New Needs, New Methods: A Review of Sustainable Transport and Mobility Planning in Abidjan, Côte d'Ivoire

Cazemier, Mathijs

NEW NEEDS, NEW METHODS

A Review of Sustainable Transport and Mobility Planning in Abidjan, Côte d'Ivoire

Universiteit
Leiden

Mathijs Cazemier - s2211831

African Studies Centre

Leiden University

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Supervisor: Dr. Rahmane Idrissa

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Abstract:

Africa's urban population is expanding, and the mobility of many city dwellers across the continent is in jeopardy. In recent years, growing social, economic and environmental pressures in African cities have precipitated investment in transport infrastructure and new forms of public transportation deemed more "sustainable". This trend is particularly felt in the city of Abidjan (Côte d'Ivoire), where this new approach to transport planning is currently redefining the mobility of the local population, the "Abidjanais". This thesis sets out to understand whether transport planning in Abidjan is supporting, or would support in the near future, sustainable forms of mobility for local city dwellers. Through a qualitative and quantitative assessment of various transport policies and projects, it is argued that inadequate transport planning in Abidjan is exacerbating unequal access to public transport and socio-economic opportunities, and is failing to meet the context-specific needs of local city-dwellers.

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Abreviations

AMUGA: *Autorité de Mobilité Urbaine dans le Grand Abidjan*

ARTI: *Autorité de Régulation du Transport Intérieur*

BNEDT: *Bureau National d'Etudes Techniques et de Développement*

BRT: Bus Rapid Transit

CNStat: *Conseil National de la Statistique*

DGTTC: *Direction Générale des Transports Terrestres et de la Circulation*

GIS: Geographic Information Systems

INS: *Institut National de la Statistique*

NGO: Non Governmental Organization

RGPH: *Recensement Général de la Population et de l'Habitat*

PPP: Public Private Partnership

SDG: Sustainable Development Goals

SDTUGA: *Schéma Directeur des Transports Urbains du Grand Abidjan*

SDUGA: *Schéma Directeur d'Urbanisme du Grand Abidjan*

SOTRA: Société des Transports Abidjanais

STL: Services de Transport Lagunaire

I. Introduction

1.1 Urbanization and Transport Planning in Africa

Rapid urbanization has emerged as one of Africa's great contemporary developmental challenges. With some of the poorest and fastest-growing urban populations globally, and amid a set of new environmental constraints, the continent's urban share of the total population keeps expanding. While in 2020, 46% of Africans lived in cities (Saleh 2021), this number is expected to grow to 50% in 2030 and 60% by 2050 (African Development Bank 2012). The rapid urbanization of Africa's population also translates into the spatial expansion of cities. As a result, villages have grown into towns, towns into cities, and cities into metropolises in an often unregulated fashion. Such a turn of events for Africa is not without any consequence on the lifestyle of city-dwellers. Most importantly, urbanization has increased people's necessity to be mobile in the face of continuous urban sprawl (Meite 2013, 13).

Ever since African states obtained their independence from European colonial powers, the mobility of city dwellers has mainly been ensured by private and, in most cases, informal actors generally referred to as paratransit. High levels of flexibility and adaptability have allowed the informal transport economy to thrive in a context of unregulated urban expansion. By filling the institutional vacuum left by formal public transport, paratransit has emerged as the more accessible alternative - both financially and physically. However, despite the vast array of transport options available to African urban dwellers, the transport economy in Africa remains plagued by traffic congestion, lack of regulation, deterioration of urban infrastructure, unequal access to transportation services, frequent road accidents, and conflictual relations between informal and formal actors of mobility (Meite 2013, 13-14).

However, states and non-governmental organizations (NGOs) have increased their concern for mobility issues in the last ten to fifteen years, and have worked closely with the private sector to improve the conditions of commuters in African cities. This has been reflected in the intensification of transport planning, which is conceptualized here as “planning required in the operation, provision and management of facilities and services for the modes of transport to achieve safer, faster, comfortable, convenient, economical and environment-friendly movement of people and goods” (The Economic Times 2022). Moreover, by emphasizing sustainable cities as one of the developmental priorities of the coming decades, the United Nations' 2015 Millennium Development Goals have reinforced

the validity of sustainability as a framework for addressing issues of urban mobility in Africa. While there is no official consensus on what "sustainable mobility" really entails, the concept best describes a transportation network that “allows the basic [...] needs of individuals and societies to be met safely and in a manner consistent with human and ecosystem health, and with equity within and between generations” and “is affordable, operates efficiently, offers choice of transport mode, and supports a vibrant economy” (Litman 2007, 10).

1.2 Transport planning in Abidjan: towards new forms of mobility?

With 5.335 million inhabitants in 2021, Abidjan is the largest city in Côte d’Ivoire and the second-largest city in West Africa after Lagos, Nigeria. Its status as an economic powerhouse in the West-African sub-region has attracted many migrants from neighboring countries. The city, which has suffered from rampant urbanization and erratic urban planning in the last two decades, now displays high urban poverty rates and struggles to absorb huge numbers of opportunity seekers yearly. One of the areas where this struggle is keenly felt is transportation. The public transportation networks that existed at independence have been overwhelmed by the rapid ever-expanding demand, which led to the emergence of a vast informal transport economy, and the majority of *Abidjanais* to rely on paratransit for their daily commutes (Doherty *et al.* 2021, 3). In recent years however, the local transport economy has been undergoing a true mutation with the formulation in 2000 of the *Schéma Directeur d'Urbanisme du Grand Abidjan* (SDUGA), a framework steering sustainable city planning in the district of Abidjan. The *Schéma Directeur des Transports Urbains du Grand Abidjan* (SDTUGA), a component of the SDUGA, investigates sustainable transport and mobility planning with the aim of improving the efficiency, equity, safety and environmental sustainability of transportation networks in Abidjan. While transport investments were halted due to two consecutive civil wars in 2002 and 2010, the Ouattara administration has been dedicated to transforming public transport in Ivorian cities for the past 10 years. Current projects comprised within the SDTUGA include, but are not limited to:

- The construction of a metro line along the north-south transit corridor
- The elaboration of a Bus Rapid Transit (BRT) system along the east-west transit corridor
- The professionalization, regularization, and overall “formalization” of paratransit
- The construction of new roads, interchanges, and bridges, and the development of waterways

- The redevelopment of the *Société des Transports Abidjanais* (SOTRA) and its scheduled bus services

(MCLAU & JICA 2015, 139-172; Johnstone and Ratanavaraha 2020, 197-203)

These projects are currently at different stages in their advancement. If SOTRA bus fleets have already been extensively renewed, notably since 2019, the *Abidjanais* will have to wait until 2026 to be able to use the metro. Preliminary studies for the implementation of the BRT are only expected to end in 2022, and the ministry of transport has to yet to communicate a date of operationalization. However, some major infrastructural projects, like the Yopougon bridge or the Grand-Bassam toll road are close to completion.

1.3 Research question and objectives

The remodeling of Abidjan's public transportation sector, driven notably by the formulation and application of the SDTUGA, is currently redefining what it means to be mobile in a large African metropolis. In light of these recent developments, this thesis sets out to understand whether transport planning in Abidjan is supporting, or would support in the near future, sustainable forms of mobility for local city dwellers. It is primarily argued that inadequate transport planning policies and projects in Abidjan have exacerbated, or would heighten in the near future, unequal access to mobility and socio-economic opportunities, and have failed to meet certain requirements of sustainable transport planning.

This research paper addresses several related sub-questions. First, how is the concept of sustainable mobility understood in African cities, and Abidjan more specifically? Secondly, how is the supply of public transportation in Abidjan being reorganized through various policies of transport planning to meet the requirements of sustainable mobility? Thirdly, how is this reorganization promoting, or inhibiting sustainable forms of mobility? And finally, how can we further improve transport and mobility planning in Abidjan as a means to effectively address issues of safety, accessibility and sustainability?

Ultimately, this study seeks to contribute to the broader discussion on urban mobility in the global South and the elaboration of effective, inclusive, and adapted transportation planning policies that respond to the context-specific needs of city dwellers in such regions.

1.4 Thesis outline

The next chapter outlines how scholars have approached the issue of urban mobility in Africa, with particular attention to how existing studies have failed to examine recent efforts

to upgrade public transportation in Africa. Additionally, this chapter takes a closer look at the issue of mobility in Abidjan and how existing literature primarily focuses on paratransit, with a lack of consideration for new mobility planning policies and projects comprised within the SDTUGA. Chapter III highlights the methods and theories that have helped frame and address the issue at hand. Chapter V provides an overview of the current governance of Abidjan's formal and informal transportation networks and how different stakeholders (with sometimes conflicting interests) cooperate or inhibit each other. The research findings are contained in chapter VI. Chapter VII discusses how existing transport planning policies in Abidjan can be improved and adapted to the context-specific needs of city dwellers, and provides a critical outlook on potential and existing innovative projects.

II. Literature review

2.1 Global discussions around mobility in Africa and the historical dominance of the informal transport economy

Literature on issues of urban mobility in Africa is abundant. Scholars from diverse fields of study have actively been researching the contemporary challenges encountered by commuters in African cities, sometimes resulting in the formulation of recommendations and policies addressing these challenges. While the conditions for mobility vary across African countries and cities, the belief that public actors (states, regional governments, etc.) have not been able to meet the demand for mobility of city dwellers is widely shared. Sietchiping *et al.* (2012, 183), and Porter (2008, 285) argue Africa's few mobility plans have been centered around the construction of roads in both the urban and rural contexts, and that mass public transportation alternatives remain highly under-investigated. While extensive road networks are important vectors of mobility, as they connect urban centers to peripheries and rural areas, scholars have emphasized the many shortcomings of this approach, and stressed that "roads are not enough" (Porter 2007, 1).

First, Sietchiping *et al.* (2013, 184) argue that most transport planning policies in African cities promote the use of individual motorized vehicles, and create car-dependent urban environments. Africa has seen the massive importation of second-hand vehicles from Asia and Europe, which, in most cases, fail to meet environmental and safety standards. Despite global efforts to call attention to the importance of sustainable transport planning, the proliferation of these vehicles is, therefore, an important cause of sound and atmospheric pollution, traffic congestion, and insecurity (Sietchiping *et al.* 2013, 184). Additionally, Porter claims that Africa's mobility plans and over-reliance on motorized vehicles fosters unequal access to mobility, more specifically for women (2008, 285). This is because women face more constraints on their mobility and travel mode as a result of "lower incomes than men and less access to land, labour resources and other productive assets [...] and the time–poverty induced by heavy work burdens and child care responsibilities" (Porter 2008, 282; see also Blackden and Wodon, 2006). Porter and Olvera Diaz *et al.* (2013, 56) agree that urban planners and decision-makers continue to have a feeble understanding of daily travel behaviors in the cities of the global South, and point to an overall lack of consideration for gendered practices within the literature on African urban mobility. While it is the case that gender is slowly permeating the academic debate around mobility in African cities, transport planning, and the operation of transportation networks in Africa remains dominated by men.

Income inequality is an important determinant of access to transportation, and has led to segregated forms of mobility across African cities. Besides Porter, several scholars have emphasized the intricate relationship between income and access to mobility. Evidence based on household surveys conducted in Zimbabwe and Uganda point to the following observation: when income decreases, so does access to motorized transportation (Bryceson *et al.* 2003). Indeed, lower income groups in Africa tend to rely more on non-motorized means of transportation like walking and cycling than middle and higher income groups. Porter argues that these disparities call for an approach to transport planning that promotes non-motorized forms of mobility, and acknowledges income as an important constraint for accessing fast and efficient transportation (Porter 2007, 253).

In the absence of adequate and accessible formal public transportation networks, most African urban dwellers rely on small scale transport businesses referred to as paratransit. These alternatives are specific to each African city and have proven highly resilient to the local urban context. Given the myriad of options available to African city dwellers, and their perceived complexity, unconventionality, and almost "exoticness" from the perspective of the global North, they are given plenty of academic attention. Because it contrasts with more formally regulated transportation networks found in the West, paratransit has systematically been referred to as "informal", or even "rogue", in previous literature on the topic (see Cervero and Golub 2007; Booysen *et al*. 2013; Goodfellow 2015). Klopp, Harber, and Quarshie (2019, 2) stress that this is a mistake as paratransit is organized through processes that also involve the state. For instance, in most African countries, paratransit operators need to pay fees for vehicle and route licenses to the government. Instead, the word "informal" best describes how small scale transport businesses and the state cooperate and compete, "with both sides of this relationship acting inside and outside the law" (Klopp *et al.* 2019, 2). The word "informal" also implies a lack of organization. This is misleading because, in most African metropolises, paratransit is organized, regulated, and operated through complex systems of trade unions and user associations (Meite 2014, 105).

Paratransit, and other resilient forms of mobility have a high social value and are an essential driver of inclusion for many urban dwellers in Africa - and the global South more broadly. From walking and cycling (Ligege & Nyarirangwe 2015; Loo and Siiba 2019) to using complex networks of collective taxis and minibuses (for Abidjan, see Adolehoume & Zoro 2002; Aloko-N'Guessan 1999; Olahan 2006), scholars give a great deal of attention to how these transport alternatives sustain the socio-economic needs of large portions of the African urban population. Indeed, in a climate of widespread unemployment, paratransit

remains a relatively thriving job market and constitutes a financial safety net for many African urban households (Meite 2014, 32). Moreover, paratransit is flexible in nature, and is often more attuned to the mobility needs of vulnerable groups like women and children (Meite 2014, 32; Doherty 2020).

However, the academic fascination for paratransit in African cities may have led to a Manichaean understanding of the issue at hand, where formally regulated public transportation is automatically portrayed as the "bad" and inadequate option. In contrast, paratransit is seen as the people's preferred choice, and is therefore intrinsically "good". Paratransit does present several significant shortcomings nonetheless. For instance, Behrens, McCormick, and Mfinanga argue that the self-regulation of the market and the unrestricted entry of business actors have led to "attempts to violently remove competitors, aggressive driver behavior, unsafe operations, and unfair labour relations" on lucrative routes (2016, 12). The notorious "taxi wars" in South Africa effectively illustrate how this unfolds in practice (see Dugard 2001; Ngubane 2016). Another consequence of profit-seeking market behaviors has been the withdrawal of businesses from less lucrative routes, leaving certain residential areas under-serviced and compromising the mobility of isolated communities. Finally, and as mentioned previously, paratransit is a significant cause of the emission of air pollutants and presents an array of security hazards (Behrens *et al.* 2016, 12; Klopp *et al*. 2019, 3). These shortcomings call for attempts to improve "the quality, reliability, and coverage of public transport systems" (Behrens *et al.* 2016, 12). While they acknowledge how path dependencies can limit transport reforms, Behrens *et al.* argue that a new approach to transport planning is required; one that promotes the use of mass public transportation and is resilient to the inevitable expansion of African urban areas (2016, 12). If Behrens *et al.* do not exclude paratransit from the equation, as the elimination of the latter would represent a social and economic disaster for many stakeholders, Anita Sobjàk argues that paratransit on its own cannot sustain the mobility needs of future generations, and further investing in public transport infrastructure is an urgent matter (2018, 1).

2.2 Mobility planning and the (re)emergence of mass public transportation

In 2013, Youssouf Meite stated that

> *"Dans nombre de Pays d'Afrique subsaharienne, les dernières décennies ont été marquées par le déclin des services publics de base particulièrement des réseaux urbains de transport"*. (2013, 23)

> "In many sub-Saharan African countries, the last decades have been marked by the decline of basic public services, notably urban transportation networks".

While this was certainly true at the time, current developments in urban mobility planning throughout Africa are slowly tipping the scale. Indeed, Pirie (2013, 10) and Klopp *et al.* (2019) contend that there has been a recent surge in attempts to "formalize" informal networks, increase public investments, and promote innovative mass public transportation systems on the continent. For instance, attempts to implement Bus Rapid Transit (BRT) systems have proven successful in the cities of Lagos and Dar es Salaam and are currently being envisioned in the cities of Dakar, Johannesburg, Addis Abeba, and Nairobi (Klopp *et al.* 2019, 5) as well as Abidjan (MCLAU & JICA 2015, 197). The Institute for Transportation and Development Policy (ITDP) defines a BRT as "a high-quality bus-based transit system that delivers fast, comfortable, and cost-effective services at metro-level capacities. It does this through the provision of dedicated lanes, with busways and iconic stations typically aligned to the center of the road, off-board fare collection, and fast and frequent operations" (2022, 1). The city of Lagos was the first African city to acquire such technology in 2008. While it exemplified significant progress in transport innovation in Africa, academia mostly overlooked its implementation. Supported by case studies on Lagos, Johannesburg, and Nairobi, Klopp, Harber, and Quarshie (2019), as well as Oluwakoya (2008), argue that BRTs are a potential answer to the mobility needs of African city dwellers. They are a popular innovation in African cities given that they are a fast and accessible option for African commuters and are much cheaper to implement than a Light Rail Transit (LRT)[1] system or a metro (Oluwakoya 2008, 846). They have become the face of public transport innovation in Africa and will likely take up a central role in the daily mobility of African city dwellers in the near future (Pirie 2013, 10).

