

Djibouti Technical Assistance for Urban Public Transport: Situational Analysis

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2 EXECUTIVE SUMMARY

This report presents an analysis of the public transport system in Djibouti. These are the findings of data gathering and situational analysis, conducted in Djibouti and Balbala in May and October of 2019 by the World Bank, in partnership with the Ministry of Transportation and the University of Djibouti.

The key findings are as follows:

2.1 DESCRIPTION OF URBAN MOBILITY IN DJIBOUTI:

- Mobility is provided primarily through the 'informal' public transport system, consisting of minibuses and midibuses operating throughout the city, supplemented by Bajaj and rickshaw vehicles operating within Balbala.
- These are privately owned and leased daily to drivers, who work 18-20 hour days and earn low incomes after paying for the cost of the lease, fuel and other expenses.
- Routes are not centrally planned, but have developed in response to demand and the street grid. Place Harbi, Hayableh and PK12 are some key nodes in the network.
- Only 3% of Djiboutians own cars, and the rest rely on public transport. It seems only about 40% of Djibouti-ville residents use public transport regularly. This means the rest must rely on walking, or on employer provided transport or taxis.
- Congestion is a growing problem, limiting mobility and having economic and health impacts.

2.2 IMPORTANCE AND LIMITATIONS OF THE PUBLIC TRANSPORT SYSTEM:

- The price of public transport is very high relative to incomes in the city, limiting residents' ability to travel and access their jobs, services, and more. Public transport users pay an average of 150 DjF per day for travel, and take three buses.
- Travel times are relatively short, though not especially so – average door to door trips being 44 minutes - and thanks to the dense and compact structure of the city, most residents are able to access public transportation within a reasonably short walk of their homes and destinations.
- The working conditions of drivers in the system, however, mean that accident rates are high and driving is often dangerous.
- For passengers, issues of waiting times, comfort, safety, and drivers behaviour are the greatest concern. Price, stop and route locations and personal security are of less concern.

2.3 FUTURE PROBLEMS

- The increasing sprawl of the city – locating housing developments and new university campus outside of the city – will increase travel times, congestion and travel costs, and erode the present benefits of the system.
- The transport system is expensive and highly inequitable, with many residents unable to afford to travel as much as they would need, stifling their personal development and the city economy.
- Congestion is a growing problem and will continue to get worse with rising incomes and urban growth, if a coordinated planning effort is not applied immediately.

2.4 REFORM APPROACHES

A detailed series of reform recommendation and action plan will be delivered in a later report. Drawing on the current research, however, several important points will guide this work:

- Improvement of the public transport system is the most important part of the project.
- Its current strengths must be maintained, while some of the worst problems ameliorated and improved: safety, crowding, pollution, high prices.
- The drivers and owners must both be engaged fully and be partners in reform efforts. Issues of financial viability, improved working conditions, livelihoods and training must be fully funded and developed. Extension of discipline without corresponding support will make the transport system worse, not better.
- The Ministry of Transport must play a key role in greater regulation and support both, offering both funding and training to the sector, while also demanding – and enforcing – important changes.
- The Ministry must also develop a spatial planning role, taking responsibility for guiding the long-term development of the transport network, and coordinating with the housing and other ministries to make clear the full impacts of land-use decisions.

3 INTRODUCTION

The city of Djibouti is growing, and its urban transport network is becoming increasingly unsustainable and unsuited to the needs of the population. With economic growth, car ownership will continue to grow, leading to extreme traffic and congestion in a small, dense city, even as those who cannot afford car ownership will be increasingly marginalized. This will only be mitigated by improvement, investment and planning of the public transport network.

This report details the findings from research into the state of the public transport system conducted in May 2019 and October 2019, carried out by the World Bank and University of Djibouti, in response to the Ministry of Transport. The second part lays out recommendations for both immediate and long term interventions and policy approaches for the public sector to adopt towards the mass transport system specifically and urban mobility needs more broadly.

The research component of this report includes a mapping of the routes and capacities of the mass transit system – operated exclusively by private operators in an ‘informal’ or paratransit mode - and an overview of the operation, finances and working standards of the sector. It also includes surveys of passengers and a street intercept survey, as well as focus groups with segments of the city population to identify overall transport needs and patterns of passengers. The detailed methodology, survey formats and limitations are in the methodology appendix, section 6.

The recommendations section addresses several pillars of recommended reform and regulation approaches for the Ministry of Transport to undertake, primarily towards the private-sector transport operators that provide most public transport in Djibouti. The approach adapted promotes, on the one hand, close engagement and recognition of the importance of the existing informal system, but on the other, an understanding of their limitations and the needs to intervene in order to create more efficient, safe, affordable and inclusive services for passengers and more professional and dignified working conditions for the labour force employed in the sector.

3.1 WELL-BEING AND ECONOMIC BENEFITS OF URBAN TRANSPORT

Effective public transport is critical for both individual well-being and overall economic development and growth at the urban and national level. Household’s ability to arrive at jobs, schooling, shopping and entertainment, and most other functions, is highly dependent on their ability to travel throughout the city. If urban mobility is too inefficient, households are not only limited in and of themselves, but the city overall fails to gain the benefits of size and agglomeration. It remains a cluster of adjacent neighbourhoods, and does not fully develop a single market for labour and goods, stymying the exponential growth in productivity we can expect from an urban economy.

