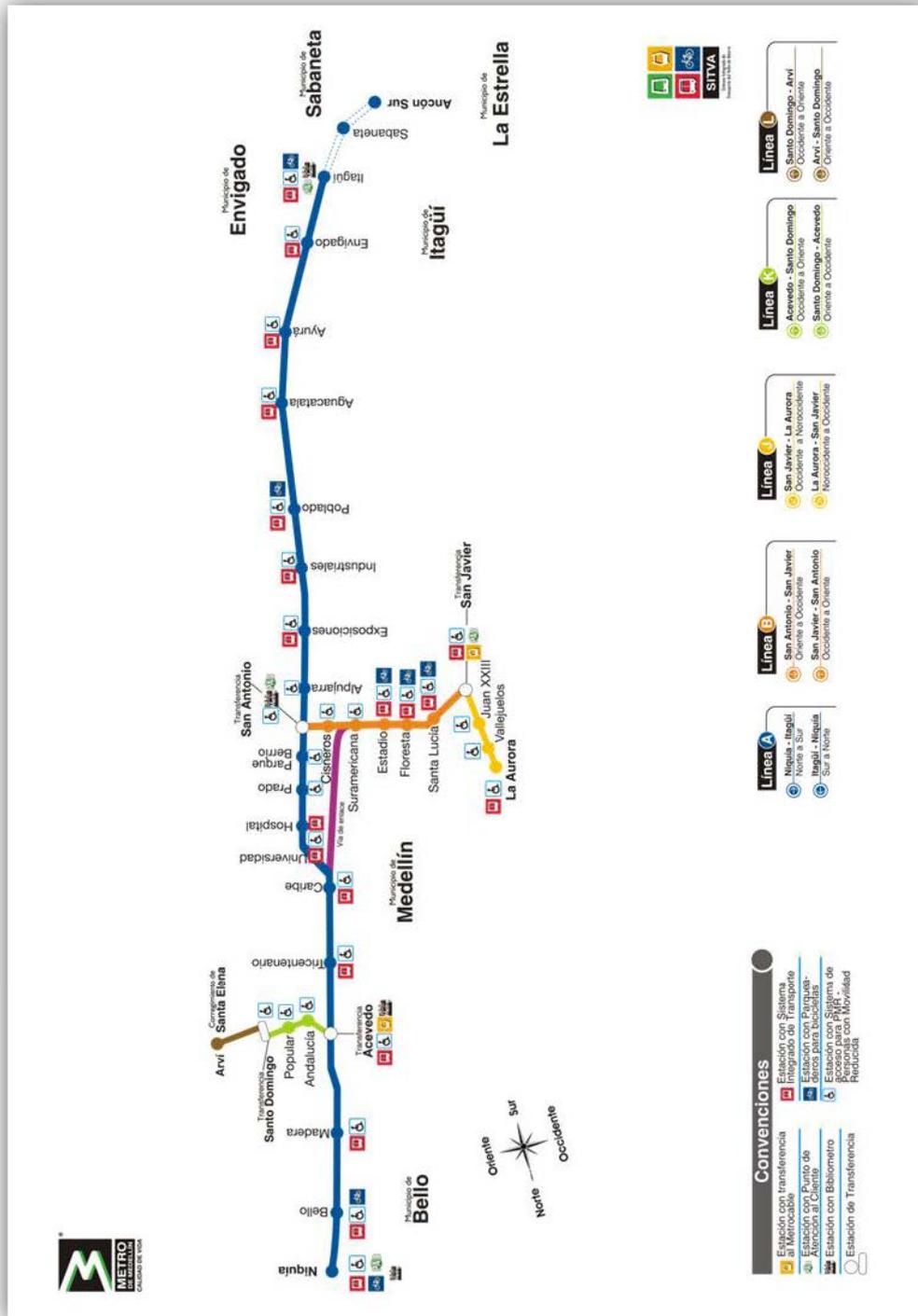
or that it allowed individuals to access health facilities without somebody else having to drive them. Other interviewees commented the system allowed them to expand their within-reach area to look for jobs. Another resident explained that he or she wouldn't have moved to the area if it hadn't been for DLR being at reach.