Still, certain scholars emphasize a number of limitations associated with these new technologies. First, they claim that behind every BRT lies "a combination of local politics and political economy, both legitimate and illegitimate, ranging from the need for high-profile developmental projects to win votes to crude patronage and corruption" (Klopp *et al.* 2019, 22). While corruption affects infrastructural projects globally, Sobjàk contends that Africa is particularly incline to such misbehavior because most projects are financed through Public

[1] Light Rail Transit systems are a form of public urban rail public transportation with lower speed and passenger capacity than metro systems, but higher capacity and higher speed than traditional street-running trams.

Private Partnerships (PPPs). Indeed, she argues that PPPs, as opposed to traditional contracting models, “can easily have over 1,000 contractual links, each of them dependent on other contracts in the chain” and that all of these links “provide a separate opportunity to pay a bribe or extract an undue benefit” (Sobjàk 2018, 2). As a result, projects promoting other approaches to bus, rail, and non-motorized transport upgrading struggle to thrive (Klopp *et al.* 2019, 22), and there is important knowledge gap subsists regarding how these technologies may affect the mobility of city dwellers if widely implemented across Africa.

2.3 Mobility planning in West Africa: Abidjan under the spotlights

Transport in Abidjan is characterized by a large informal economy on the one hand, and considerable investment in public transport innovation on the other. However, like in many other African metropolises, the informal transport economy has gathered most academic attention, at the expense of new forms of urban mobility promoted by the Ivorian government (metro, BRT, waterways, etc.). From the widespread use of *gbaka* minibusses (Olahan 2006; Adolehoume 2002) and *wôrô-wôrô* communal taxis (Aloko-N'Guessan 1999; Akou 2007) to the emergence of *salonis* tricycles (Doherty et al. 2021), scholars have produced significant insights into what it means to be a mobile *Abidjanais.* All of these studies argue (to different extents) that informal networks are an essential driver of mobility for many city dwellers, notably the most vulnerable ones. Kassi-Djodjo (2010) argues, for instance, that informal *gbakas* and *wôrôs-wôrôs* have played a crucial role in extending economic opportunities to inhabitants of peripheral areas suffering from inadequate urban and transport planning. She even argues that informal networks are currently driving the urban expansion process and should therefore not be disregarded by the Ivorian authorities when formulating new transport planning policies. Unlike Behrens *et al.* (2016), Kassi-Djodjo advocates for a city-wide restructuring of transportation networks that gives a central place to small scale transport enterprises as the latter have shown incredible resilience and adaptability to the local context.

Similar arguments can be found in the works of Jacob Doherty. In a study on mobility and social reproduction among mothers in the municipality of Yopougon, Doherty finds that informal transportation networks are central to a number of urban supply chains, and most notably food systems. He further argues that paratransit is the "logistical backbone of a variety of commercial activities that sustain social reproduction at the urban scale" (2020, 770). Very few scholars have provided a critical and feminist take on mobility in Africa, let alone in Abidjan. By building notably on Porter's previous literature, Doherty campaigns for

a new form of gender-sensitive transport planning that answers the needs of all commuters (2020, 771).

2.4 Knowledge and methodological gaps

This chapter disclosed a number of knowledge gaps in how scholars have addressed urban mobility in Africa, and Abidjan more specifically. First, it appears that new transportation technologies (BRTs, LRTs, and metros) promoted by African authorities remain very much under-investigated by academia. Indeed, when articles are not outdated, new mobility planning policies are often brushed over and not given much consideration. There are two main explanations for this gap. First, public transport innovation in African cities is a relatively new phenomenon , and the number of projects that have successfully been completed remains extremely low. Scholars, therefore, lack the perspective and empirical evidence needed to assess the sustainability of new transport alternatives, notably with respect to their sustainability and long-term viability. Secondly, Western fascination for the "exotic" has diverted academic attention to paratransit and the informal transport economy. Of course, paratransit continues to dominate the transportation sector in Africa, and is an extremely relevant and fascinating object of study. However, the emergence of new actors of mobility, and the intensification of transport planning in African cities has been completely overlooked, and the ways in which new transport innovations can potentially redefine mobility for African city dwellers remains unclear. Looking into the specificities of Abidjan, this is the major knowledge gap that this thesis attempts to fill.

Secondly, most, if not all of the literature on urban mobility in Abidjan takes on an ethnographic or anthropological approach that focuses on the experiences of individuals and necessitates the use of various qualitative research methods rather than quantitative ones (interviews, participant observation, or focus groups). As a result, academia is mostly disconnected from the field of spatial urban planning (which is mostly informed by quantitative data), and often fails to inform practitioners and urban planners. While qualitative research methods are at the core of this research project, as they provide great insights into problems that involve individual experiences, this thesis introduces a set of complementary innovative visual and spatial analytical tools, notably spatial and morphological analyses conducted using Geographic Information Systems (GIS). Chapter V serves as a further justification for using these analytical tools in the study of mobility and transport planning.

III. Theoretical and analytical framework: defining and measuring sustainable mobility

This chapter aims to provide a concise definition for the concept of mobility, and how it is understood in African cities like Abidjan. It also aims to define the objectives underpinning sustainable mobility, and discloses how the concept can be used as a "barometer" to assess transport planning policies and projects in the focus area.

4.1 Theoretical framework

4.1.1 Mobility: finding the right approach

> **"**Transportation ("across-carry" in Latin) describes the act of moving something or someone, whereas mobility ("capable of movement") describes the ability of a person to move or be moved. In other words: transportation is something you do and mobility is something you have." (McKay 2019, 1)

Mobility refers to the ability to move oneself across virtual, social, or physical spaces (Meite 2015, 43). The concept is used within an array of academic disciplines, and its definition varies accordingly. However, such a broad definition would be ill-suited to frame and tackle the issues of this research project. **Spatial mobility**, defined as the sum of all human movements within physical spaces regardless of distance, time, and means of transportation (Lévy and Dureau 2002, 6), is a widely accepted definition within various fields ranging from engineering to sociology. Three main parameters influence spatial mobility. First, accessibility determines the supply of means of transportation available to commuters. Secondly, human localities and demographic distribution determine where movement occurs. Thirdly, temporal and economic constraints may inhibit or alter one's movements (Lévy and Dureau 2002, 6).

However, spatial mobility as a concept does not discriminate between the types of spaces. Because African cities like Abidjan generate unique social dynamics, the movements of city dwellers are highly influenced by the city itself. Following the rise of urban studies as a relevant academic field in the latter part of the 20th century, the concept of **urban mobility** was framed in response to this theoretical gap. It is defined as the sum of human movements that originate and end within the same urban unit (Orfeuil 2000 in Meite 2015, 46).

In light of unprecedented urban and demographic growth, mobility is increasingly determined by "both infrastructures and services for urban mobility, as well as the interactions between social actors while using them" (Oviedo *et al.* 2020, 1). If, in the West, urban mobility was traditionally associated with individual motorized modes of transportation, the World Bank and Ke Fang (2015, 1) emphasize that the concept needs to be revised to encapsulate the experiences of city dwellers in the global South, and Africa more specifically. In Abidjan, for instance, in 2020, only 16,25% of motorized intra-urban trips were carried out using a private car, 2,42% using a private motorcycle, and the remaining 81,33% using modes of public transportation (AMUGA 2020). Therefore, mobility in African metropolises like Abidjan should be framed as sustained access to an array of urban services and amenities that allow city dwellers to reach their destination in the shortest time and at the lowest financial cost possible.

4.1.2 Sustainable Mobility

The concept of sustainability rose as a prominent framework for urban development and other policy domains after the formulation of the United Nations' 2015 Sustainable Development Goals (SDGs), and reflects global ambitions to reduce domestic and international disparities, alleviate poverty, and provide equal opportunities in all aspects of modern urban life. While there is no universal definition for sustainable mobility, the World Bank has emphasized four global goals that the concept aims to achieve: (1) equitable access; (2) security and safety; (3) efficiency; and (4) pollution and climate-responsiveness (Mohieldin & Vandycke 2017, 1). These four goals will be used as a framework for assessing transport planning policies and projects in Abidjan. However, one must avoid falling into the trap of applying a Western concept on African realities. This requires a careful assessment of how these goals can be met with regards to the contextual specificities of the city. For this purpose, a thorough identification of Abidjan's socio-economic and demographic makeup is provided in the next chapter.

4.2 Methodological approach

In order to assess whether transport planning policies and projects in Abidjan meet the requirements of sustainable mobility, this study draws from various disciplines ranging from professional fields like urban planning to academic fields like urban sociology and social geography. An adapted methodological apparatus was therefore elaborated. The latter

includes a combination of quantitative and qualitative methods which are detailed in the following section.

4.2.1 Spatial and morphological analyses of roads, networks, and transport amenities.

According to Meite (2015, 46), and Weber et. al (2016), spatial analyses are one way to "measure" mobility, and therefore to assess the efficiency and sustainability of new transport planning policies and projects. By mapping out transportation networks using Geographic Information Systems (GIS), and by applying a set of algorithms, it is possible to retrieve valuable quantitative data and establish patterns of transport accessibility and efficiency. Additionally, urban morphological analysis will be used repeatedly throughout this study. It is defined as "the study of form and structure in cities that focuses on the dynamics of change and rules underlying these dynamics" (Batty 2013, 179). The key assumption of urban morphological analysis is that urban form[2] matters for several urban development issues including equitable access to public transportation (Weber et. al. 2016, 9). The following spatial data components are used extensively throughout this study:

1. **Road networks.** OpenStreetMap is used to retrieve all road networks within the focus area, as it offers the most accurate and detailed database available

2. **Transportation networks.** In order to assess the accessibility and distribution of existing transportation networks, and those planned through the SDTUGA, gathering spatial data showing the locations of bus stations and stops, as well as all existing itineraries was fundamental. This was achieved with the help of the Agence de la Mobilité Urbaine dans le Grand Abidjan (AMUGA) who was willing to share up-to-date databases. A few additional components such as ferry terminals were mapped out manually during field trips, or using online services like Google Earth.

3. **Population distribution.** Transport accessibility is hardly understood independently from spatial demographic data. The latter supports a comparative assessment of transportation networks in the various municipalities of Abidjan. For this task, we rely on the 2014 *Recensement Général de la Population et de l'Habitat* (RGPH).

[2] Urban form is here understood as "the physical characteristics that make up built-up areas, including the shape, size, density and configuration of settlements" (Williams 2014, 6).

Moreover, data displaying the use of land in the district of Abidjan was used to map out the city's main residential areas.

4.2.2 Qualitative data gathering and analysis

While spatial and quantitative data provide a general understanding of the mobility trends for the target population, this study seeks to shed light on individual experiences and attitudes with respect to public transportation and transport planning in Abidjan. A total of 21 semi-structured interviews were conducted with various stakeholders including users, drivers, urban planners, and professionals of the transportation sector. Urban planners were contacted through my own personal network, and with the help of the urban development branch of the African Development Bank. Users were recruited through my own personal network, or during observational field trips at various bus, taxi, and ferry terminals in the municipalities of Plateau, Cocody, Abobo, Marcory, and Treichville. In order to facilitate interactions, to ensure the anonymity of the participants, and to respect the professional confidentiality of urban planners, interviews were never recorded. Instead, notes with relevant comments and themes were taken on the go. Note that all participant names mentioned throughout this research paper are fictional in order to ensure their anonymity. A summary of the different interviews containing all relevant comments is provided in the appendix. The findings, in the form of notes, were coded manually in order to retrieve important and recurring themes. The findings were subsequently classified into four categories:

1. Obstacles experienced by commuters in their daily mobility
2. Positive attitudes towards transport and mobility planning in Abidjan
3. Negative attitudes towards transport and mobility planning in Abidjan
4. Suggestions for improving transport and mobility planning in Abidjan

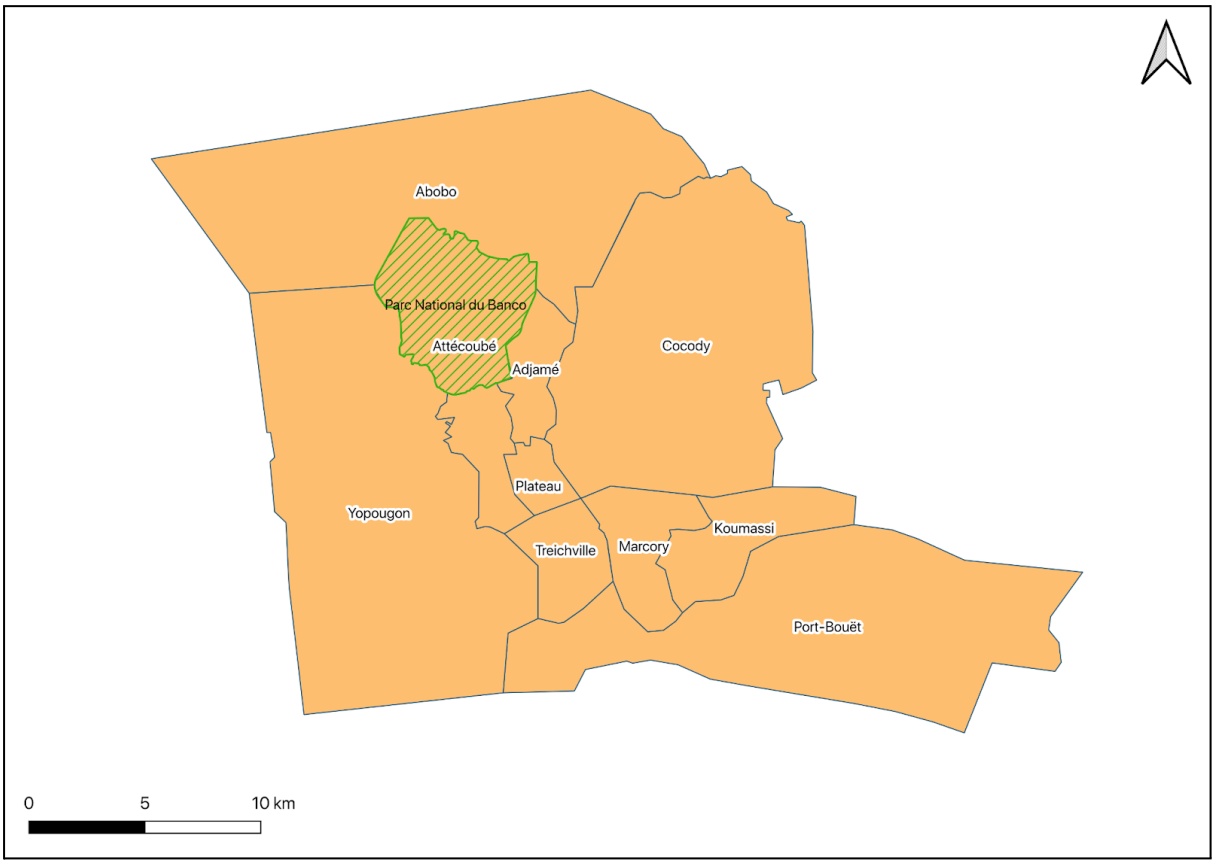
IV. The contextual specificities of Abidjan

Before launching the bulk of the data collection, a short preliminary study was conducted in order to determine the socio-economic profiles of the 10 municipalities contained within the urban area of Abidjan, and the indicators of mobility that are relevant to local city dwellers. This chapter is mostly supported by secondary sources and quantitative data gathered via the *Institut National de la Statistique* (INS), and with the help of the *Bureau National d'Etudes Techniques et de Développement* (BNEDT). This section helps to better frame the target population, to visualize how the needs of the population vary across municipalities, to understand how social inequality is reflected in spatial terms, and sets the basis for a comparative analysis between different municipalities in later stages of the research paper.