Furthermore, if household spending on transport is high, it stifles personal opportunity and consumer spending both. Money spent on transport is not being spent elsewhere. (In many countries, households spending on transport is second only to spending on housing). At the same time, limiting travel for individuals – as they must do, in the face of high costs – means that people are not able to access both critical services and opportunities, such as jobs, schooling or medical services, and daily needs around shopping and socializing, limiting their development and investment in human capital.

It is important to think about this in terms of money, but also of time. If travel is time consuming, individuals can travel less and go less far, limiting the parts of the city they have access to. A worker who cannot afford to take the bus to work, must spend more time walking and this will cut into his working day, as well as level of energy, reducing his income and the economic productivity of the business he works for.

As well, travel time and priorities vary between social groups, and have different impacts. Women, for example, often have less free time, as they are more responsible for inflexible household activities such as childcare and cooking. Thus, even if a household may be able to afford travel, slowness and inefficiency means many people – in particularly more vulnerable, or more time burdened groups – cannot make use of it.

Poor transport goes beyond failing to facilitate growth, and may actively harm it. Most obviously, dangerous driving and car accidents are one of the greatest causes of death in many countries and the cost of deaths, injuries and life-long health conditions and disabilities caused by vehicle accidents impact lives and cities. Secondly, poor public transport naturally leads families to purchase cars as soon as they are economically able, a trend seen across the world, where car ownership growth quickly come with income. However, this has extensive negative externalities, causing congestion, loss of time, more accidents, health impacts due to increased pollution and destruction of the urban fabric to accommodate traffic, parking and other car-infrastructure. Finally, use of a poor public transport system – one that is time consuming, unpredictable and physically crowded and uncomfortable has been shown to come at a high cost to its passengers, being tiring and frustrating and significantly impacting individual happiness and well-being.

3.2 AGENDA FOR CHANGE

This research and recommendations are explicitly centered on the public transport system as the key component for mobility in Djibouti and Balbala. Only 3% of households in the city own cars, and the system of buses, minibuses, Bajaj's and rickshaws provides the majority of mobility needs, alongside walking, for the overwhelming majority of Djibouti residents.

This analysis studies both the strengths and weaknesses of the system, in order to develop recommendations for its improvement, stability and sustainability in providing necessary services to all Djibouti residents.

The goal of this analysis is to understand how Djibouti residents can be better served in accessing needs and opportunities throughout the city, in order to facilitate a higher quality of life, affordability and economic development for households. We draw on an accessibility and inclusion framework, where transport is assessed and planned in terms of how well it is able to provide access to specific needs – jobs, hospitals, shopping, services, social activities – for individuals, rather than considering only the availability of particular services or infrastructures, or the amount of travel conducted. Therefore, alongside a mapping of *where* transport services are available, we must also consider – where are they going? Are they operating at all necessary times of day? Are they operating at affordable price points? Are they comfortably accessible for all groups, socially and physically (for example, a woman travelling with children?) and other relevant questions.

Beyond this, it is recognized that more may not always be better, and we also consider inter-related accessibility questions, such as land use – where housing, jobs and services are located and how this can be configured in order to provide better access with less travel, the comfort and safety of walking.

In particular, Djibouti's physical layout means that there is a strict bottleneck in the two roads connecting Djibouti-ville and Balbala. This is already heavily trafficked, and will grow worse with time, as more private cars are bought and as the city grows. Current development patterns, locating new housing developments, the university campus and business and industrial areas in the far west or south of the current built-up area of the city means that these patterns of travel across the bottleneck will only accelerate and soon lead to destructive gridlock. If steps are not taken to think about maintaining the compact and mixed-use nature of the city, and the public transport isn't improved to capture and facilitate this traffic, Djibouti's traffic problems will soon grow exponentially worse.

Finally, the existing transport system, provided by small-scale private operators with a variety of vehicle types, is a crucial component going forward, and this report attempts to understand its economic and social qualities, and considers the drivers and vehicle owners as full partners in any forthcoming reform. Any future improvements will need to take the financial viability and dignified and improved working conditions of vehicle crews into account in order to improve transport operations.

4 SITUATIONAL ANALYSIS

This section presents an analysis of the current state of the transport sector in Djibouti and Balabal, including the perspectives of operations, passengers and urban impact. It is meant to highlight the strengths and weaknesses of the existing system, and propose an analysis to understand the interdependencies and relationships of the different actors.

4.1 METHODOLOGY AND GOALS OF RESEARCH PROCESS

The data presented in the analysis below was gathered over a 3 week period in May 2019, by the world bank alongside the University of Djibouti. The priorities of the research were:

- To map and characterize the public transport system
- To understand the quality of services for passengers
- To find what limitations and gaps in services there are

The first and foremost priority of the study was the public transport system, with a secondary interest in firm-provided transport, walking and different types of taxi services. This study is not strongly concerned with private car use, which is limited to a small, elite proportion of the population and does not facilitate mass mobility in Djibouti.

We explicitly recognize that growing car use will be detrimental to overall sustainability, equity and economic growth in Djibouti, and therefore issues of traffic, congestion and road management are investigated and related to primarily in their impact on questions as public transport prioritization and travel time, pedestrian safety and accessibility, long-term land use and street use issues.

4.1.1 Data

Data was gathered through the following tools, and full questionnaire formats and detailed training materials can be found in the Methodological Annex.