- **Use of the transport system – main reasons:** takes into account residents' views on why they choose the transport system over other transport modes. For the case of Medellín, factors like physical accessibility, availability of information, quicker journey times, reliability and good connections are factors that can be taken into account based on the DLR research.
- **Variation in use of the transport system by journey-purpose and frequency:** evaluates individuals' views on what they use transport for and how frequently. This includes non-frequent users who use the system to access leisure, shopping, faith and health activities.
- **Who uses the transport system most?** This question is related to describing the views of the most common users of the system. In other words, the question reflects the views that people who use DLR the most have on North Woolwich. This brings a useful insight in determining which type of users predominate in the system, their views around the area and how they might underrepresent other social groups present in the area, reflecting the importance of interviewing households, not just users of the system.

Business views: Besides the research conducted on individuals and households, DLR researchers interviewed local businesses to grasp their views on the changes the area has experienced since the system has been working. In a similar way to what individuals answered, some business representatives consider things were improving in the area, whilst others didn't perceive much change; others linked the existence of the DLR to an increase in sales and easiness in the hiring process.

ANNEX 1

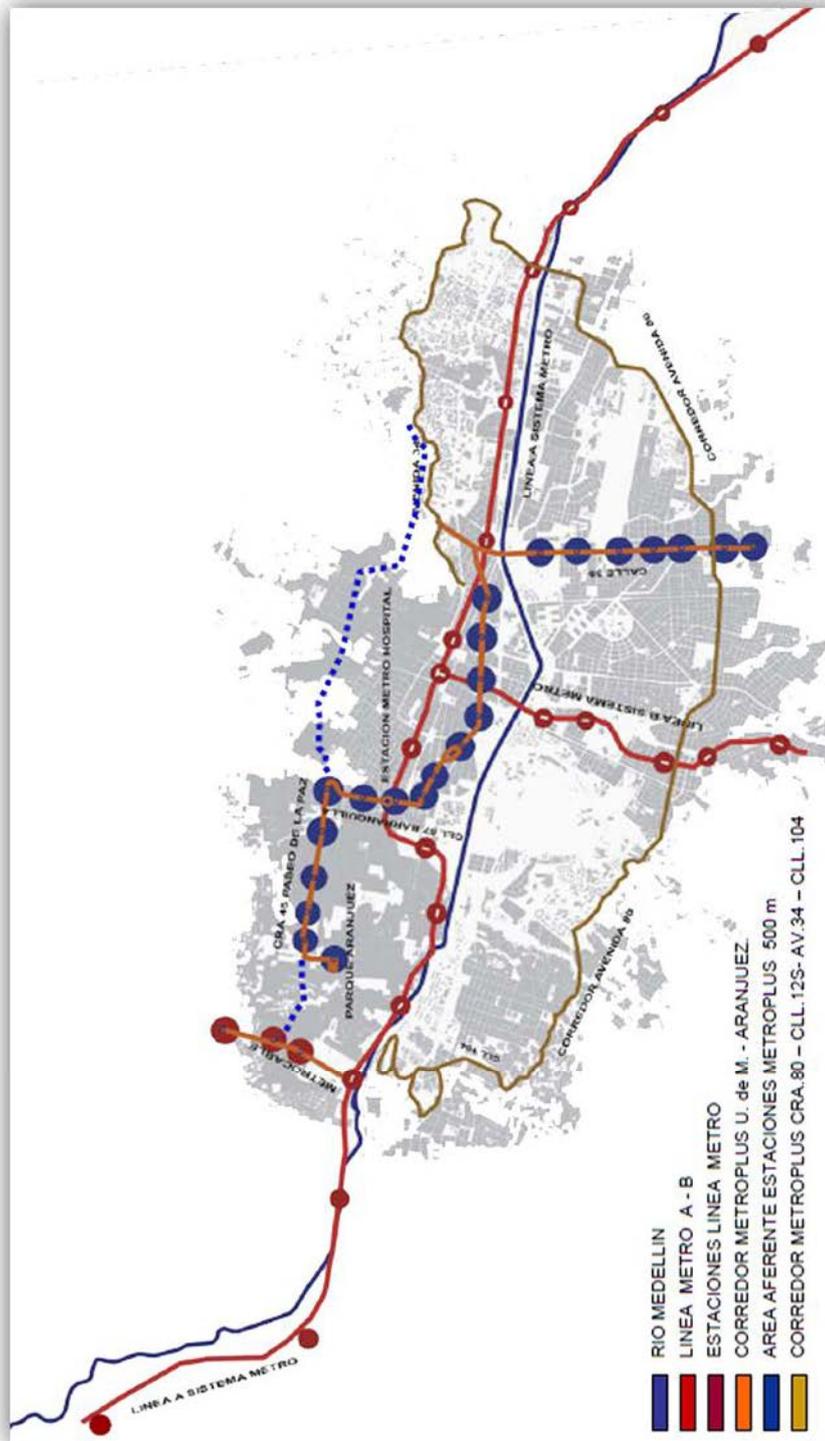
Medellín Metro and Metrocable Network



Source: Márquez, 2008; Restrepo-Vélez, 2009

ANNEX 1

Medellín Metro, Metrocable and future *Metroplús*



Source: Márquez, 2008; Restrepo-Vélez, 2009

ANNEX 2

Metrocable FACTS: Infrastructure

Component	K Line (2004)	J Line (2008)
System type	Fully Detachable Monocable Gondola	Fully Detachable Monocable Gondola
Length (according to slope, metres)	2072	2789