3.1 Area of focus

The urban area of Abidjan is widely understood as a conglomerate of ten distinct *communes*, referred to as municipalities in this paper. They are shown in Figure 1. The urban area of Abidjan must not be confused with the Autonomous District of Abidjan, which includes an additional 4 sub-prefectures (Songon, Anyama, Brofodoume, and Bingerville) in the periphery of the city. However, these outlying areas are more or less disconnected from the main urban fabric, and will not be included in this study. Abidjan occupies a surface area of of approximately 400 square kilometers (Gouvernement de la République de Côte d'Ivoire 2016) and is is located on either side of the Ebrié lagoon, in the south-east of Côte d'Ivoire. Through the municipalities of Yopougon and Port-Bouët, and the Vridi canal, Abidjan is also connected to the Atlantic Ocean.

Figure 1: The 10 communes (municipalities) of Abidjan



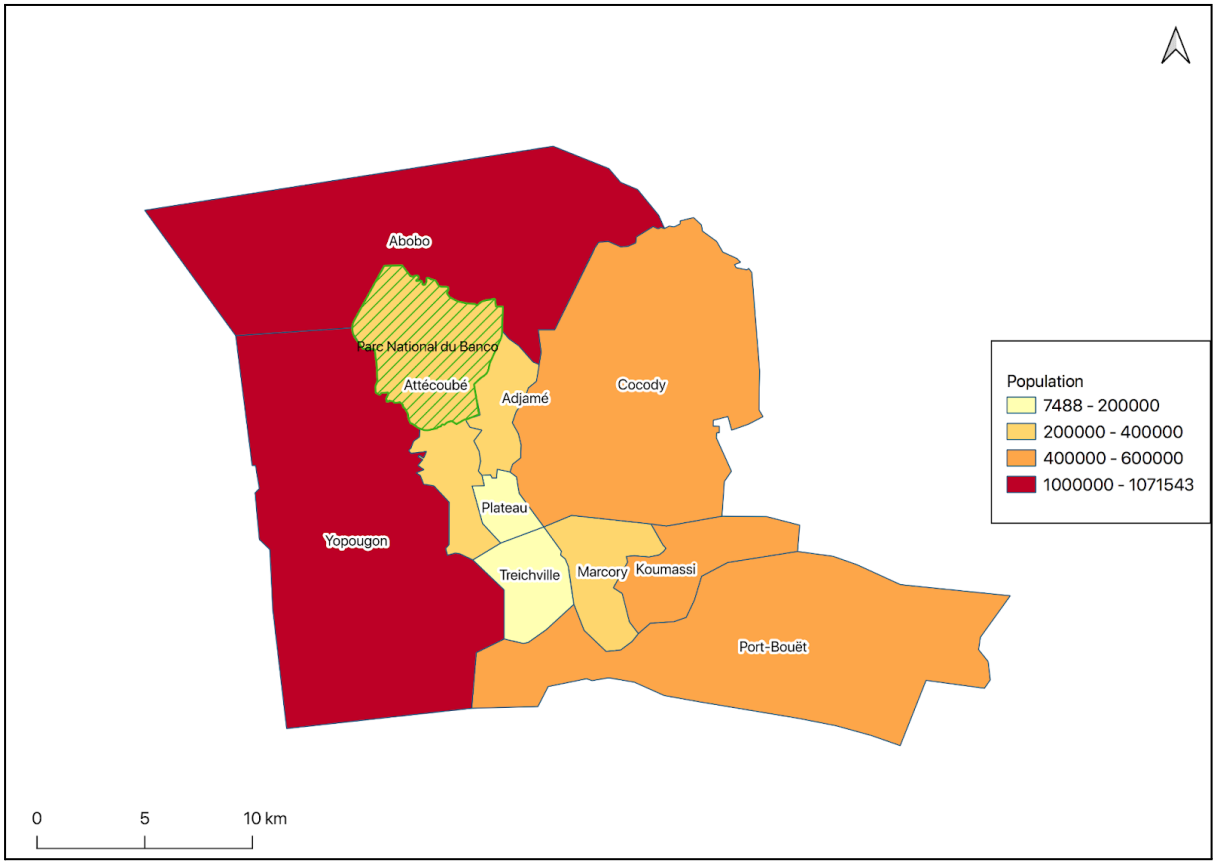
3.2 Socio-economic and demographic profiles of the ten municipalities

In 2014, the *Conseil National de la Statistique* (CNStat) conducted a nationwide population census operation. By using the municipality as the main geographical unit, the *Recensement Général de la Population et de l'Habitat* (RGPH) produced insightful data on the number of people living in each municipality, their gender, their employment, their housing situation, and many other demographic features of the Ivorian population. Figure 2 and Table 1 show the distribution of the population in the urban area of Abidjan in 2014. Unfortunately, by the time this research was conducted, the results of a more recent census conducted in 2021 census were not yet publicly available. Although an increase in the overall population of Abidjan is to be expected, this study assumes that the proportion of people living in the different municipalities has remained relatively stable.

Table 1: Population of the 10 municipalities of Abidjan according to the 2014 RGPH

Municipality	**Population in 2014**
Le Plateau	7488
Cocody	447055
Marcory	249858
Treichville	102580
Yopougon	1071543
Adjamé	372978
Koumassi	433139
Abobo	1030658
Attécoubé	260911
Port-Bouët	419033
Total Abidjan	**4 395 243**

Figure 2: Distribution of the population in the 10 municipalities of Abidjan (2014)



Source: Elaborated by the author based on data from the *Recensement Général de la Population et de l'Habitat (2014)*

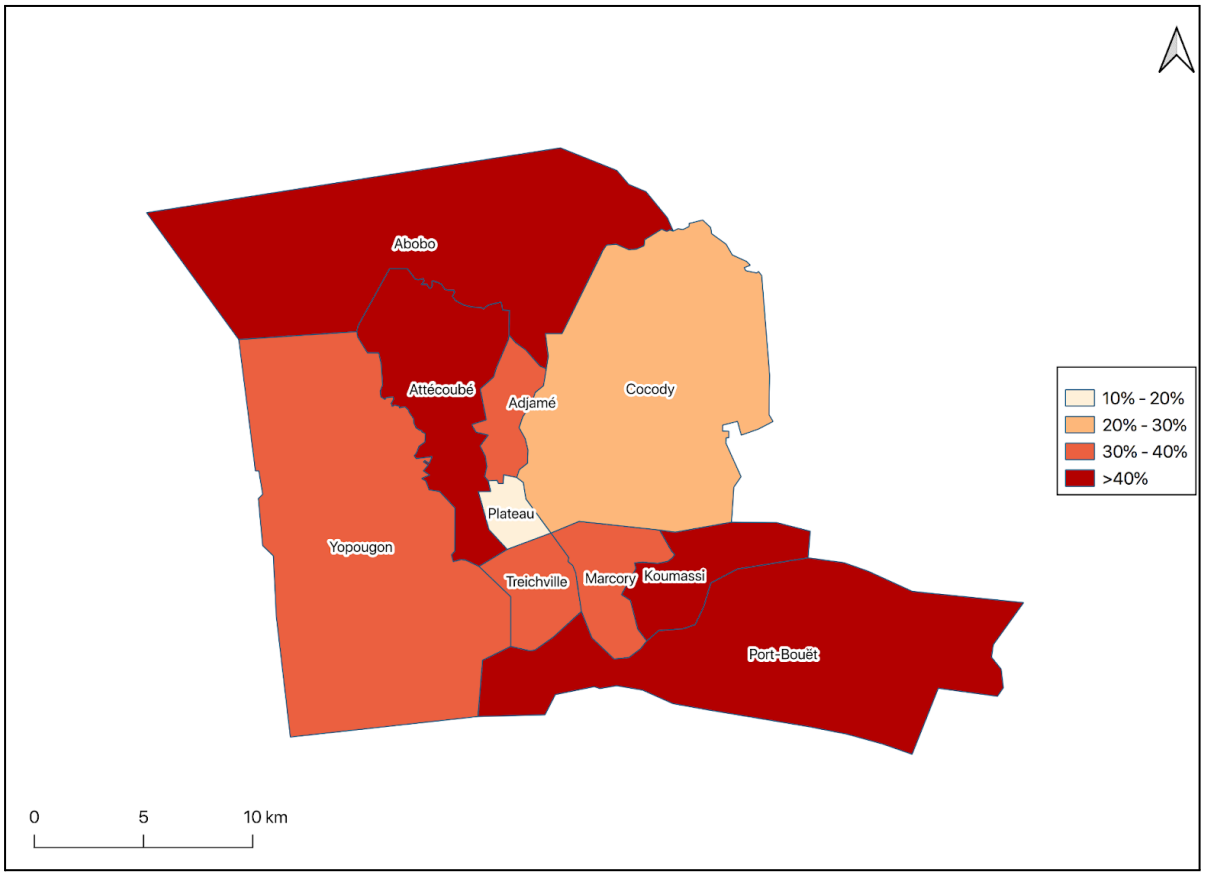
Population clusters go a long way in understanding where mobility needs are the most important within a given urban area, as they provide an overview of where most commuters originate, as well as some of the major points of transit. However, population distribution is not the only parameter to take into account when studying urban mobility. The socio-economic background of city dwellers greatly influences where, when, and how they commute. By combining these two types of data, one can identify the areas that are most in need of infrastructure and networks ensuring the mobility of their inhabitants, and effectively assess whether these needs are being met or not. However, due to the city's prominent informal economy, data concerning the income levels of city dwellers is unavailable. Akoisso Doria Deza's non-financial poverty incidence index was used as a substitute to map out the socio-economic profiles of the different municipalities of Abidjan. The index serves as a tool for measuring the living standards of households based on various non-income criteria including the type of housing (number of rooms, building materials, nature of the floor, etc.),

access to water and sanitation services (toilets, garbage disposal, etc.) and possessions (home appliances, computers, phones, etc.) (Deza 2017, 9-10). Based on a system of ranking, Deza was able to categorize Abidjan's population into three groups: the poor (*les pauvres*), the middle class (*les moyens*), and the upper class (*les nantis*). The non-financial poverty incidence index provides a percentage of people belonging to the first category for each municipality, and, as such, offers an overview of the socio-economic makeup of the city. Table 2 and Figure 3 present the incidence of non-financial poverty in the ten municipalities of Abidjan.

Table 2: Non-financial poverty incidence in the ten municipalities of Abidjan (2014)

Municipality	Non-financial poverty incidence in 2014 (%)
Le Plateau	15,9
Cocody	25,4
Marcory	31,3
Treichville	32,8
Yopougon	34,6
Adjamé	29,5
Koumassi	40,3
Abobo	41,8
Attécoubé	44,3
Port Bouët	48,3

Figure 3: Non-financial poverty incidence in the 10 municipalities of Abidjan (2014)



Source: Elaborated by the author based on data from Akoisso Doria Deza (2017)

Figure 2 sheds light on the outward expansion of Abidjan, with the vast majority of the population being settled in the periphery of the city. Indeed, most *Abidjanais* live in the Northern and Western parts of Abidjan, notably in **Abobo** and **Yopougon** which constitute the main residential areas of the city (Zoro 2017, 2). With respective populations of 1.03 and 1.07 million in 2014, the municipalities host nearly half of Abidjan's total population, and are traditionally lower-income areas (see figure 3). **Cocody**, which shows the second-lowest rate of non-income poverty after Plateau, is very cosmopolitan. It is home to lower, middle and upper-class Ivorian households, as well as important expatriate communities (notably employees of large multinational, international organizations, and diplomatic institutions). Together with Adjamé, Cocody has the highest concentration of schools and universities in the city. **Port-Bouët** and **Koumassi** in the south, and **Attécoubé** in the West are lower-class residential areas, with few economic activities (Zoro 2017, 2). It is worth noting that most of Attécoubé's surface area is occupied by the Banco National Park, and most dwellers live in informal settlements located on the shores of the Banco lagoon in the south. The municipality

of **Adjamé**, located south of Abobo and West of Cocody, is home to the largest market in Abidjan. Due to the municipality's status as an important economic hub, extensive transportation "knots" in the form of multimodal pick-up and drop-off points are to be found in Adjamé. The municipalities of **Treichville** and **Marcory** constitute the industrial core of the city thanks notably to the presence of the Abidjan harbor, and various factories (Zoro 2017, 2). Marcory is also an important leisure area, and has a high concentration of bars, high-end restaurants, and nightclubs. With "only" 102580 and 249858 inhabitants respectively, they are some of the least populated areas in Abidjan. Note that the city's largest public hospital is also located in Treichville. Finally, **Plateau** has since independence in 1960 rapidly evolved into the administrative and economic center of the city. In its form and function, Plateau resembles many North American business districts and has even been nicknamed "small Manhattan" by locals (Steck 2005, 1). Yet, despite its importance from an economic and administrative standpoint, its residents only accounted for 0,17 percent of the population in 2014. Such a configuration, with a circular pattern of human settlement around and away from the city's economic, industrial, and administrative hubs implies that a significant portion of the population living in peripheral municipalities needs to transit to the city hubs for all sorts of proceedings. Indeed, Plateau constitutes the main destination for white-collar workers, and people dealing with administrative matters. Adjamé is a popular destination for merchants and people who seek to buy food and other home supplies. Finally, many blue-collar workers commute daily to Treichville and Marcory to work in the various factories found in the two municipalities.

V. The transportation sector in Abidjan: actors, stakeholders, and governance

5.1 Historical background

In 1961, only one year after the independence of Côte d'Ivoire, the management of public transportation in Abidjan was assigned to the *Société des Transports Abidjanais* (SOTRA). In an effort to promote mass public transportation networks, informal (or *artisanal*, French for "handcrafted") alternatives such as *wôrô-wôrôs* (collective communal taxis) and *gbakas* (minibuses) were banned from operating within Abidjan (Zouhoula Bi 2018, 23). Following a budget cut in the 1980s, SOTRA faced a series of financial complications. Due to unprecedented urban and demographic growth rates, and the notable expansion of the urban fabric, the company failed to adapt to longer distances, heavier traffic, and rising transportation costs. Consequently, the government became more lenient concerning the use of *wôrô-wôrôs* and *gbakas,* which started to proliferate. Trade unions and user associations tasked with regulating and supervising these new networks rose as prominent institutional actors and filled the institutional gap left by the public sector. As a result of the Structural Adjustment Programmes (SAPs) implemented by the World Bank throughout the 1990s, retrenchment in government expenditures led to failures maintaining SOTRA networks in working order (Doherty et. al 2021, 3). Between 1998 and 2015, the SOTRA bus fleet was reduced by 50% while over the same period, the potential demand for transportation increased exponentially (MCLAU & JICA 2015, 23).

It is only after the electoral crisis of 2010-2011 that the incoming Ouattara administration prioritized the re-development of mass transportation networks by endorsing public-private partnerships (PPP) with foreign private contractors. Major projects - comprehended within the *Schema Directeur d'Urbanisme du Grand Abidjan* (SDUGA) - include a Bus Rapid Transit (BRT) potentially managed by SOTRA, the further development of waterways, several bridges, and a metro line. Moreover, SOTRA partnered in 2019 with Swedish company Scania and the Ivorian ministry of transport to buy an additional 2000 buses in order to modernize and replenish its fleet (Ministère des Transports 2018). In order to accommodate for more more extensive bus networks, and absorb the demand of new potential users, the company has also improved its amenities and service points by renovating and building new covered bus stops, notably in the periphery of Abidjan (GlobeNewswire 2018). Although 77% of daily trips within Abidjan were carried out using paratransit in 2021,

transport planning increasingly aims to either "formalize and professionalize the existing popular transportation sector" (Doherty et. al 2021, 3) or replace it by promoting new forms of mass public transportation, as is the case with SOTRA.

This following sections aim to shed light on the multiple actors that make up the transportation sector in Abidjan and how they have come to cooperate together or inhibit each other in spaces where the informal economy has traditionally dominated but is currently being challenged through new policies of transport planning.