- Mapping of bus routes via GPS tracking
- Passenger Survey - 500 responses by public transport passengers
- Driver Survey – 150 responses by drivers and conductors
- Non-Passenger Survey – 50 responses by street intercept survey in areas distant from bus routes

The full, raw survey and GPS data can be found here:

https://www.dropbox.com/sh/zdsb80a27700qbl/AAB0oV5kKrZDJBJCV_ToOoU1a?dl=0

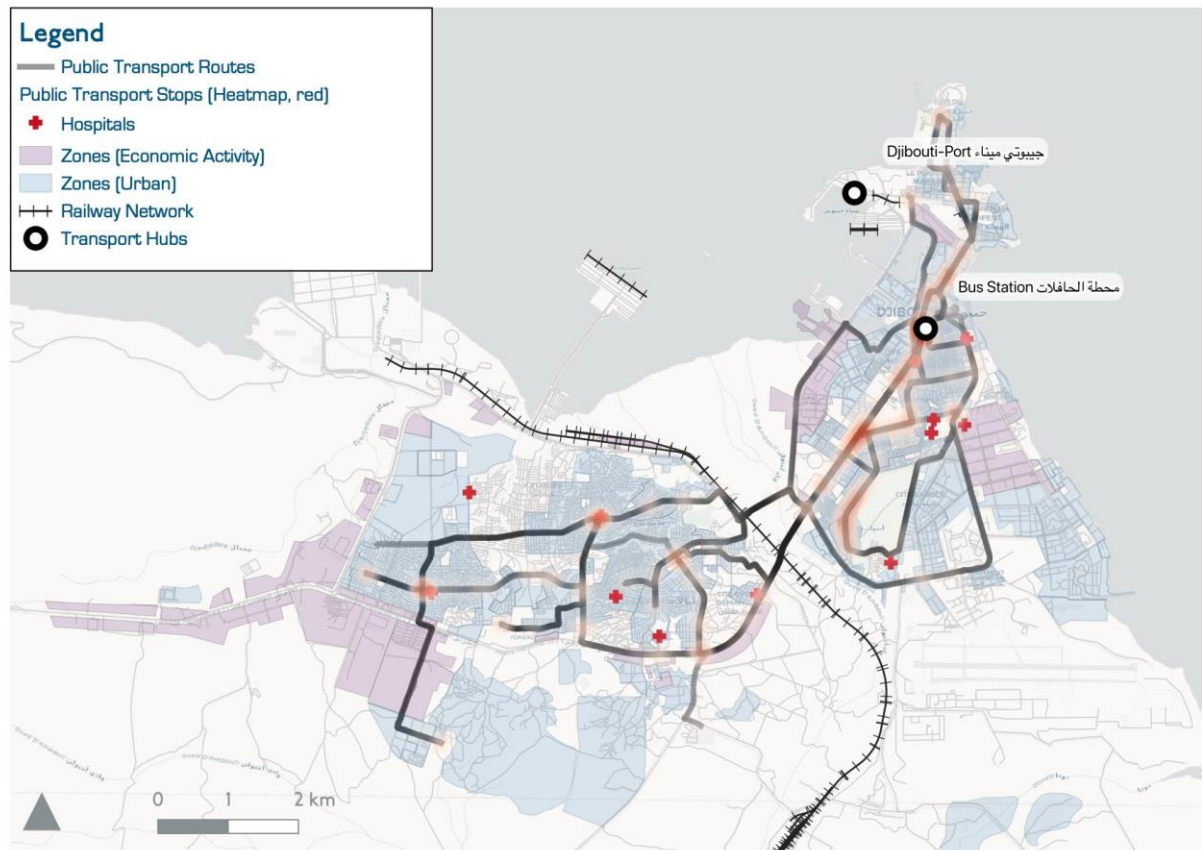
4.2 ROUTE MAP AND ACCESSIBILITY ANALYSIS

4.2.1 Maps

The maps below shows the distribution of transit routes in Djibouti and Balbala, alongside concentrations of boarding and alighting locations. Vehicles stop according to passenger requests and do not follow set stop locations.

■ WB_Dji_Q2_19_Analysis Report_Phase 1_Djibouti (July 2019)

Map of the full network (Land Use, Hospitals, Main Terminals, Routes, Railways)



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Maps 1, 2, and 3 show different analyses of the route data gathered by tracking vehicles. As can be seen, while the route network currently operating in Djibouti has some advantages, it also has shortcomings.