Altitude difference (m)	399	309
altitude of lowest station (metres above the sea level)	1451	1541
altitude of highest station (m.a.s.l.)	1850	1850
Maximum slope (percentage)	49%	73%
line speed (metres/second)	5	5
number of sustaining pillars	20	31
type of energy	Electrical	Electrical
power required (kiloWatts)	920	1134
cable diameter (mm)	51	52
installed capacity (passengers/hour)	3000	3000
estimated demand, first year (pass/day)	25000	21685
width of Right of Way (metres)	5.7	5.7
frequency (seconds)	12	12
Stations		
Number of Stations	4	4
built area (stations) (sq. Metres)	9000	7600
built area (public space) (sq. Metres)	13000	15000
green areas (sq. Metres)	34000	9000
Gondolas		
number of gondolas	93	119
distance between gondolas (metres)	60	60
specifications	aluminum design internal illumination Pininfarina Design	
participating contractors		
electromechanical design	Bocarejo Ingenieros (Colombia) Alpes Etudes, Eric ERIC (France) (both French)	
architecture project	Equipo arquitectura ETMVA	
constructors	Temporary society: Pomagalski (France) Conconcreto and Termotécnica Coindustrial (Colombia)	
Technical audit	Electrowatt - Infra (Switzerland) Integral (Colombia)	

Source: Márquez, 2008; Restrepo-Vélez, 2009. Translation is mine

ANNEX 2

Metrocable FACTS: Financial and Social Aspects

Financial	K Line (2004)	J Line (2008)
Cost of Investment	USD 25M	USD 48M
Internal Return Rate	18,2%, 15 yr payback time	n/a
financing	50% department, 50% ETMVA	72.81%D; 27.19% ETMVA

Source: Márquez, 2008; Restrepo-Vélez, 2009

Social Aspect	K Line (2004)	J Line (2008)
Population in catchment area (hab)		USD 48M
direct		15000
indirect		340000
socioeconomic layer	1, 2, 3	1, 2, 3
Maximum number of employees - construction phase		470
Maximum number of employees - operation phase	50% department, 50% ETMVA	72.81%D; 27.19% ETMVA
operations and maintance		74
watchmen and cleaners		99
Land plots negotiated under a social pricing model in which a concept of retributive justice and acknowledgement of preexisting values prevailed		271
Trees	700 planted; 6 re-planted	1100 planted; 130 conserved