5.2 The institutional actors:

5.2.1 The state

The Ivorian state, via the ministry of transportation, acts as the principal supervisor, organizer, and regulator of the various modes of transportation existing within the district of Abidjan and all other Ivorian sub-regions. More specifically, the government operates through two executive bodies: the *Direction Générale des Transports Terrestres et de la Circulation* (DGTTC) and the *Autorité de Régulation du Transport Intérieur* (ARTI) which acts as a successor for the *Société Nationale des Transports Terrestres* (SONATT) discontinued in 2013. The creation of both state bodies inscribes itself in broader efforts to coordinate the actions and the expertise of the state and local governments to better frame issues of mobility on the Ivorian territory, and increase regional autonomy in formulating local policies of transport and mobility planning.

5.2.2 Local governments

Thanks to the state's efforts to decentralize the governance of Ivorian transport systems, local governments hold, in theory, a significant say in the formulation and operation of mobility planning policies. In the district of Abidjan, the responsibility to coordinate and harmonize all transportation networks was allocated to the *Autorité de Mobilité Urbaine dans le Grand Abidjan* (AMUGA) in early 2020. The AMUGA is an independent administrative agency with a substantial institutional and legal reach that covers both the transportation of people and merchandise. As such, it acts as a medium between the government and the multiple projects conducted within the district's administrative borders.

5.2.3 Donors

The Ivorian government relies extensively on the financial support and expertise of international donors, whether these are states (France, Morocco, China), or development agencies and funds (French Development Agency, African Development Bank, Islamic Development Bank, etc.). They are major financial contributors to infrastructural projects and further ensure:

- the dialogue between the different stakeholders
- the implementation of frameworks allowing for efficient cooperation between the different actors
- the long-term monitoring of these frameworks
- the implementation of pilot projects (Meite 2013, 110)

5.2.4 The Private Sector

Many major infrastructural projects in Abidjan have been financed through Public-Private Partnerships (PPP). In these agreements, the private sector holds the necessary competencies to lead the project to term and ensure the service's maintenance (Meite 2013, 11). However, local governments (in our case, the District of Abidjan through AMUGA) remain in charge of the overall design of the infrastructural project and its services. Therefore, the role of the private sector remains, in theory, restricted to that of a contractor with very limited executive power.

5.3 The operational actors

5.3.1 Société des Transports Abidjanais (SOTRA)

Within the district of Abidjan, the *Société des Transports Abidjanais* (SOTRA) is the leading provider of formally structured transportation networks. It is a semi-public company of which 60,13% of the shares are owned by the government, 39,80% by Irisbus (Renault group), and a marginal 0,07% by the District of Abidjan. The services offered by SOTRA can be divided into two categories. The first category regroups all terrestrial urban services. These include traditional Tata shuttles, Monbus lines, and a few Express lines. The second category includes all water transport services, and notably the ferries that SOTRA operates on the Ebrié lagoon. Unlike informal alternatives like the *taxis-compteurs, wôrô-wôrôs* and *gbakas,* SOTRA offers

standardized tariffs. On land, current tariffs are 200 FCFA for standard Monbus lines, and 500 FCFA for the Express lines. On the lagoon, a ferry fare only costs 200 FCFA.

A SOTRA ferry arriving at the Blokosso terminal, municipality of Cocody. Photographed by the author on February 19th, 2022.

5.3.2 Service de Transport Lagunaire (STL)

In 2016, the state granted the Service de Transport Lagunaire (STL) partial operation of the city's waterways. STL ferries now operate alongside SOTRA ones, with fares comprised between 300 or 700 FCFA depending on the destination and the length of the trip. Unlike SOTRA, STL is a privately owned company, and the substantially higher fares translate into more comfortable boats, better infrastructure, and overall higher quality of service.

Passengers embarking on a ferry at a STL terminal in the municipality of Plateau. Photographed by the author on March 17th, 2022.

5.3.3 Private taxi services

In recent years, companies like Uber and Yango have started to offer an alternative to traditional modes of transportation. It was observed in Abidjan that the rising popularity of these alternatives can be attributed to the emergence of middle and upper middle classes who look for reliable and flexible transport. Indeed, they offer services similar to those of *taxis-compteurs,* but are often considered a more comfortable option (and therefore more expensive as fares can easily reach up to 5000 FCFA for longer trips). Through their mobile applications, users can choose from several levels of service quality, and are informed immediately of the cost of the trip which will remain unchanged regardless of traffic conditions and chosen itinerary.

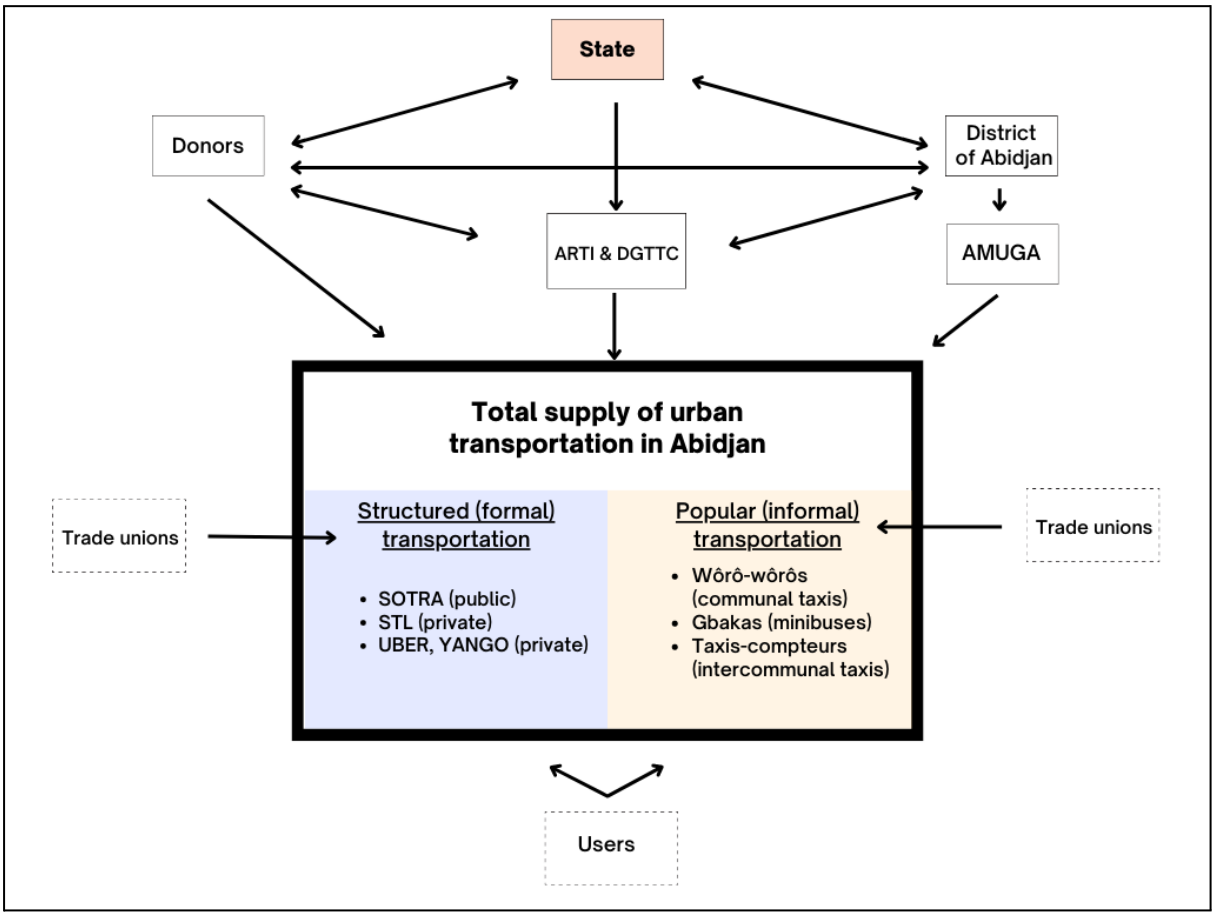
5.3.4 Informal transport services (or paratransit)

In Abidjan, three main services dominate the informal transport economy: the *taxis-compteurs*, the *wôrô-wôrôs*, and the *gbakas*.

- The *taxis-compteurs* have a standard red color and cannot be missed when traveling the streets of Abidjan. Unlike *wôrô-wôrôs,* they are not limited to specific municipalities, not assigned to specific itineraries, and allow for intercommunal trips. Although fares were initially determined by a metering device (as the name *taxi-compteur* suggests), fares are now negotiated with the driver, and are extremely variable.
- The *wôrô-wôrôs* are crucial vectors of mobility for many *Abidjanais.* They offer cheap intra-communal transport services, and trips are often shared with other passengers. Unlike the *taxis-compteurs, wôrô-wôrôs* are assigned to itineraries set by the trade unions and the municipalities. The municipality of operation determines the color of the vehicle (yellow for Cocody, blue for Yopougon, green for Treichville and Marcory, etc.). Thanks to their extremely low fares, *wôrô-wôrôs* have outcompeted *taxi-compteurs* when it comes to intra-communal transit.
- *Gbakas* are shared minibuses that offer a cheaper alternative to *taxis-compteurs.* While they are similar to wôrô-wôrôs in that they follow a set of itineraries, they still allow for intercommunal trips and are very popular among local city-dwellers. Fares can vary according to the line but often average 300 Francs CFA. Their colorful paint jobs, inspirational messages, and neon lights are hard to miss in the urban landscape of Abidjan.

A "taxi-compteur" at the Deux-Plateaux fruit market. Photographed by the author on March 12th, 2022.

Figure 4: The relationship between the different actors involved in the supply of urban transportation in Abidjan



Source: Elaborated by the author and based partly on data from Meite (2013, 106)

Table 3: Summary of all daily trips within Abidjan in 2020

Means of transportation	Percentage of daily trips	Number of daily trips	Modal share: motorized	Modal share: public transportation	Modal share: shared public transportation
Walking	43,57%	7363330			
Collective Taxis (Wôrô-Wôrôs)	13,84%	2338510	24,52%	30,15%	32,43%
Minibuses (Gbakas)	19,18%	3241111	33,99%	41,79%	44,95%
Public bus (SOTRA)	7,55%	1276090	13,38%	16,45%	17,70%
Coaches	1,36%	229606	2,41%	2,96%	3,18%
Ferries (SOTRA, STL)	0,74%	125109	1,31%	1,61%	1,74%
Motorcycles	1,36%	230680	2,42%		
Individual taxis	3,23%	545752	5,72%	7,04%	
Individual cars	9,17%	1549812	16,25%		
Total	**100%**	**16900000**	**100%**	**100%**	**100%**

Source: AMUGA (2020)

VI. Transport planning as a response to the challenge of mobility in Abidjan: an assessment

Box 1

A significant portion of the fieldwork conducted in Abidjan consisted of observational trips using the different transportation networks available to city dwellers in Abidjan (regardless of their levels of "formality"), and semi-structured interviews with users. For one of the trips, I had planned an itinerary that would take me from the Gare Sud bus terminal in Plateau to a shopping mall in Marcory using the SOTRA public transportation services. Shortly after arriving at the Gare Sud terminal, and after struggling to find the right bus line, I proceeded to ask a high-school student and her mother for advice. While they seemed surprised to see a white person at a SOTRA terminal at first, as they rightly assumed that I could financially afford private alternatives like Yango, Uber, or even a taxi-compteur, they told me that the very bus they were waiting for would take me to my destination. After briefly introducing myself, and explaining the motives of my research, the daughter told me that she was going home after classes, and that her mother had spent the morning finalizing administrative procedures at the Hôtel du District (the head office of the regional government) and at the nearby Direction Générale de la Police Nationale (the head office of the national police). They had planned their morning in such a way that they could go back home to Koumassi together. I proceeded to ask them how long a return trip to Koumassi would usually take. The mother replied that depending on how long they have to wait for the bus, it takes a minimum of 1h00 and up to 2h00 to reach their destination from Plateau using the SOTRA services. After 30 minutes, no bus had come yet. They mentioned that they had other domestic tasks to complete in Koumassi before sundown, and that waiting at the bus stop often determined how much they would be able to achieve in that lapse of time. Other passengers were getting impatient and started looking for alternatives. Shortly after, the daughter and the mother had discussed with two other women the possibility of sharing a *taxi-compteur* and splitting the fare. This would allow them to substantially decrease their transit time - as a taxi ride to Koumassi does not usually exceed more than 20 minutes, especially during off-peak hours - without necessarily exceeding their budget. They suggested I should join. I politely declined, and decided to wait another 15 minutes for the bus.

Through this interaction, I was able to reflect on the daily experiences of commuters in Abidjan. In particular, this situation revealed how certain limitations of transport planning in Abidjan require commuters to make trade-offs, and how various societal factors like gender roles, finances, and professional occupation influence these decisions. It is crucial to understand how these limitations

come to constrain people's mobility in order to assess the sustainability of transport planning in Abidjan.

6.1 Time constraints

6.1.1 Waiting times

Time waiting for public transportation determines people's access to services and opportunities and therefore, their overall economic and social self-fulfillment. In this respect, poor transport planning often generates prolonged waiting times, which in turn are closely related to diverse aspects of urban poverty and exclusion (Porter 2007, 251). While formally regulated bus networks like SOTRA work with a system of schedules, they are not immune to delays, and in that sense, are just as reliable as private alternatives like *gbakas*. Despite an increase in the number of SOTRA buses operating within Abidjan, it is extremely common for commuters to wait over 30 minutes to find a vehicle with enough space or an available seat, making commutes highly unpredictable (Doherty 2020, 765). Therefore, optimizing transit by learning bus schedules and setting up a routine has become a complex task for most *Abidjanais*. For instance, for many women, waiting times at bus terminals often determine the time they can dedicate to themselves and to perform vital domestic tasks for their household (Doherty 2020, 767). This pressure can also impact their decision on which means of transportation to use. However, alternatives are not always available, and time constraints are often not as easily escapable as was the case for the mother and the daughter by sharing a taxi with other passengers .

6.1.2 Traffic congestion

As a result of the important daily convergence of people to the different economic, industrial, and administrative hubs of Abidjan, the city is subject to two periodic episodes of traffic congestion; a first one between 06:00 and 09:00, and a second one between 18:00 and 21:00 as people travel back home. During these two rush-hour periods, major axes of the city like the Giscard d'Estaing boulevard, the Charles de Gaulle and Félix Houphouët-Boigny bridges, and the Autoroute du Nord freeway experience heavy traffic jams that do not discriminate between private vehicles, buses, minibuses, and taxis. The periodicity of these traffic jams and the heavy time constraint that they inflict has led many commuters to make drastic adjustments to their daily routine. In an interview with a young employee of the French Institute, the participant expressed her struggle with adapting her schedule to the inevitable

traffic jams between the municipalities of Abobo, where she resides, and Plateau, where her workplace is located[3]. As a daily user of SOTRA buses, and without access to any viable alternative for intercommunal transit, spending 6 hours in public transport in a day is an ordinary occurrence. Hence, to arrive at her workplace at 09:00, the participant mentioned that, like many other *Abobolais,* she has to wake up at 05:00 and make sure to be on the bus by 06:00.

More recently, traffic jams have also been caused by the numerous infrastructural construction sites scattered throughout the city and have worsened traffic conditions for many city dwellers. The construction site of the Cocody bridge and its interchange is currently generating heavy congestion between the municipalities of Cocody and Adjamé. A similar phenomenon can be observed in Abobo, where a major roundabout is being rehabilitated, and a tunnel is being built. While this is only a temporary shortcoming of transport planning in Abidjan, it is important to consider how it is generating heavy time constraints for commuters, and affects travel efficiency, especially if infrastructural projects drag on for long periods of time.

6.2 Safety

Secondly, safety risks highly influence users' daily travel behaviors, notably for women and children. In this respect, scheduled bus networks like SOTRA, as well as BRTs and LRTs are often deemed safer than informal transport alternatives. The latter are subject to high rates of sexual harrasment on board, and are more often involved in road accidents (Klopp et al. 2019, 3; Dohery 2020). In Abidjan, perceived insecurity in public transport forces people to make daily decisions with regards to which network to use and when. For instance, it is very common for mothers and their children to opt for SOTRA buses which are more expensive than other alternatives like *gbakas,* but benefit from higher safety standards. Additionally, women often avoid traveling at night because of frequent violent robberies on roadsides and at bus terminals. These limitations affect vulnerable groups' ability to control departure times and manage their commute efficiently (Doherty 2020). In turn, this hinders social reproduction, house care, and women or children's access to work and educational opportunities, and their ability to provide for their household. As stressed by Doherty (2020), daily itineraries for vulnerable groups in Abidjan are not a "pure time-space calculation, but significantly mediated by everyday forms of gendered violence that inform access to

[3] User, personal communication, March 5th, 2022.

livelihoods and the organization of care". In this respect, transport upgrading, and the overall professionalization of paratransit is expected to increase the safety of vulnerable groups when using public transport. In 2021 for instance, the mayor of the municipality of Port-Bouët announced the commissioning of 300 private taxis, which will be operated exclusively by women across the ten municipalities of Abidjan. The project, entitled Hestia, is primarily aimed at extending economic opportunities to female drivers and promoting safer traveling conditions in Abidjan. The drivers will receive a monthly salary and will be granted ownership of their vehicle three years after being recruited. The Hestia project constitutes another significant step towards the professionalization of informal transport and offers a safer alternative to paratransit for vulnerable groups like women and their children. (HestiaExpress 2021).