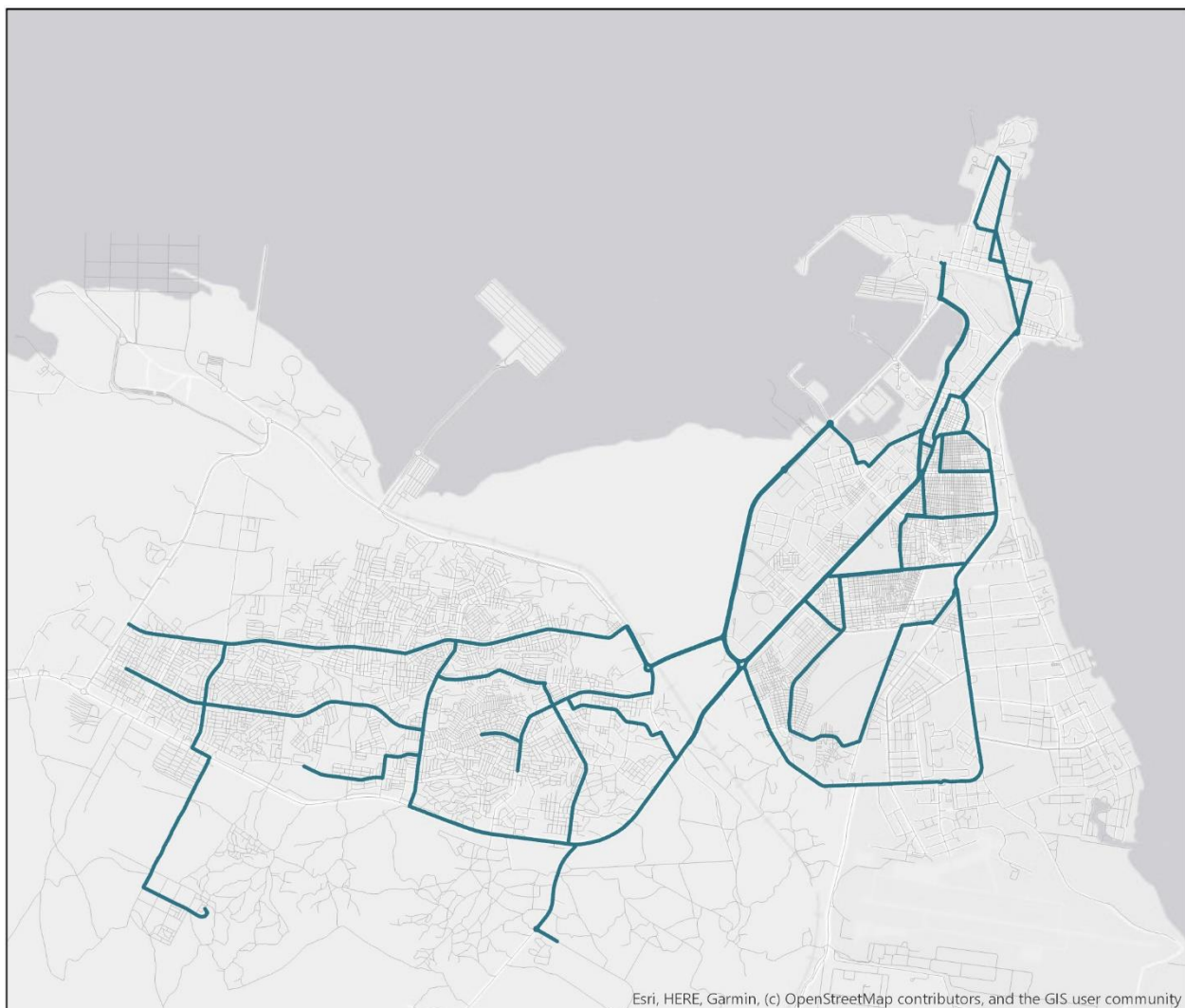
The network is primarily oriented to connecting the large residential areas of Balbala with the concentration of commercial and employment activity in Djibouti city center. Other areas, such as North and West Balbala and the Eastern and Western parts of Djibouti peninsula are more thinly integrated.

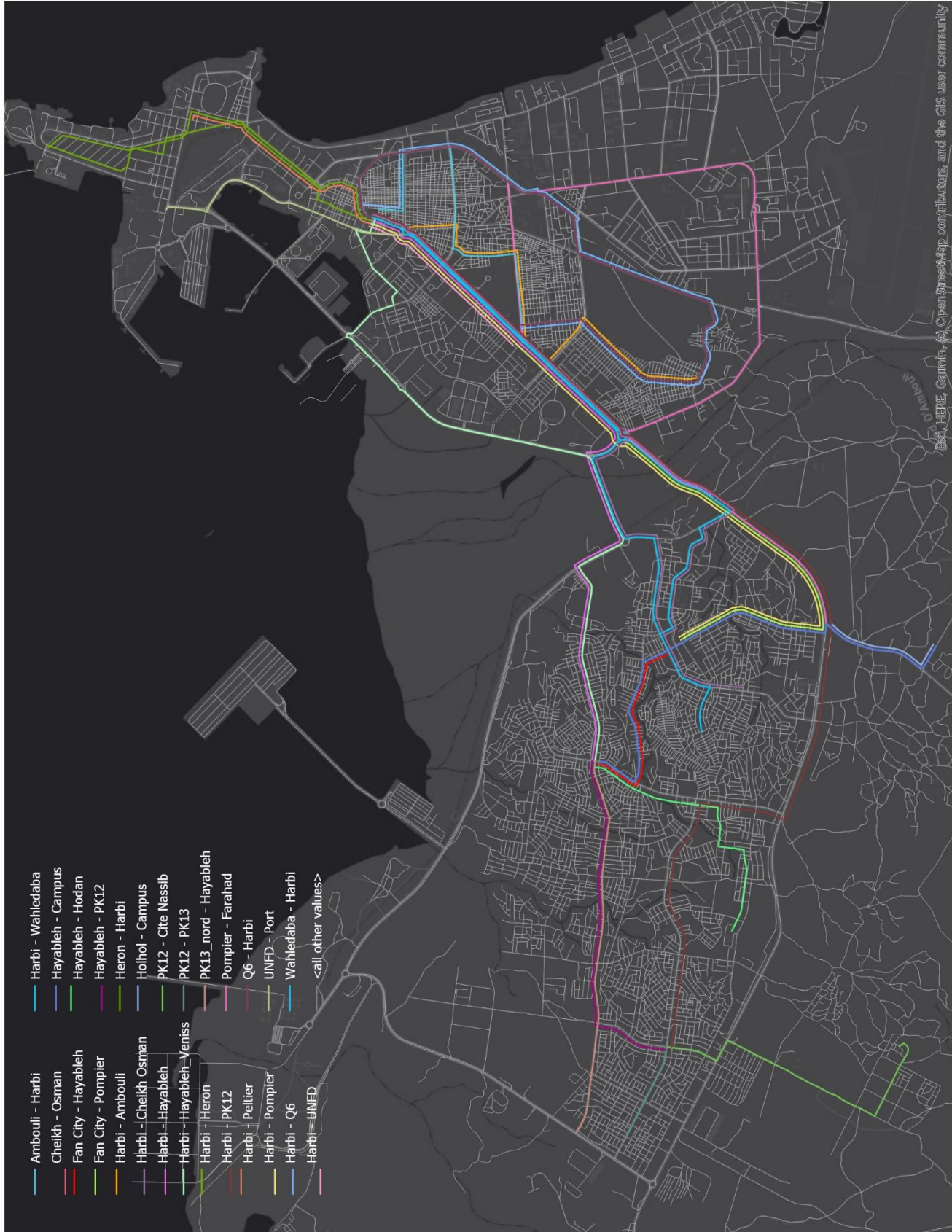
This creates bottlenecks at the two roads crossing the wadi between Balbala and Djibouti, as well as along RN1 into the city, past UNFD and to Place Harbi.