Source: Márquez, 2008; Restrepo-Vélez, 2009. Translation is mine

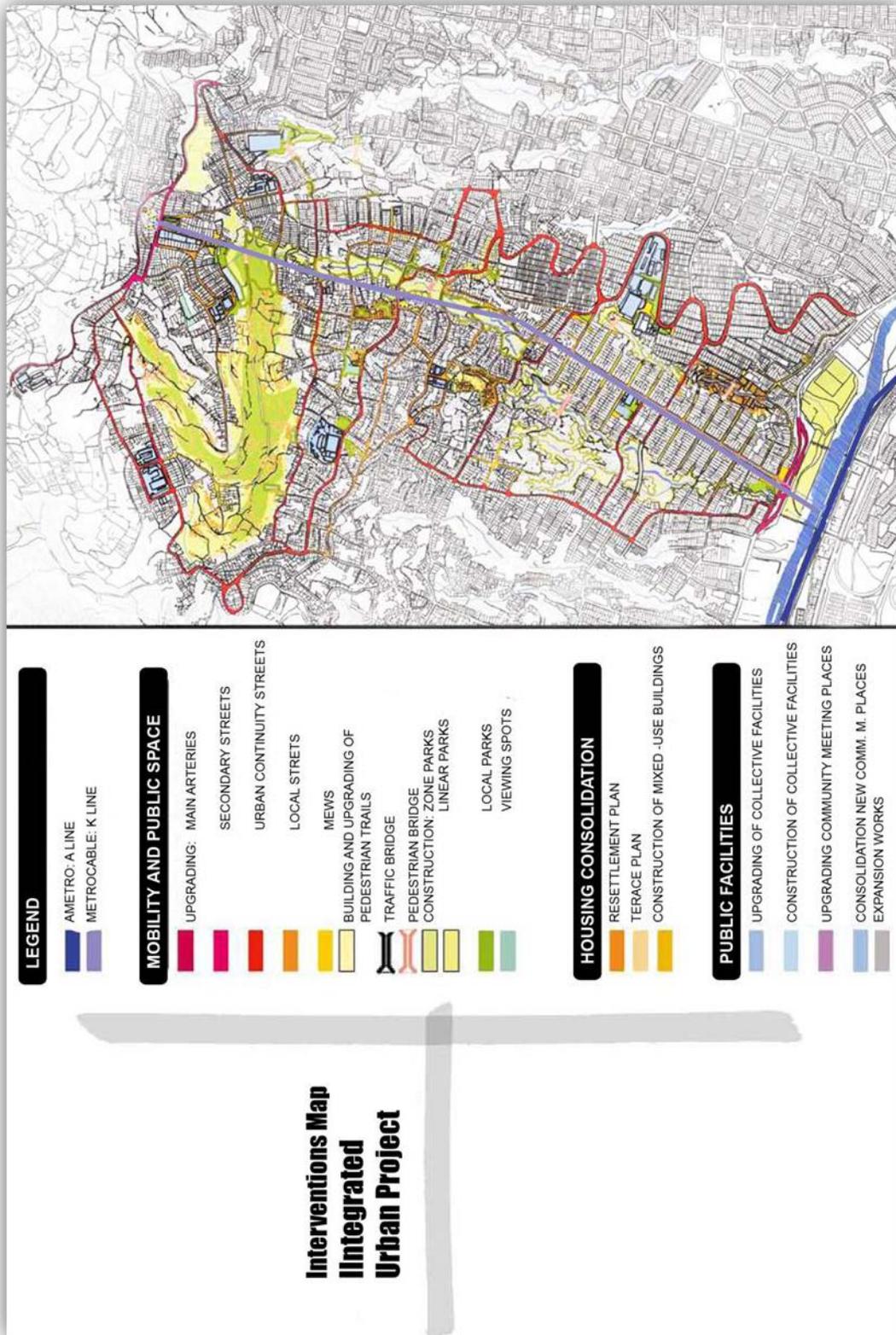
ANNEX 2

Medellín Metro FACTS: Fares

FARE	PRICE (COP)	
Single ticket	\$	1,550
Single integrated ticket (metro after taking bus)	\$	950
using contactless card:		
own card	\$	1,400
tourist temporary card	\$	1,500
student metro area	\$	1,150
student rural	\$	735
senior	\$	1,350
disabled	\$	1,090

Source: Márquez, 2008; Restrepo-Vélez, 2009. Translation is mine

ANNEX 3 PUI FACTS: Intervention fronts



Source: Cárdenas, 2005. Translation is mine