6.3 Unequal access to transport amenities and segregated forms of mobility

Box 2

Marie[4] is a 60 year-old housemaid residing in the Riviera II area of Cocody. On mondays, wednesdays, and saturdays, she commutes to Plateau where she tends to expatriate families. On these days, she finds it convenient to use the new SOTRA bus services, and usually takes two Express lines with a connection at the Gare Nord Adjamé. Due to paratransit being banned from operating in Plateau, she is unable to use cheaper paratransit alternatives to reach her workplace. The total cost for her daily trip to Plateau amounts to 2000 XOF (4 times 500 XOF), which represents a considerable expense according to her, as she is a mother of six, and has to provide for her entire family. However, despite longer waiting times, Marie mentioned that SOTRA buses remain the best option for her, as the new Express lines are relatively comfortable, and fares remain cheaper than those of the taxis-compteurs for which she would have to spend double the amount. Yet, on Tuesdays and Fridays, Marie works at the house of an employer who also lives in Cocody Riviera III. On these days, she prefers to take a shared communal taxi (*wôrô-wôrô*) as they are widely available in her area, and are substantially cheaper (only 600 XOF for a round trip). While *wôrô-wôrô* rides are shared, and drivers can sometimes take detours to drop passengers off, Marie declared that she enjoys being dropped off at the door and not having to walk (which she would have to do if she were to take a bus). Marie's experiences with transportation networks in Abidjan reflect a dichotomy: SOTRA busses facilitate intercommunal transit, notably to central municipalities like Adjamé and Plateau, as formal transport amenities are satisfactory in these areas. Moreover, despite longer waiting times, they are

[4] The participant's name was modified in order to ensure confidentiality.

sometimes cheaper than other alternatives that allow intercommunal transit (taxis-compteurs, or certain gbaka lines for instance). However, because access to SOTRA services and amenities is limited in peripheral and semi-peripheral areas like Cocody, commuters like Marie prefer cheaper alternatives like *wôrô-wôrôs* for trips within the same municipality.

Equal access to mobility is one of the main concerns of sustainable mobility planning in Abidjan (MCLAU & JICA 2015, 1). Nevertheless, like in all large cities around the globe, people in Abidjan still experience different levels of accessibility to public transport depending on their localities (residence, workplace, etc.). The unregulated expansion of the city, and the public sector's failure to provide services in newly-built peripheral areas have exacerbated these disparities. As a result, people's geographical location also determines the nature of the networks available to them. The trend in Sub-Saharan Africa is that people living in the periphery have poorer access to scheduled transportation networks than those living in the center of the city. Conversely, paratransit is more widely available in the peripheries (Kassi-Djodjo 2010, 8). In light of public investments in new transport technologies, it is possible to verify if this trend continues to apply to Abidjan by analyzing the size (i.e. the number of connecting lines accessible at each terminal) and distribution of major SOTRA bus terminals, and comparing the accessibility of SOTRA bus networks between the ten municipalities. Figure 5 and table 4 show the distribution and the size of all major SOTRA bus terminals:

Figure 5: Size and distribution of the 11 largest SOTRA bus terminals following the formulation of the SDTUGA and the redevelopment of SOTRA

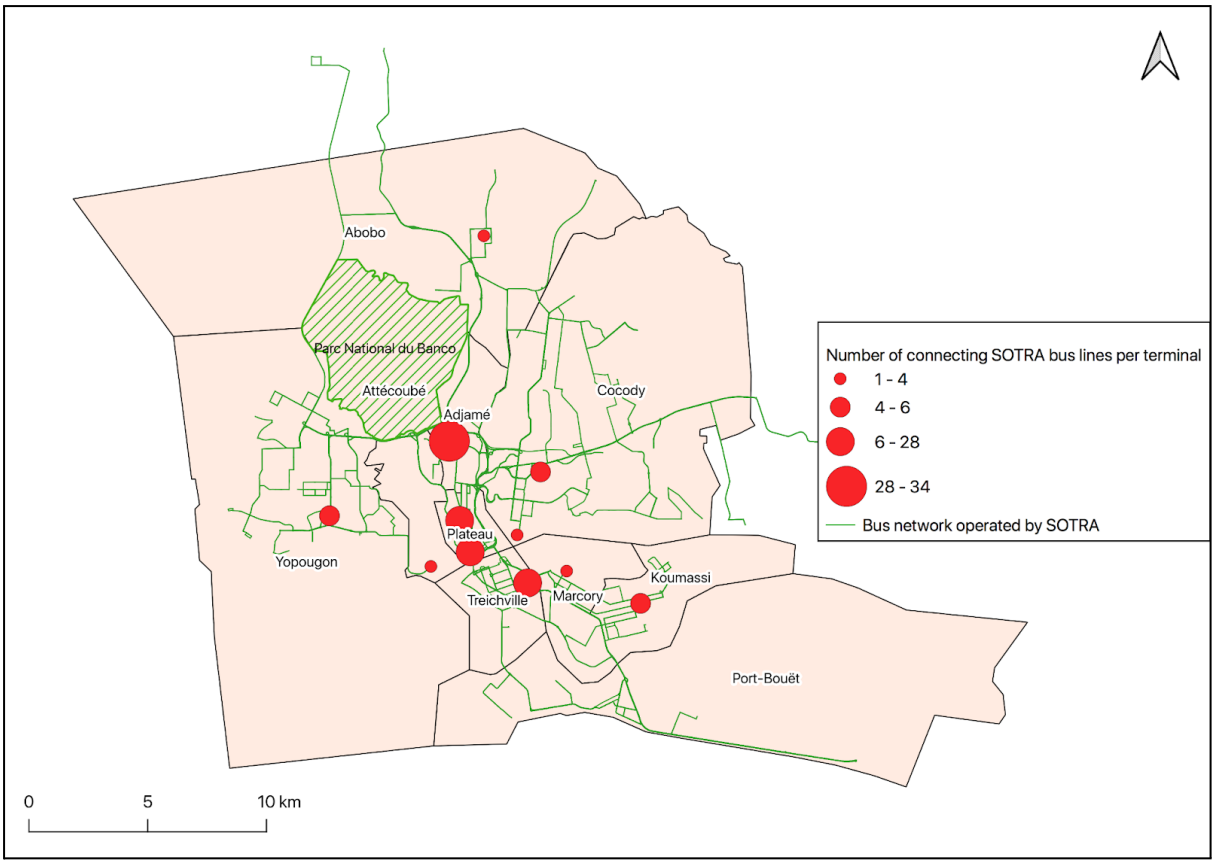


Table 4: Number of connecting bus lines at the 11 largest SOTRA bus terminals

SOTRA Terminal	Number of connecting bus lines
Gare Nord Adjamé (Adjamé)	34
Gare Sud (Plateau)	28
Cité Administrative (Plateau)	8
Marché de Treichville	7
Gare de Koumassi	6
Gare de Yopougon Kouté	6

Gare Campus de Cocody	5
Gare de Blockhauss	4
Gare d'Abobo Doumé	4
Gare Marcory	4
Gare Cité Universitaire d'Abobo	3

Source: Elaborated by the author based on data from the *Autorité de Mobilité Urbaine dans le Grand Abidjan* (AMUGA) (see appendix).

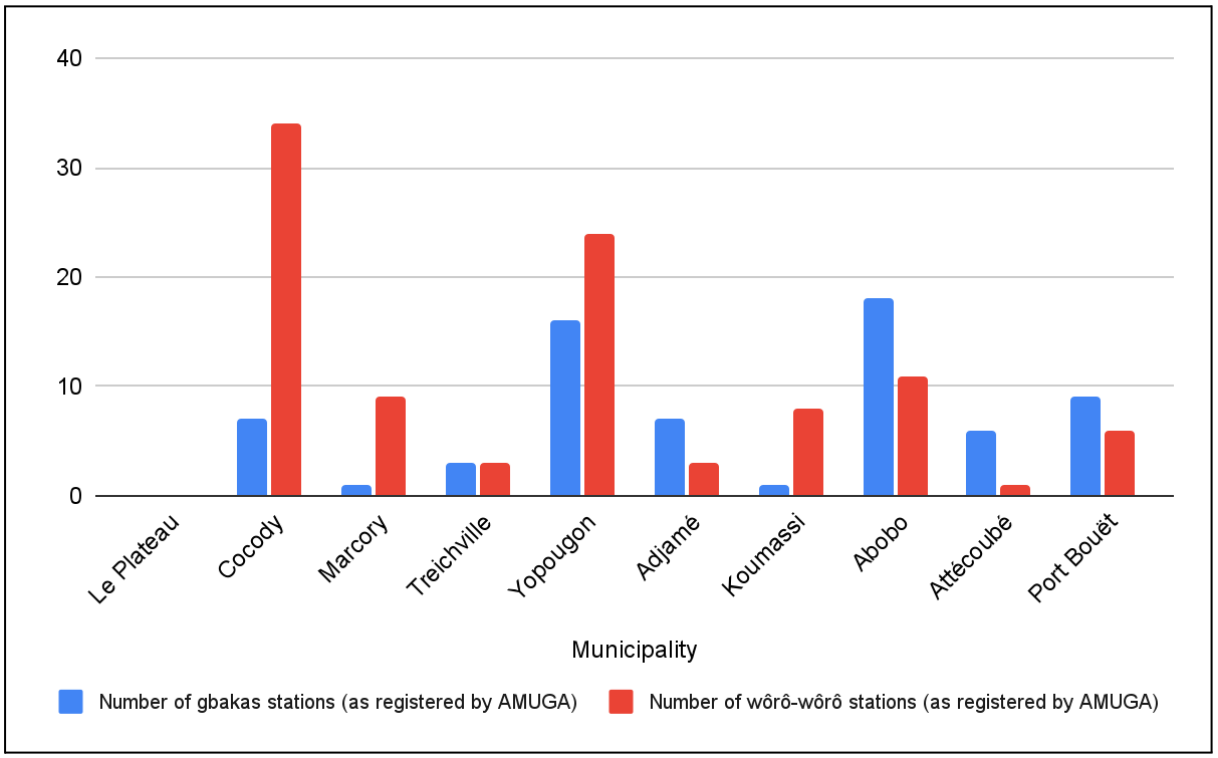
It appears that the largest SOTRA bus terminals are located in the municipalities of Treichville, Plateau, and Adjamé. Note that these three municipalities were identified as the economic, industrial, and administrative cores of Abidjan in chapter III. With 34 connecting bus lines, the Adjamé bus station (*Gare Nord Adjamé*) constitutes the largest bus terminal in Abidjan, and is an important transit point for thousands, if not millions of daily commuters. It is no coincidence that the latter station is located close to the international train station and the Adjamé market. Similarly, the *Gare Sud* and the *Cité Administrative* in Plateau are located within walking distance from major administrative, economic and political institutions (the African Development Bank, the Abidjan courthouse, several ministries, or the *Hôtel du District* to name a few). Finally, the *Marché de Treichville* bus terminal is located at the heart of the municipality's commercial and industrial hubs.

The *Yopougon Kouté* and *Cité Universitaire d'Abobo* terminals are placed at important intersections within the city's two main clusters of population, and represent, at least theoretically, strategic service points for local populations. Paradoxically, they only offer a limited amount of connections (6 and 3 bus lines respectively), and are unable to sustain the mobility needs of local city-dwellers who predominantly rely on paratransit (see figure 7).

Most importantly, the spatial distribution of these terminals reflects how public networks like SOTRA, notably since the formulation of the SDTUGA, remain set up in such a way that they facilitate intercommunal trips from middle and higher-income residential areas to the different hubs of activity. By comparing the distribution of SOTRA terminals to that of *gbaka* and *wôrô-wôrô* terminals, it is possible to visualize how formal and informal transportation networks target different demographic groups. The graph below shows the

distribution of major informal pick-up and drop-off points across the ten municipalities of Abidjan.

Figure 6: Number of informal transport terminals in the municipalities of Abidjan



Source: Elaborated by the author based on data from the *Autorité de Mobilité Urbaine dans le Grand Abidjan* (AMUGA) (see appendix)

Figure 6 reveals how informal terminals are concentrated in peripheral and semi-peripheral areas like Yopougon, Abobo, and Cocody. Conversely, the number of informal terminals in city hubs like Treichville, Adjamé and Plateau is relatively low. Note here that the value for Plateau is 0 for both *gbaka* and *wôrô-wôrô* terminals, as paratransit was banned from operating within the municipality (Zouhoula Bi 2018, 23).

Box 3

Ousmane is a Malian immigrant and taxi-compteur driver from the municipality of Abobo. Every morning, he takes a gbaka to commute to his employer's garage in Cocody where he picks-up and drops-off his taxi. I met him on a ride back from the Deux-Plateaux fruit market, and he agreed to answer some questions on his daily travel behaviors and experiences with public transportation in

Abidjan. During the interview, Ousmane stressed that traveling from and to Abobo is extremely time consuming as there is only one main road leading to other municipalities like Cocody, Adjamé, and Plateau. He added that Abobo is separated from the rest of the city by the Banco national park, and that city planning in the area has traditionally been extremely limited. Abobo, he said, is historically an immigrant and Muslim district. During the civil war, it suffered from the conflict opposing partisans of Alassane Ouattara to partisans of Laurent Gbagbo, and was nicknamed "Abobo-la-guerre". Being the black sheep of Abidjan, Abobo continues to be neglected by the authorities. After discussing the traveling conditions of the average Abobolais, I proceeded to ask him how the redevelopment of SOTRA lines and infrastructure was being perceived in Abobo, to which he replied:

> "You know, if people can avoid taking the [SOTRA] bus they will, regardless of the amount of money that they have".

Ousmane then argued that SOTRA buses remain relatively cheap, and that the quality of service is substantially higher than informal alternatives (SOTRA buses are, for instance, more spacious and more comfortable). However, although Abobo is the second largest municipality in Abidjan, SOTRA amenities are still very scarce and inaccessible for most residents. Therefore, people continue to rely on the informal transport economy when it allows them to save time.
Ousmane then mentioned that he had spent a few years in Paris during his youth, and proceeded to compare French bus systems to Ivorian ones. He said:

> "What we need here is a bus network like the French ones. French buses come every ten minutes and are always on time. Ivorian buses are never on time!".

Another useful tool for measuring transport accessibility is the "*amenity* per 1000 inhabitants" method. By measuring the number of SOTRA bus stops per 1000 inhabitants in each municipality, it is possible to analyze how unequal access to SOTRA amenities persist despite the company's efforts to extend its services to peripheral areas, and provide homogenous access to bus networks. This statistical analysis is based on the following method:

- *Step 1:* The location of all SOTRA bus stops was retrieved using the Quick OSM algorithm in the QGIS software.

- *Step 2:* Using the "Count points in polygon" tool, we can obtain the number of bus stops in each municipality.

- *Step 3:* the "bus stops per 1000 inhabitants" index for each municipality was obtained using the following formula:

$$Q = (1000 \times Nb) \div P$$

Here Q represents the number of bus stops per 1000 inhabitants in each municipality. Nb represents the number of SOTRA bus stops in the given municipality. P represents the population of the given municipality. The results are presented in the table below.