Place Harbi functions as the key central node. Its location, within the heart of the commercial area of the city and with a close concentration of businesses, government services and educational facilities is advantageous. However, the infrastructure, parking, terminal and passenger facilities and dominance of private cars on surrounding streets make access complex and limited, creating an unnecessary constraint and loss of time.

Another point of concern is the proliferation of short, indirect routes serving secondary destinations, such as the campus or residential areas south and West of Balbala or in Northern Djibouti. These small local routes allow flexibility and immediate access for some residents, but they also require further transfers at larger terminals for trips into the city and create dangerously crowded and inefficient transfer terminals.

Finally, increasingly sprawling land use will limit the effectiveness of the system if it is not brought in line with transport planning and considerations of population density and employment and commercial spaces throughout the city.





DATA HERE: Garmin, OpenStreetMap contributors, and the GIS user community

4.2.2 Route Data

Route Number	AM Frequency	Origin	Destination	Vehicles per hour	Vehicle Seats	Passengers per hour
0_0	30	Fan City	Hayableh	2	12	24
0_1	30	Hayableh	Fan City	2	8	16
1_0	30	Fan City	Pompier	2	8	16
1_1	30	Pompier	Fan City	2	8	16
10_0	30	Harbi	Pompier	2	12	24
10_1	3	Pompier	Harbi	20	12	240
11_0	3	Harbi	UNFD	20	12	240
11_1	30	UNFD	Harbi	2	12	24
12_0	30	Harbi	Hayableh_Veniss	2	32	64
12_1	30	Hayableh	Harbi_Veniss	2	32	64
13_0	5	Harbi	Peltier	12	12	144
13_1	15	Peltier	Harbi	4	12	48
14_0	15	Hayableh	Hodan	4	8	32
14_1	30	Hodan	Hayableh	2	8	16
15_0	2	Hayableh	PK12	30	3	90
15_1	2	PK12	Hayableh	30	3	90
16_0	30	PK13_nord	Hayableh	10	3	30
16_1	30	Hayableh	PK13_nord	10	3	30
17_0	30	Holhol	Campus	10	8	80
17_1	30	Campus	Holhol	2	8	16
18_0	30	PK12	Cite Nassib	2	3	6
18_1	30	Cite Nassib	PK12	10	3	30
19_0	30	PK12	PK13	2	3	6
19_1	30	PK13	PK12	10	3	30
2_0	30	Pompier	Farahad	2	12	24
2_1	30	Pompier	Farahad	2	12	24
20_0	2	UNFD	Port	30	12	360
20_1	30	Port	UNFD	2	12	24
21_0	30	Harbi	Wahledaba	2	12	24
21_1	30	Wahledaba	Harbi	2	6	12
3_0	45	Harbi	Ambouli	1	12	12
3_1	5	Ambouli	Harbi	12	12	144
4_0	60	Harbi	Q6	1	12	12
4_1	10	Q6	Harbi	6	12	72
5_0	4	Hayableh	Campus	15	8	120
5_1	10	Campus	Hayableh	6	8	48
6_0	5	Harbi	Heron	12	12	144
6_1	10	Heron	Harbi	6	12	72
7_0	60	Harbi	Hayableh	1	32	32
7_1	2	Hayableh	Harbi	30	32	960
8_0	30	Harbi	Cheikh Osman	2	32	64
8_1	10	Cheikh	Osman	4	32	128
9_0	8	Harbi	PK12	8	32	256
9_1	3	PK12	Harbi	20	32	640