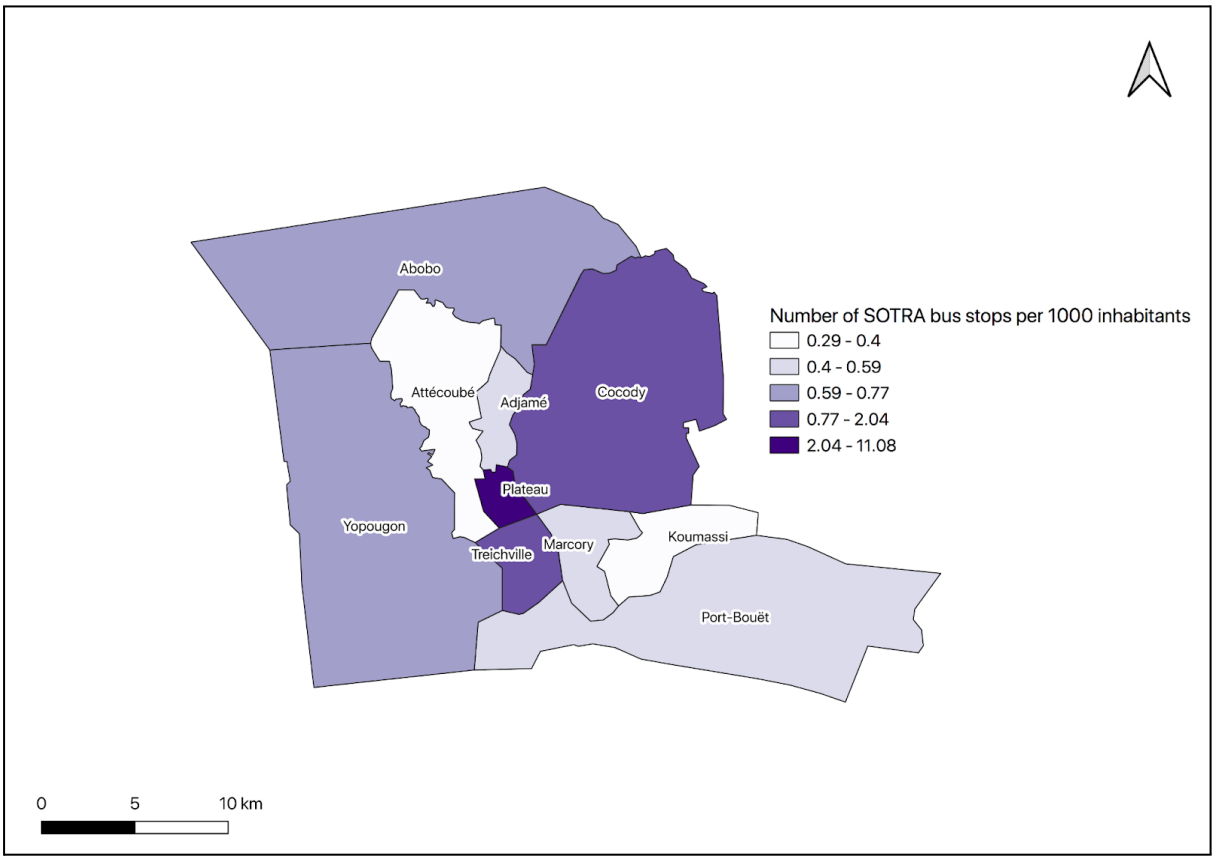
Table 5: Number of bus stops per 1000 inhabitants in the 10 municipalities of Abidjan since the redevelopment of SOTRA

Municipality	**Population (P)**	**Number of SOTRA bus stops (Nb)[5]**	**Number of bus stops per 1000 inhabitants[6] (Q)**
Le Plateau	7488	83	**11,08**
Cocody	447055	916	**2,05**
Marcory	249858	141	**0,56**
Treichville	102580	166	**1,62**
Yopougon	1071543	834	**0,78**
Adjamé	372978	215	**0,58**
Koumassi	433139	176	**0,41**
Abobo	1030658	738	**0,72**

[5] In Abidjan, bus stops are in most cases indicated by a simple road sign, and are not serviced systematically. Permanent bus stops with bus shelters are less frequent.
[6] Note that this index fails to take into account daily commuters who work but do not live in the given municipality, and who make daily use of these amenities.

Municipality	Population (P)	Number of SOTRA bus stops (Nb)[5]	Number of bus stops per 1000 inhabitants[6] (Q)
Le Plateau	7488	83	**11,08**
Cocody	447055	916	**2,05**
Attécoubé	260911	76	**0,29**
Port Bouët	419033	250	**0,60**

Figure 7: Visualization of Table 5



The results show that the municipalities with the highest number of bus stops per 1000 inhabitants are again the different economic, administrative, and industrial hubs of Abidjan. Indeed, with over 11 bus stops per 1000 inhabitants, the municipality of Plateau shows the highest rate of accessibility to SOTRA amenities. Treichville, as the industrial hub of the city, also demonstrates relatively high rates, with 1,6 bus stops per 1000 inhabitants. With only 0,2

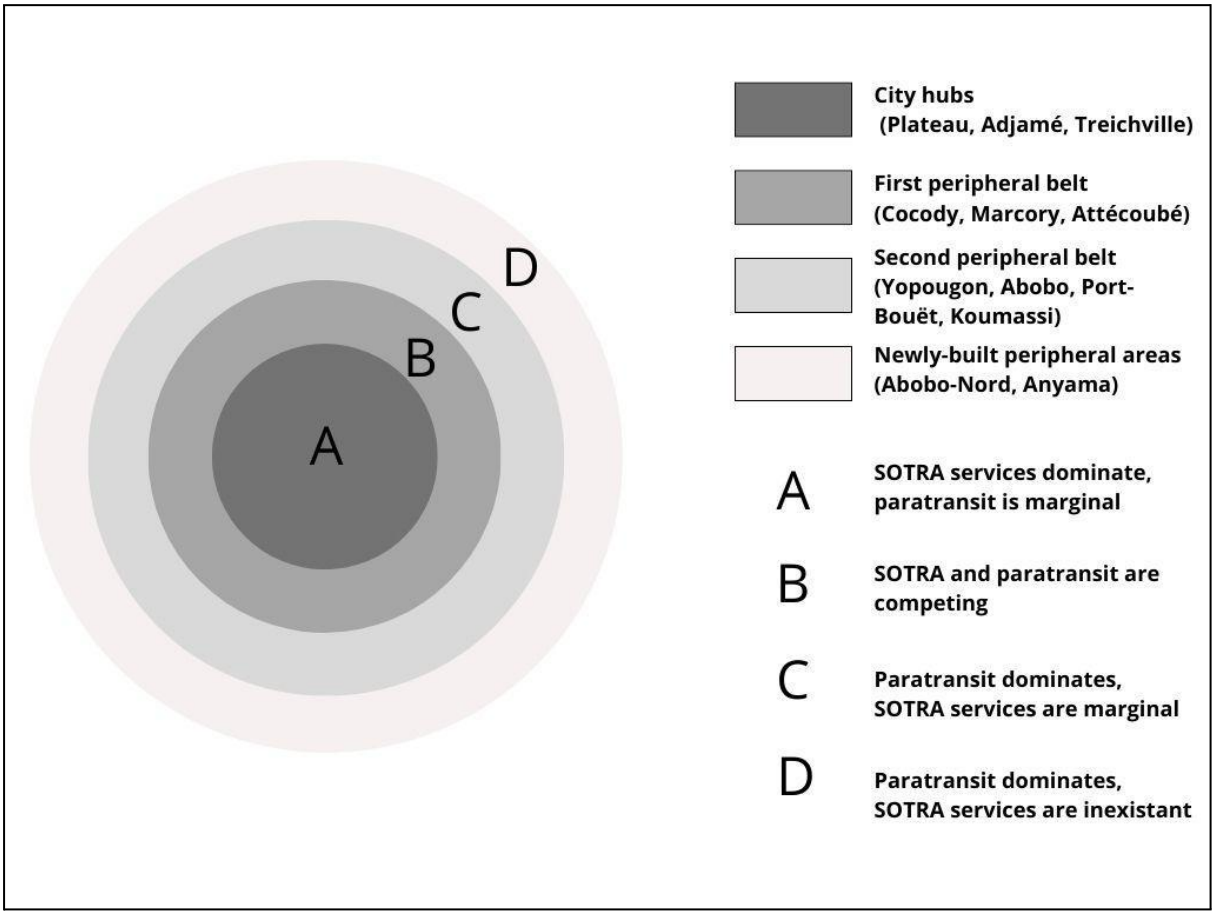
bus stops per 1000 inhabitants, people living in Attécoubé experience the lowest rate of accessibility to SOTRA amenities, and the municipality remains highly underserviced.

However, this analysis produced some unexpected results. First, while it was not identified as an economic/industrial hub, nor as an administrative center, Cocody shows the second highest rate after Plateau (2,05). Here, the explanation rests in the socio-economic status of the municipality. Indeed, Cocody was identified as one of the wealthier areas of Abidjan, and has traditionally been home to many civil servants working in public administration (Mairie de Cocody 2018). The latter demographic constitutes an important portion of the people commuting to Plateau every day, and is therefore in need of adequate intercommunal transport services and amenities. The presence of diplomatic institutions, universities, and large expatriate communities in the south of Cocody may as well explain the above-average quality and accessibility of SOTRA services in the municipality.

Conversely, the rate for Adjamé, which was identified as the commercial hub of the city thanks to its market, appears to be relatively low. The main explanation here is likely to be population density. Indeed, despite being home to nearly 400 000 inhabitants, Adjamé only covers an area of 12 square kilometers and is one of the smallest municipalities of Abidjan. Moreover, SOTRA amenities are mostly concentrated around the market, and the *Gare Nord Adjamé* terminal more specifically.

These results suggest once more that, despite extensive efforts by the government to make mass public transport more attractive, notably by financing the redevelopment of SOTRA (MCLAU & JICA 2015, 23), the organization and operationalization of public transport in Abidjan remains spatially segregated. Mass public transportation remains catered to a specific middle-class demographic living and working in the different hubs of activity, and fails to appeal to a majority of people living in the peripheries and working in the informal economy. Instead, the latter group tends to rely on informal alternatives like *wôrô-wôrôs* and *gbakas,* as they are often cheaper and widely available locally (Kassi-Djodjo 2010, 7). The redevelopment of SOTRA networks does therefore not promote equitable access to services, and fails to meet the requirements of sustainable transport planning. The current segregated organization of public transport in Abidjan is best illustrated using an adapted and updated version of Kassi-Djodjo's organizational model of public transport in sub-Saharan African cities (2010, 8):

Figure 8: Spatial organization of public transport in Abidjan since the formulation of the SDTUGA



Source: Elaborated by the author and adapted from Kassi-Djodjo's organizational model of public transport in sub-Saharan African cities (2010, 8)

6.4 Increasing transportation costs

During my interview with Marie, she emphasized the importance of properly managing her budget allocated to transportation costs, as it often determines "how much food is going to be on the table for dinner"[7]. Finances are an important limiting factor to the mobility of city dwellers in Abidjan, and systematically influence people's daily choices and behaviors. As a result of huge economic disparities in Abidjan (see chapter 3 - Figure 3), commuters have different levels of access to mobility. Moreover, the privatization of certain transport infrastructures has generated additional transport costs for commuters. This is the case of the Henri Konan Bédié bridge between Marcory and Cocody, built in 2014. The bridge was one

[7] User ("Marie"), personal communication, February 19th, 2022.

of the first major infrastructural projects initiated by president Alassane Ouattara, and was financed through a public-private partnership (PPP) with French contractor Bouygues Construction. Users are required to pay a toll in order to pass over the bridge. The toll varies according to the size of the vehicle: 500 XOF for cars, 1500 XOF for vans and small trucks, and 3000 XOF for large trucks (Pont HKB 2022). Another important infrastructural project initiated by the Ouattara administration is a toll road connecting Abidjan to the nearby city of Grand-Bassam. The project was predominantly financed by the Chinese company Eximbank and also requires users to pay a toll (Ageroute 2017). While the road is already operational, the toll station was still under construction at the time this paper was written, and the amount to be paid by users still unknown. During an informal conversation with a Yango driver from the municipality of Yopougon, the participant expressed his discontent towards privatized transport infrastructures like the Henri Konan Bédié bridge and the Grand-Bassam highway, as they have abruptly increased the transportation costs for small firms and users that operate or travel along these routes. Users are increasingly faced with a dilemma where they have to choose between spending more money, or more time in traffic[8]. If the potential of the HKB bridge and the Grand Bassam highway to decrease transport time and traffic congestion is undeniable, many users will tend to avoid tolls and choose alternative routes that are often longer in order to save money[9].

6.5 Shortcomings linked to the proliferation of Public Private Partnerships

Box 4

On April 1st, 2022, I had agreed to have an phone call with a young urban planner in training working for the BNEDT, in order to discuss the issue of mobility planning in Abidjan. The main subject of our conversation turned out to be the recent proliferation of Public Private Partnerships (PPPs) and their consequences on the mobility of city-dwellers, and the overall evolution of the transport sector in Abidjan. He pointed out that the Ivorian state, under the presidency of Alassane Ouattara, had been committed to attracting foreign investors and contractors for various infrastructural projects, notably with respect to urban transportation. This has notably materialized in the construction of several bridges (like the HKB Bridge), roads (like the Abidjan-Grand Bassam toll road), and other projects like the future metro line. On April 4th, he invited me to his office at the BNEDT headquarters in

[8] Taxi driver, personal communication, April 15th, 2022.
[9] Taxi driver, personal communication, April 15th, 2022.

Cocody, where him and two of his colleagues were working. In a sort of improvised focus group, the conversation organically diverged towards the metro project, and the latter's important social repercussions. If interviews with users are a great tool for gathering individual experiences, and people's perceptions of new transport policies and project, discussions with local urban planners offer more technical and specialized insights into the benefits and limitations of transport planning in Abidjan.

The different interviews with urban planners revealed some shortcomings associated with the spread of PPPs. A first notable limitation is a lack of accountability and transparency from both the government and foreign contractors. On the one hand, by overly relying on foreign contractors to design and build transport infrastructure, the state tends to offload responsibility for the adequate implementation and maintenance of the infrastructure to the contractor. This often leads to poor communication between the authorities and potential users and very limited stakeholder participation in the designing, planning, and implementation of PPPs (Osei-Kyei 2016, 179). Also, local investors and practitioners are often sidelined despite their awareness of the contextual needs of local users.

On the other hand, profit-seeking mentalities will lead foreign contractors to be less attentive to the needs of city-dwellers and sometimes neglect the proper maintenance of infrastructural projects. As a result, major infrastructures like the Houphouët-Boigny bridge, which was built through a PPP with French construction companies Eiffage and SPIE, are in an advanced state of degradation, affecting traffic conditions within Abidjan (Agence Française de Développement 2015, 1-2).

Furthermore, large infrastructural projects financed through PPPs can become a source of exclusion even before they are implemented. The construction of the Abidjan metro and the urban train line in Dakar have led authorities to conduct evictions (a process usually referred to as "*déguerpissement*" in Francophone West Africa). In the district of Abidjan, hundreds of households were evicted in Anyama, a town north of Abobo, to make space for a 100-meter-wide service corridor around the tracks (Ciyow 2021; Yasseu 2021). Although 53 billion XOF have been allocated to compensating impacted households, the project has caused public agitation as many believe that the amount offered remains insufficient and will not allow families to relocate (Sangaré 2021). Other eviction operations along the route are expected before the project's completion.

Additionally, the construction of the service corridor is currently dividing the city into two halves. Indeed, while the train tracks already exist, they are crossed on foot by thousands of people every day. However, as part of the project, important safety measures will be implemented, and infrastructure will be built to prevent access to the tracks and surrounding amenities. The service corridor will therefore act as an additional barrier for the communities settled around the tracks. Unless authorities have planned the construction of adequate infrastructure like pedestrian bridges or tunnels, traveling between Abidjan's eastern and western halves is likely to become arduous.

Finally, evidence from Dakar shows that "Western" transport innovations like LRTs can clash with local users' cultural norms and socio-economic needs. Indeed, many instances where merchants were not allowed to board with their merchandise have been recorded (SeneNews 2021). It is likely for this phenomenon to happen in Abidjan as well.

Still, the potential of PPPs to enhance mobility and foster economic growth in Abidjan should not be overlooked. Evidence from other West African countries, and notably Nigeria, show that, with the right combination of stakeholder participation, state involvement, and transparency from both the public and the private sector, local populations can benefit directly and indirectly from PPPs. For instance, the Lekki toll road project in Lagos was exceptional in that most of the project funds were raised from local financial institutions and lenders (Osei-Kyei and Chan 2016, 175) and had long-term benefits on the mobility of people and goods. The project is, to this day, considered one of the most successful infrastructural PPPs in Sub-Saharan Africa (Osei-Kyei and Chan 2016, 175).

Similarly, the metro line in Abidjan has been the object of careful planning since the formulation of the SDUGA in 2000, and different stakeholders are confident in its potential to decongest major roads (notably in Abobo) and enhance the mobility of vulnerable groups. However, because PPPs are a more recent phenomenon in Abidjan, we lack perspective on their long-term viability. It is, therefore, harder to predict whether projects like the metro or the Grand-Bassam toll road will enhance the mobility of local city-dwellers, or if they will constitute another money pit for users and put small transport firms out of business. This constitutes a major limitation of this study.

6.6 The consequences of unsustainable transport planning on the inclusion of city dwellers

Chapter VI showed several limitations linked to new transport planning policies and projects in Abidjan. While investing in transport infrastructure and formulating new transport policies is an urgent matter given the current demographic, environment and socio-economic pressures experienced in the city's peripheries, it was observed that transport planning does not always promote sustainable forms of mobility. The chapter called particular attention to how specific projects fail to enhance the mobility of vulnerable groups by addressing persistent issues of delays, safety, increased transport costs, and unequal access to transport amenities.

However, mobility is not an end in itself. People's inclusion in modern urban institutions and their ability to generate human capital are increasingly determined by the quality of the public transportation services offered to them (Olvera Diaz *et al.* 2013, 63). By generating conditions of unequal access to mobility, unsustainable transport planning in Abidjan is compromising certain groups' movement from households to the service points and amenities that sustain people's participation in the city's economic, political, and social spheres.

As an illustration, let us consider two native Ivorian young women in their 30s. One of them resides in Abobo, and the other one in Treichville. The woman from Abobo has, according to the findings, more limited access to SOTRA amenities, and other forms of scheduled transportation like ferries. She is, therefore, likely to rely on paratransit, which offers limited intercommunal services, and is likely to be confined within the limits of her municipality for her daily activities (job, business opportunities, healthcare, unpaid care work, social activities). The woman from Treichville, conversely, resides in the industrial hub of Abidjan and now has sustained access to SOTRA amenities. Moreover, her proximity to the lagoon grants her access to SOTRA and new STL ferry networks. Because these conditions facilitate inter-communal transit, she will be more inclined to travel to other municipalities and find better socio-economic opportunities outside of her municipality of residence.

VII. Solving the puzzle of sustainable mobility in Abidjan: a discussion

Box 5

On March 26th, 2022, I took a taxi to the Félix Houphouët-Boigny university, where I was hoping to interview students, as public transport is an important aspect of their daily lives, and their access to educational opportunities is partially determined by the quality of transportation networks available to them. Because I had chosen to go in the morning, we experienced heavy traffic congestion on the way, and the driver started ranting about the government's inability to improve traffic conditions in the city. I was eager to hear about his recommendations and asked him what solutions could be implemented to improve the travel conditions of commuters and enhance their mobility. To my surprise, his solution did not lie in Abidjan itself but rather in developing other Ivorian cities. Indeed, he argued that Abidjan is a victim of its success and that successive waves of economic immigration have resulted in uncontrolled urbanization and the deterioration of transport services and infrastructures. He added that in order to solve overpopulation, the Ivorian state has to make other Ivorian cities like Bouake, Man, or Yamoussoukro attractive to better "spread out" the population.

According to him, this could be achieved by building an extensive network of trains connecting cities together, in turn promoting employment and economic growth across the country, and eventually decongesting Abidjan.

Overall, throughout my stay in Abidjan and during my conversations with different stakeholders, I was astonished by the amount of suggestions, ideas, and recommendations that people would communicate to me. They subsequently allowed me to reflect on the different aspects of people's mobility that transport planning policies in Abidjan had overlooked and what potential solutions should be investigated or further developed.

7.1 Stakeholder participation and the "local solutions to local problems" approach

Despite extensive efforts by Ivorian authorities to promote new forms of mobility in Abidjan, some parameters influencing the mobility of local city-dwellers continue to be neglected. This study showed that the over-reliance on foreign funds and expertise for the construction of transport infrastructure, combined with deep socio-economic inequalities among the population, have generated unequal access to mobility and opportunities. In order to overcome these challenges, it is first crucial to increase input from local practitioners and users. Because they demonstrate high levels of awareness of local mobility trends, they are better positioned to assess the efficiency, feasibility, and suitability of policies and projects.

Increasing stakeholder participation in the formulation of mobility plans like the SDTUGA would facilitate the elaboration of effective, inclusive, and adapted transportation planning policies that respond to those needs. This is best achieved using a "local solutions to local problems" approach to transport planning. This chapter discusses some of these solutions.

7.2 A case for developing waterways

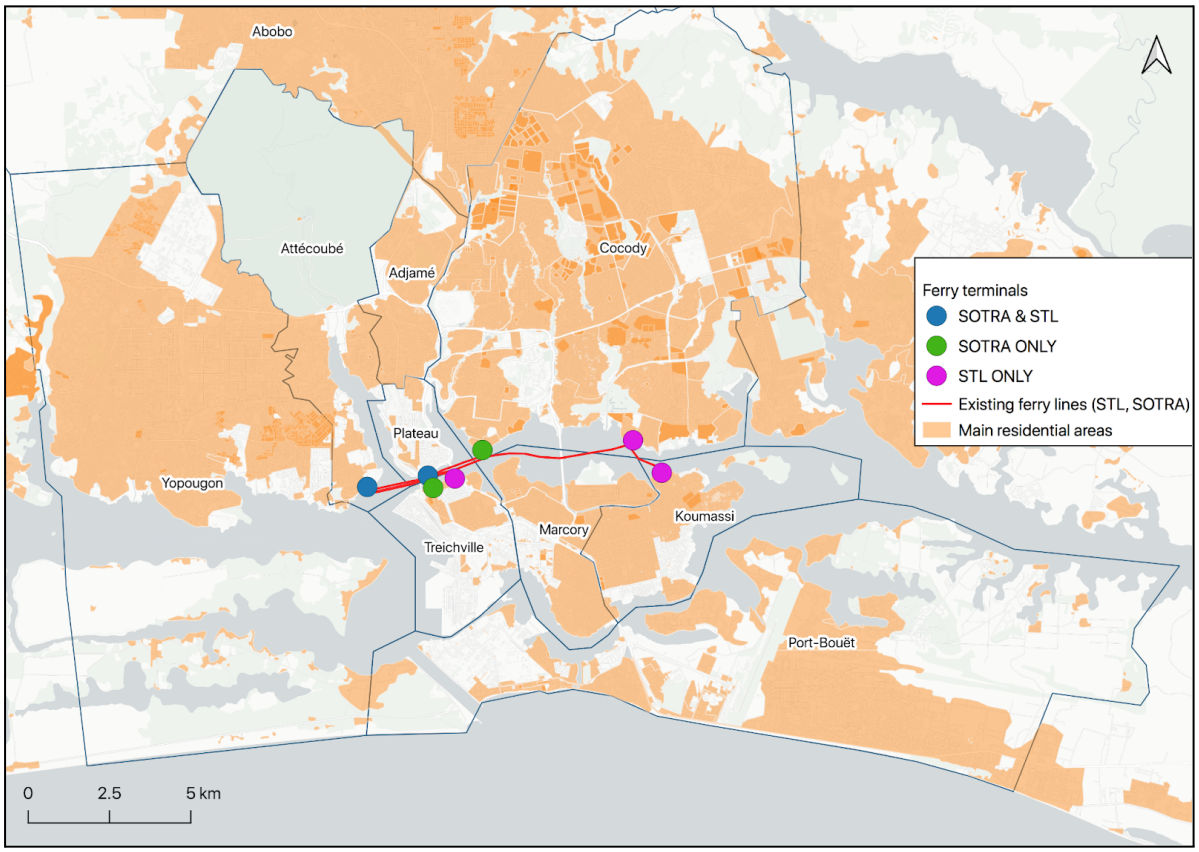
The Ebrié lagoon provides enormous potential for water-bound transportation. All municipalities in Abidjan, except Abobo and Adjamé, have direct access to the lagoon. While ferry services are on the rise, notably with the recent operationalization of STL lines, waterways remain extremely underexploited. Indeed, inhabitants of Yopougon, Marcory, and Port-Bouët, with a combined population of almost 1.75 million, do not have direct access to SOTRA or STL ferry amenities, despite being a pool of potential users due to their proximity to the lagoon.

Additionally, while STL now serves Koumassi, there are no SOTRA ferry terminals in the latter municipality. Several participants have claimed that ferry networks are underdeveloped, that SOTRA and STL fleets are scant, and do not necessarily appeal to the average *Abidjanais* due to long waiting times. By further developing waterways, it is argued that traffic congestion will substantially decrease and will allow city-dwellers to commute faster both on land and on water. Additionally, ferries are a great alternative to buses and *taxi-compteurs* for intercommunal trips. They provide a cheap incentive to travel outside of people's municipality of residence and are a driver of social mingling. Finally, the cost of developing ferry networks is relatively low and would have a relatively limited environmental and social impact. Indeed, the expansion of current STL and SOTRA networks to underserviced areas of the city would theoretically only require the construction of a few additional terminals, investing in new boats, and the integration of waterways into local transportation networks (by setting up multimodal terminals for instance).

There are, however, some obstacles to the successful development of waterways, most of which pertain to the perceived "unsafe" nature of ferries and passenger boats. In 2018, for instance, the pier of a SOTRA ferry terminal in Plateau experienced water damage and collapsed under its own weight (Lecomte 2018). Not only did this incident make ferries less appealing to the general public, but it also revealed a general lack of maintenance of water transport amenities. Hence, getting commuters to use boats in their daily commutes would require reversing negative attitudes towards ferries and water transport in general. To achieve

such a “rewiring”, vast operations of promotion and sensibilization disclosing the social, economic, and environmental benefits of water transport would have to be undertaken.

Figure 9: Distribution of SOTRA and STL ferry terminals



7.3 Increasing travel efficiency through multimodal transport planning

New policies of mobility planning are received with different levels of enthusiasm, and attitudes toward large infrastructural projects like the Abidjan metro line or the BRT depend greatly on people's individual commuting patterns. However, several participants shared the concern that new mass public transportation networks will fail to be integrated into the existing transport landscape. For many stakeholders, the construction of isolated BRT or metro lines constitutes a good start, but a heavier focus should be placed on increasing multimodality (availability of modes) and encouraging intermodality (successive use of different modes in the course of a single trip (Olvera Diaz et al. 2015, 1)). Indeed, most Ivorian and other African city dwellers do not have fixed destinations and will use various means of transportation interchangeably. In this respect, an isolated metro line does not answer the needs of most commuters. While some *Abidjanais* may use the metro at some

stage in their daily commutes, they will still have to rely on paratransit or other flexible transportation networks for the first or final leg of their trip. A multimodal station is currently envisioned in Adjamé, at the intersection between the metro and the BRT. However, more similar stations will have to be implemented along the route of the metro in order to ensure sustained access to secondary networks.

Regarding multimodality, most ferry terminals now offer a connection to SOTRA bus services. For instance, the STL and SOTRA ferry terminals in Plateau are located at a two-minute walking distance from the *Gare Sud* bus station. Similarly, the Blockhauss bus station in Cocody is easily accessible from the local *gare lagunaire.* However, boats and ferry networks remain managed independently, and cooperation between the two modes could further be improved (through schedule synchronization, for example). Additionally, while cooperation between informal and informal networks can happen organically, coordinating SOTRA services with local private transport alternatives should be investigated to improve travel efficiency.

7.4 Professionalizing the taxi sector

In 2017, the Ivorian ministry of transport announced the start of the Taxi Ivoire project, which aims to limit the emission of greenhouse gasses by gradually replacing all the *taxi-compteurs* with newer and more sustainable vehicles (Ministère des Transports 2017). Through this project, the transport ministry has increased its cooperation with private transport businesses and is slowly trying to formalize, professionalize, and effectively regulate existing informal transport alternatives. Furthermore, the Taxi Ivoire project aims to increase access to transparent pricing information, to digitize the transportation sector by developing a mobile app for users, and to improve road safety by modernizing the car fleet. The project has proven relatively successful, as many small taxi business owners are being granted ownership of these vehicles. Most importantly, the Taxi Ivoire project resonates with Kassi-Djodjo's (2010) claim that mobility planning in Abidjan should give a central role to private transport businesses due to their adaptability and flexibility and that improving the mobility of vulnerable groups can only be done by developing local solutions. A similar approach could for instance be envisioned for *gbakas.* In Abidjan, many PPPs were argued to be an inadequate answer to the mobility needs of local city dwellers. Instead, the professionalization of paratransit alternatives would increase stakeholder participation, limit environmental degradation, and improve security without losing in flexibility. Aside from

renewing car fleets, this can be achieved by providing training to taxi drivers, increasing cooperation between existing trade unions, user associations, and the ministry of transport, and delivering authorizations for vehicles that meet the requirements of local environmental policies[10].

Yet, some shortcomings arise from such an approach to mobility planning. First, although banning old vehicles can limit green gas emissions, the Taxi Ivoire and Hestia projects do not solve issues of traffic congestion. While they promote the use of "greener" vehicles, they only provide a partial answer to the problems of atmospheric and sound pollution and uphold car dependency in Abidjan. As such, the city's transition to "green" mobility would only be deferred. Secondly, increased state regulations and the potential implementation of taxation systems will likely bring fares up and increase transportation costs for users, in turn reducing their disposable income.

Finally, looking at formal private alternatives, it appears that the emergence of global taxi services like Yango and Uber are also contributing to the professionalization of the taxi sector and offering a pool of new job opportunities for potential drivers. These services' increasing popularity is directly linked to the growth of an Ivorian middle class that can afford higher fares. While their modal share is likely to increase in the coming years thanks to their high levels of flexibility, safety, and reliability, these services remain out of financial reach for a large portion of *Abidjanais* and do not respond effectively to the need for equitable and inclusive transportation in Abidjan.

[10] Urban planner, personal communication, April 4th, 2022.

VIII. Conclusion

This study sought to comprehend how current transportation planning policies in Abidjan affect the mobility of local city dwellers and whether these policies promote sustainable forms of mobility. Through a combination of qualitative and quantitative methods, it was primarily argued that inefficient transport planning in Abidjan is failing to meet specific requirements of sustainable transport planning.

The first half of the thesis aimed to contextualize issues of mobility in Abidjan through a socio-economic analysis of the city's ten municipalities, and allowed for a better understanding of the indicators of mobility relevant to local urban dwellers, notably in relation to sustainability. An analysis of all relevant stakeholders involved in the supply of public transport in Abidjan was also conducted.

Chapter VI sought to uncover how the mobility of the *Abidjanais* comes to be constrained and whether transport planning in Abidjan is effectively addressing these constraints. First, the study confirmed that deep socio-economic disparities between the ten municipalities of Abidjan subsist, generating all sorts of obstacles hindering the mobility of more vulnerable groups. Various factors like locality, employment sector, gender, age, and standard of living are potential inhibitors of access to public transport services and amenities. Because they mainly operate within Abidjan's different economic, industrial, and administrative hubs, new formal public and private networks sustain the mobility needs of a small segment of the population. Other types of mobility found in the peripheries of Abidjan and among vulnerable groups have mostly been overlooked. Therefore, despite the government's efforts to extend public transport services to the peripheries of Abidjan, notably as a reaction to the city's rapid expansion, access to mobility remains highly segregated and influenced by the socio-economic background of users.

Secondly, Chapter VI took a closer look at the proliferation of public-private partnerships, through which foreign expertise and financing are being commissioned, and emphasized the limitations of such an approach to transport planning. It was argued that by overly relying on PPPs, authorities further neglect the actual economic, social, and environmental needs of local city dwellers. Additionally, increased user costs, lack of transparency from both public and private actors, and inadequate infrastructure all contribute to generating conditions of unequal access to mobility, and have impacted the societal inclusion of vulnerable groups.

The public sector's limited ability to provide equal access to mobility in Abidjan calls for a new approach to sustainable transport and mobility planning, one that is adapted to the context-specific needs of local city dwellers. It was discussed in chapter VII that developing local transport alternatives like cheap ferry and taxi networks, and adopting a "local solutions to local problems" approach to transport planning may result in long-term improvements in the daily mobility of vulnerable groups. Additionally, in a context where the amount of transport options available to commuters is increasing, transport planning in Abidjan and other African cities should focus more on multimodality and encourage cooperation between formally regulated networks and paratransit. Furthermore, despite showing some limitations, local initiatives like Taxi-Ivoire and Hestia testify to increased cooperation between stakeholders and authorities and the potential of bottom-up approaches to transport planning in Abidjan.