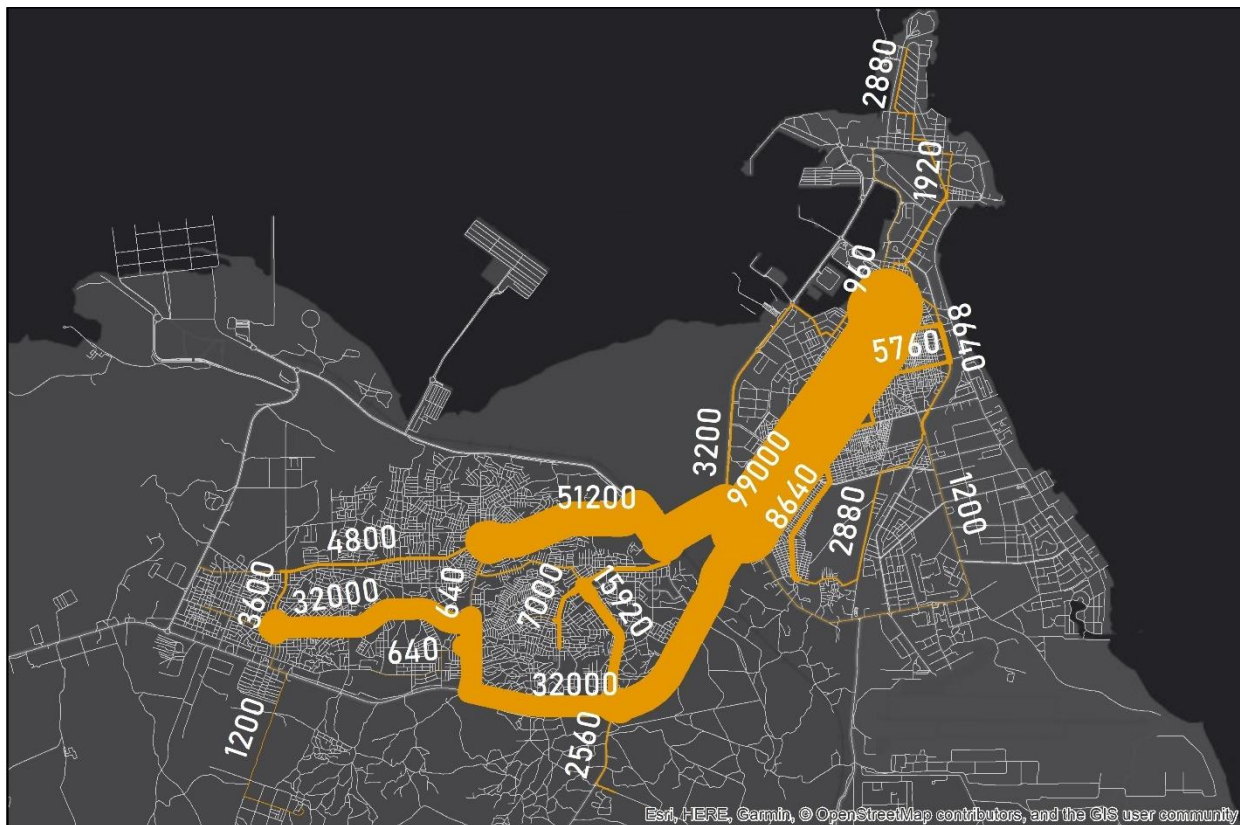
The table above lists the identified routes operating throughout Djibouti ville and Balbala. Routes with the same designation number – for example 3_0 and 3_1 are considered returns of one another. They are separated because in some cases, though having the same origin/destination pair, they do not typically follow the exact same roads in each direction.

The other table columns are as follows, with all of the table figures being per single hour stretch:

- **AM Frequency** estimates the number of buses departing per hour during the AM peak rush (estimated as 6:30 to 7:30 AM, see above)
- **Vehicles per Hour** converts this to vehicles per hour
- **Vehicle seats** is an estimate of the type of vehicle. These are 3 – rickshaw, 8 – Bajaj, 12 – Minibus, and 32 – Midibus. Some routes operate on a mix of types of vehicle and, while usually full, vehicles are not always full. The slightly lower numbers serve as an estimate of passenger capacity.
- **Passengers per Hour** multiplies passengers by vehicles to arrive at the number of passengers on a route during an hour of peak travel.

4.2.3 Sectoral Analysis

While some estimation due to lack of data gathering capacity has been necessary, this mapping considers services relatively conservatively. Vehicles are estimated to travel primarily at high occupancy, and to have frequent departures on key routes.



Number of passengers per corridor (addition of all vehicles operating on different routes on this road) during 1 hour of AM Peak.

Several issues emerge:

Services are very limited in capacity, compared to the population of the city and the reliance on public transport. The sum total number of passenger seats, in both directions, in the estimates above is less than 5,000 per hour. Extrapolated across a 3-hour morning peak (a very liberal assumption – in fact, traffic is much slower by 8 AM), this means that **only 15,000 residents are able to make use of the buses each morning**, and this does not account for any passenger taking more than one vehicle! Even if these estimates are to be considered too limited, and capacity is *doubled*, this is still only 30,000 passengers.

This suggests a significant undersupply of vehicles, a very limited demand (which indicated that prices are too high – this is analysed further in the following section) or both.

Services are extremely concentrated on a few routes. As the map below shows, a few corridors and terminals carry most of the traffic, with other regions of the city very thinly served. This causes several problems – firstly, the concentration of services means many passengers, or potential passengers, are left out, both lacking in service and not contributing potential revenue to the transport sector, because the nearest bus service is too distant, too unreliable or operates too infrequently.

Secondly, in these key corridors, traffic is cumbersome and heavy, causing congestion and logistics problems without contributing much to mobility. This is the case, firstly, at the corridor level – Fan City, the densest node, sees 160 or more buses per hour – this is a bus every 20 seconds. At the same time, some routes depart as frequently as every 2-3 minutes during peak time. Given the time it takes passengers to file into a vehicle and the vehicle to pull into traffic, **this creates a logjam and delays** that would not be necessary under a better aligned, higher capacity system.