Above all, this thesis called attention to the fact that much of African urban dwellers' social, financial, and physical well-being is determined by adequate transport policy. In this regard, the know-how of local stakeholders and their ability to steer positive change in transport planning should not be underestimated. It is expected that further research on urban transportation in Africa will increase its consideration for local solutions and inform governments and private contractors on the benefits of stakeholder participation. Only then will we witness the emergence of more socially, economically and environmentally sustainable forms of mobility for African city dwellers.

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Appendix

1. Distribution of major gbaka and wôrô-wôrô terminals in Abidjan (manual count using an official AMUGA print map of major transportation networks in Abidjan)

Municipality	**Number of *gbakas* terminals (as registered by AMUGA)**	**Number of *wôrô-wôrô* terminals (as registered by AMUGA)**
Le Plateau	0	0
Cocody	7	34
Marcory	1	9
Treichville	3	3
Yopougon	16	24
Adjamé	7	3
Koumassi	1	8
Abobo	18	11
Attécoubé	6	1
Port Bouët	9	6

2. Number of connecting bus lines at the 11 largest SOTRA bus terminals (manual count using an official AMUGA print map of major transportation networks in Abidjan)

SOTRA Terminal	Number of connecting bus lines
Gare Nord Adjamé (Adjamé)	34
Gare Sud (Plateau)	28
Cité Administrative (Plateau)	8
Marché de Treichville (Treichville)	7
Gare de Koumassi (Koumassi)	6
Gare de Yopougon Kouté (Yopougon)	6
Gare Campus de Cocody (Cocody)	5
Gare de Blockhauss (Cocody)	4
Gare d'Abobo Doumé (Attécoubé)	4
Gare Marcory (Marcory)	4
Gare Cité Universitaire d'Abobo (Abobo)	3

3. Interviews and personal communications (relevant comments)

Date and participant information	**Obstacles experienced by commuters in their daily mobility**	**Positive attitudes towards transport and mobility planning in Abidjan**	**Negative attitudes towards transport and mobility planning in Abidjan**	**Suggestions for improving transport and mobility planning in Abidjan**
Participant 1: SOTRA and *wôrô-wôrô* user ("Marie"). Resident of Cocody (Riviera 2). February 19th, 2022	- Abidjan is a difficult city for commuters because of daily traffic jams. **"No matter how early you wake up, you will get stuck into traffic on the way to work".** - SOTRA busses are often too late and overcrowded. Express lines are more comfortable but not necessarily more punctual. - *Wôrô-wôrôs* often take detours based on other passenger's destinations - Abidjan is an expensive city to commute given the average salary and people's standard of living. - Transportation costs are a determining part of people's budget, and can influence whether **"people have food on the table or not in the evening".**	- The BRT Yopougon Cocody will possibly reduce commuting time but will still involve connections, and will therefore involve additional costs.	- Metro will be of no use to her because the line does not go through Cocody.	

Participant 2: SOTRA user. Resident of Yopougon. February 23rd, 2022	- Commuting in Abidjan is increasingly difficult, and it is becoming extremely expensive, especially when using public transport like SOTRA. - SOTRA buses are constantly late and can be overcrowded depending on the time of the day. - Traveling is emotionally draining. - Delays affect her daily commutes.	- The BRT will definitely reduce commuting time to her workplace, as she lives in Yopougon.	- Unsure about the metro because people are not used to traveling like this. - The metro will be of no use for her, because it is not located on her route.	- People need a true network, a few isolated lines do not suffice.
Participants 3 and 4: SOTRA and *taxi-compteur* users ("Mother and daughter from Koumassi"). Residents of Koumassi. March 2nd, 2022	- Buses do not come frequently enough: 40 minutes is their average waiting time but it can be much more if busses are full and they have to wait for another one. - Taxi-compteurs are more expensive and are the only available alternative for intercommunal transit. But they are not immune to traffic.	- METRO will reduce commuting time for certain people, and will help reduce traffic congestion.	- METRO and BRT are less flexible than taxis and minibuses. Using the METRO will require using secondary networks anyways. People will continue using paratransit	
Participant 5: SOTRA user. Resident of Abobo.	- SOTRA Buses are always overcrowded, especially the ones going and leaving from Abobo (where she lives) due to a lack of lines and bus	- Since SOTRA is redeveloping, she recommends using their busses as they are the more comfortable option		

March 5th, 2022	stations. - Express lines are too expensive for most people - People have to stand in the normal lines (Monbus)	- As an inhabitant of Abobo, she is very excited about the thought of having a metro in Abobo. - *After showing her the prospective metro route:* She will certainly use it, as her workplace is located at a walking distance from one of the future stops.		
Participant 6: Yango driver. Resident of Yopougon. March 6th, 2022	- As the city is currently undergoing redevelopment, construction sites throughout the city worsen traffic congestion. - Travel conditions in SOTRA buses are terrible, especially during peak hours. Not suited for people in Abidjan (people will try to sell merchandise). - Ferries are underdeveloped (although he would not use them for practical and personal reasons) - The government does not really listen to the needs of the people	- positive views on the various projects in the city. Shows redevelopment of the city. **"In 10 years, everything will work perfectly"**. - As a driver, current projects will probably not affect his business negatively. Less clientele does not matter if traffic improves as he will be able to make more trips. - The BRT project may improve traffic between Yopougon, Adjamé, and Cocody - Claimed to be in favor of PPP's when it comes to infrastructural projects (bridges, road interchanges, etc.) because **"Europeans and Asians have more**	- **"The government does not really listen to the needs of the people"** - PPPs show the government's inability to conduct its own developmental projects: overreliance on foreign investment - therefore lack of accountability	

		expertise”. Projects are therefore more likely to last in the long term		
Participant 7: *Taxi-compteur* driver. Resident of Yopougon. March 6th, 2022	- Delays on construction sites in Abidjan are currently worsening traffic congestion.	- Construction of bridges will help to decongest the city - New projects will not affect his business negatively, as there will always be a demand from people who want to be dropped off from door to door - only taxis allow this (woros woros, taxis compteurs, and yangos/ubers)(especially richer portions of the population)	The real needs of the people are not taken into account: lagoon ferries would allow to decongest traffic and allow people to commute faster to different parts of the city. Attécoubé is a perfect example, it already has 2 boat stations but not enough boats to satisfy the transportation demand. - Metros are a good idea in theory, but the project will be confronted with clashing cultural norms in practice: people carrying merchandise will not be allowed on board. Informal settlements around the tracks will probably make maintenance harder for the authorities. **“Africa is not Europe”**. - lack of coordination between government and private sector. Lack of communication: **“we don’t know who is behind the projects and what to expect from them”**.	- Claims that African solutions should be implemented to tackle African problems. - Aside from developing transportation infrastructure in Abidjan, the government should focus on improving the connection between Abidjan and other cities to topple overpopulation, and contain urban expansion. Making other cities like Bouake or Yamoussoukro more attractive by building an express train line would be an option. Abidjan has become the center of attraction and is a “victim of its own success”.

Participant 8: March 10th, 2022	- Delays on construction sites in Abidjan are currently worsening traffic congestion. - Despite the existence of a boat stop in his residential area, has never seen the point of taking the boat (not frequent enough, not enough boat stations) - A lot of people are still reliant on SOTRA for intercommunal transit.	- Metro will hopefully decongest traffic and improve overall traveling conditions within the city for everyone - The BRT has potential to connect Yopougon to the rest of the city.	- Few people are affected (only people located on the axis of the metro will benefit from it, as it does not require an additional connection). - Only 1 metro line and 1 potential BRT line are not sufficient.	
Participant 9: *Taxi-compteur* driver "Ousmane". Resident of Abobo. March 12th, 2022	- **"si les gens peuvent éviter de prendre les bus SOTRA, peu importe leur revenu, ils le feront"** - There are lots of SOTRA amenities (stops, stations), but buses are not reliable (delays, overcrowding). - People tend to rely on popular means of transportation when it allows them to save time and money. - Transit from and to Abobo is extremely complicated as there is only one main road leading to the rest of the city. Urban planning in the area is very limited because of the Banco National Park, which	- People are welcoming the metro (overall good public opinion despite lack of communication - sold as a technological wonder so people adhere to it). - Will not affect his business if traffic is improved.		- French buses and metros are always on time, Côte d'Ivoire should learn from French multimodal systems - **"What we need here is a bus network like the French ones. French buses come every ten minutes and are always on time. Ivorian buses are never on time!"**

	stands in between Abobo and the municipalities of Adjamé, Plateau, Yopougon, and the more southern municipalities. Current construction on this main axis (rond point d'Abobo) is worsening traffic in an area which was already extremely congested.			
Participant 10: Yango driver. Resident of Cocody. March 15th, 2022	- Complained about overpopulation - **"soon, Abidjan will represent ⅓ of the total Ivorian population"**. This demographic evolution is not sustainable as the transportation sector, especially the formal one, will not manage to keep up and to adapt to higher demand. - Complained about traffic in Abobo - while investment is being done, construction sites all over the municipality are worsening traffic congestion (example of the roundabout near the townhall).	- Positive views towards BRT, as it will allow for greater bus frequency, reduced travel time, and punctuality.	- Did not know about the BRT (lack of communication) - Metro will be useless for people in Yopougon	- *After showing him the prospective route of the metro:* The metro will only be effective if a multimodal station is built in Adjamé that connects it with BRT (this is planned according to AMUGA). - Topple overpopulation by making other cities attractive (example of Bouake with the SOTRA buses). Yamoussoukro is empty despite being the capital - attract more people, create demand for transportation between cities, not within.
Participants 11, 12, 13:	- Choosing to take a bus or	- All three agreed that the	- The metro is less flexible	

SOTRA, *wôrô-wôrô*, and *gbaka* users. All residents of Adjamé. March 17th, 2022	not depends on the time available to you. People usually do not prioritize busses, but will use them in last resort. - Taking the bus requires a lot of planning ahead. - Taxis are more reliable but more expensive. - On a daily basis, people use popular modes of transportation as it allows them to save money in the long run. Money can be used to provide for family. SOTRA buses are catered to an overall richer portion of the population, and are useful for people who commute regularly to the same workplace, and who know the schedules in order to get into a "routine".	metro will substantially shorten their travel time. All three intend to using it once it is operational. - Taxis Ivoire are a great initiative because of their flexibility. If the driver knows the city well, they can avoid traffic and reach the destination more quickly than a bus which is limited to a specific itinerary	than other transportation modes, and is likely to be more expensive in the long run. This is mostly due to the use of secondary networks to reach the stations.	
Participant 14: SOTRA and *Taxi-compteur* user. Resident of Abobo. March 21st, 2022	Despite being a frequent user of SOTRA buses, the participant avoids them when there is a time constraint. Instead, it is best to use a taxi-compteur	Views the metro project rather neutrally. It needs to be implemented first to know whether it is going to benefit the population in Abobo. But the idea is good as long as it remains affordable and accessible.	Recent efforts to revitalize SOTRA are useless, and will not improve the mobility of Abidjanais, especially in remote areas like Abobo.	What people need is a new transportation network (not single lines) that supplements and is competitive with SOTRA. It needs to come at a lower cost to ensure the mobility of the poorest portion of the population currently

				excluded of the equation, while offering a better service quality than informal networks (woro-woro, gbakas). People don't necessarily have fixed and daily destinations: flexibility is key!
Participant 15: STL worker ("chef de gare"). March 22nd, 2022	At the *Gare Lagunaire du Plateau*, boats come at an average of 40 min, which is not sufficient given the number of people commuting to and back from Plateau. People, therefore, resort in using alternative modes like SOTRA buse	- STL offers a high quality of service for a reasonable price and attracts a socially diverse clientele - Boats are not subject to traffic jams, are always on time, generate less pollution, and are quieter than cars and busses - The geography of the city is favorable for water-bound transportation. all municipalities except Abobo have access to the lagoon	- But there are insufficient boat stations, especially in Port-Bouet and the Yopougon which are subject to intense traffic despite their proximity to the lagoon.	Believes in the potential of ferries in ensuring the mobility of Abidjanais. Networks should be further developed.
Participant 16: Urban planner April 1st, 2022 and April 4th, 2022.		The re-development of SOTRA amenities is in theory beneficial for city dwellers, as more people will have access to their services.	- PPPs in Côte d'Ivoire often reflect a lack of accountability from the government. There is a shift of responsibility to private economic actors. It becomes unsure who is in charge of	- Municipalities need to be connected together in order to avoid ghettoization. - Transportation planning should take into account local needs and geographical features of the city. The vast

			maintenance and who is benefitting from the project. - The privatization of transport infrastructure often leads to additional costs for users (example of the 500 toll on the Pont HKB - The metro is currently dividing the city into two parts, and it is going to become harder for certain people, especially those traveling on foot, to commute from east to west. - The construction of the metro has a great sociological impact: evictions (déguerpissement) - Insufficient measures are taken to financially and socially help evicted households. - The metro is mimicking western transportation networks. The cultural and socio-economic background of local city dwellers Abidjan are not taken into account (example of merchandize carrier arrested for taking the train in Dakar).	lagoon surrounding the city offers great potential.Developing waterways instead of a metro would therefore be more beneficial for inhabitants of Port-Bouët, Marcory, and Yopougon. Efficient ferry networks would substantially reduce commuting time to central municipalities and reduce traffic congestion.

Participant 17: Urban planner April 4th, 2022	- In theory, more buses and increased investment in urban infrastructure (bridges) will lead to more accessibility, and in turn to more participation in urban institutions.		- Many recent mass transportation and urban infrastructure projects come with vast operations of displacement (*déguerpissement*). Metro is a great example, with thousands of people displaced from the technical corridor. - Price (of a metro ticket) remains unkwown, and there is an overall lack of transparency and communication with transportation planning projects in Abidjan	
Participant 18: Urban planner April 4th, 2022				- Because there is a lack of coordination between all informal actors of mobility, the goal is to formalize informal activities. The solution lies in the redevelopment, formalization, and regulation of existing solutions (gbakas, woros woros). - This can be done by providing training for taxi drivers while maintaining existing trade unions as main

				actors. - Delivering authorizations for vehicles that meet the requirements of the country's environmental policies (although motorized vehicles are never really sustainable, emissions can be limited by banning old vehicles). - It is important to increase coordination with local authorities like AMUGA. - Multimodality (availability of modes) and intermodality (cooperation between modes) should be at the center of transportation planning, and urban planning in general.
Participant 19: Urban planner April 10th, 2022	- Occasionally takes the bus to reduce transportation costs: “if the bus is there i’ll take it, if I have to wait, I won’t”		- PPPs in Ivory Coast often reflect a lack of accountability from the government. Shift of responsibility to private economic actors. Who is in charge of maintenance? Who is benefitting? The Societe des Transports	

			Abidjanais sur Rails (STAR) refuses to publicly release data on evictions, costs, etc… even AMUGA, as the main coordinator of transportation networks in Abidjan does not have access to this data. - Multiplicity of actors within the urban development sector make it hard for AMUGA to keep track, and effectively coordinate all projects. - Lack of collaboration = failure to meet the needs of users?	
Participant 20: Urban planner April 11th, 2022			- AMUGA is struggling to coordinate transportation in the district of Abidjan because of the multiplicity of actors, and their different levels of formality.	- AMUGA is working towards efficient cooperation between all actors of mobility in Abidjan. As of now, focus is placed on initiating negociations with user associations and trade unions to better understand how informal networks are being handled.
Participant 21: Yango driver. Resident of Yopougon	- Traveling within and outside of Abidjan has become more costly due to an increase in tolls (example	Yango passengers are usually ready to pay for the toll, so it is not affecting his business that much.	Privatization of transport infrastructure has become an obstacle for many commuters and transport	Transport infrastructure should be made public to reduce transportation costs (increased state regulations

April 15th, 2022	of the new tolls on the way to Yamoussoukro, and the HKB bridge - The privatization of transport infrastructure is affecting both users and business owners. People are increasingly faced with a dilemma where they either have to spend more money or more time in traffic by taking alternative routes. - Passengers are usually reluctant to pay the toll, and the driver has to bear the costs		business owners (notably taxis, gbakas, and wôrô-wôrôs)	and accountability).