The table in Figure 1 illustrates drivers' perceptions of the best routes to operate, and show a consistent pattern. The maps on the previous page illustrate the data in the route table. Vehicles (purple map) and passengers (blue map) are concentrated on main roads and, when frequency and volume of passengers are taken into account, many areas of the city emerge as having even more limited service than may be thought at first glance in mapping out routes.

The proliferation of small vehicles in Djibouti, alongside narrow roads and concentrated services gives the impression that urban public transport is omnipresent. As the maps and data above show, this is misleading for many, indeed, most, parts of the city.

As well as passengers and vehicles, the map below (orange) shows a rough calculation of revenue (per hour, in Djiboutian francs) for each corridor. (Summing up different routes and vehicles.) This matches, to a large extent, the findings of Table 9 below. This is an analysis of driver's stated preference for which routes are the best and most profitable to drive. This shows an overall pattern with obvious preference for the long trips between Djibouti ville, starting at Place Harbi, and to the major terminals of Hayableh and PK12 in Balbala.

This appears counterintuitive at first glance – these routes are longer and more time, and fuel, consuming to drive, while paying only a slight premium (40 vs 50 francs) over shorter routes. However, drivers have multiple, complex considerations, including the reliability of finding passengers, the quality

of the of the roads and traffic. It appears that the relative complexity of establishing new routes and generating a passenger base in underserved parts of the city may be encouraging this concentration.



Above: number of vehicles per hour, average at peak – 6 AM to 8 AM

Below: revenue (number of passengers multiplied by fare) per corridor per hour – AM peak



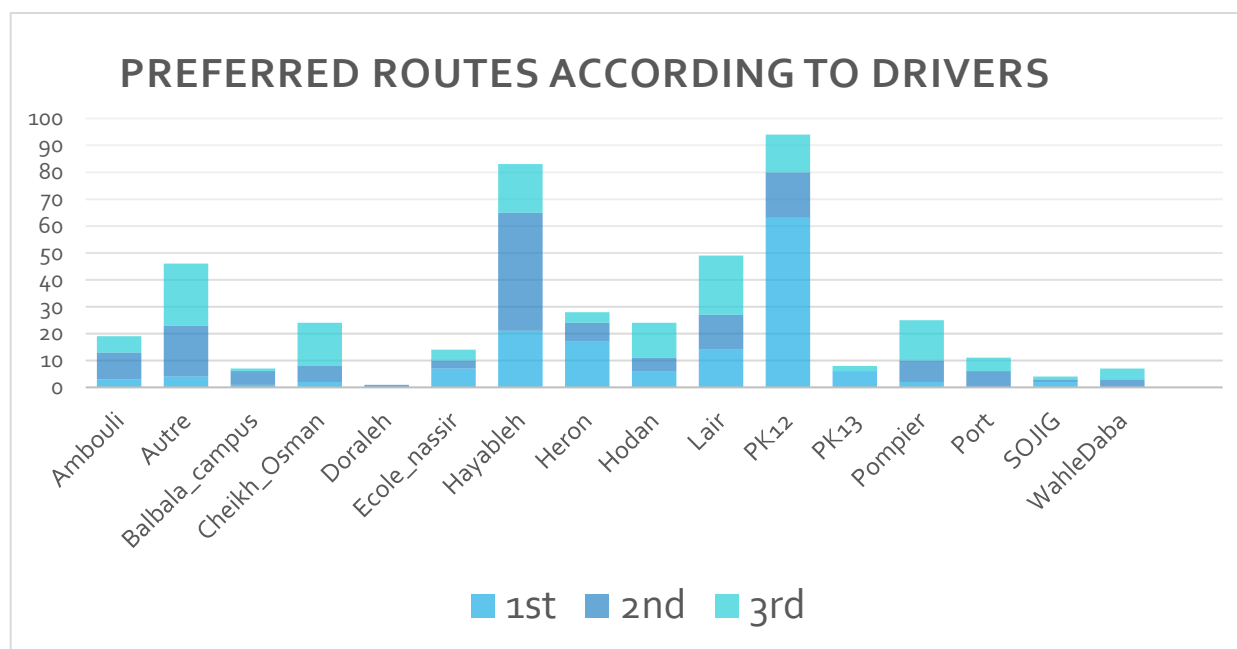


Figure 1 Driver's Preferred Routes to Drive on

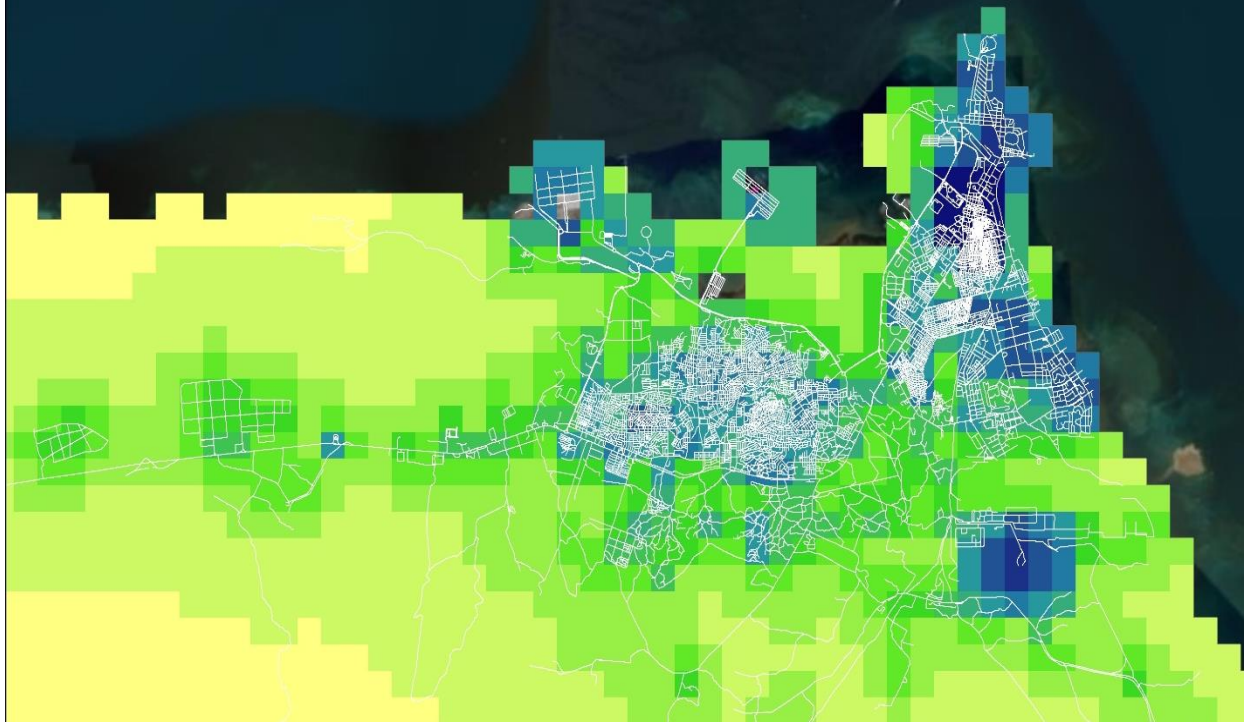
4.3 ACCESSIBILITY ANALYSIS

In analyzing accessibility, the map below is used. It presents an approximate distribution of "Employment Opportunities" – these are not specific jobs or employment clusters, but rather a distribution based on the methodology developed by the World Bank. It includes the location of businesses and services scraped from Open Street Map, with an emphasis on financial institutions and the density of the street grid.

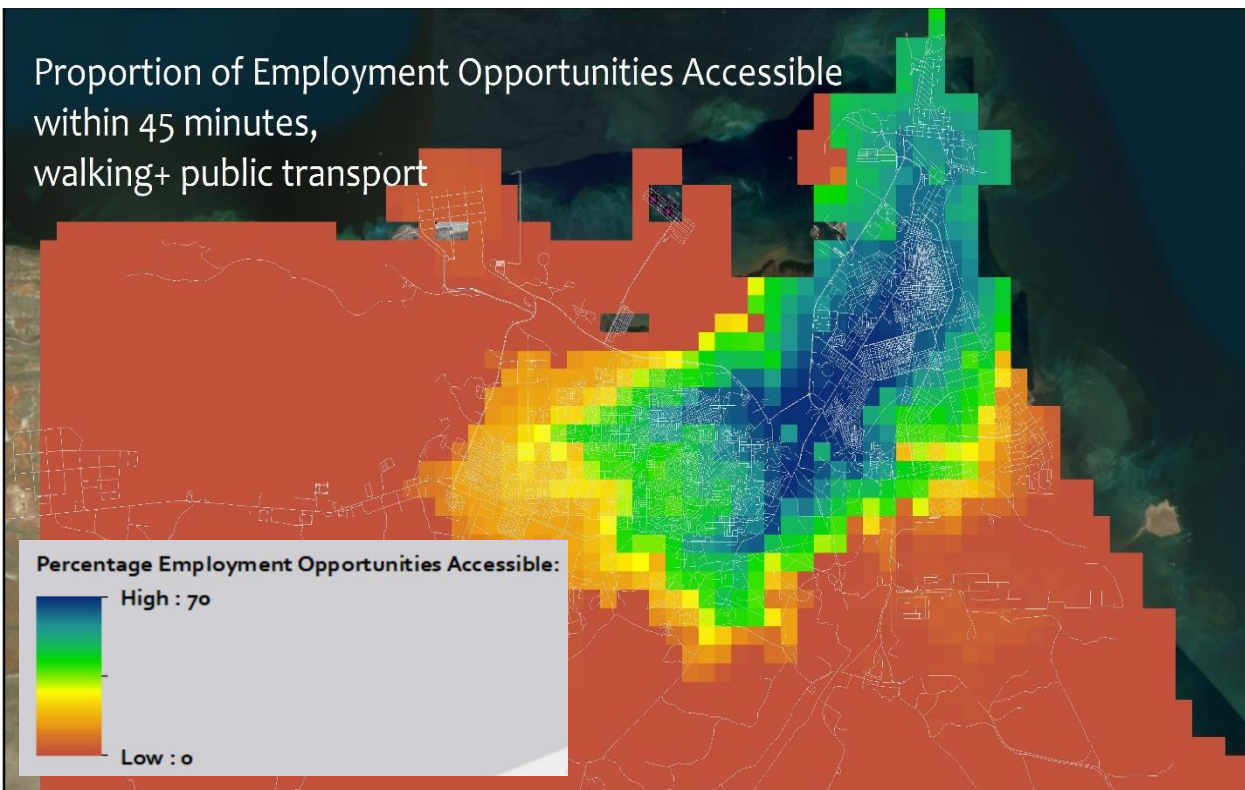
The map below is the basis of the accessibility analysis below, which is created using the Conveyal analysis tool, using a 45 minute travel threshold. As can be seen, the strong concentration of jobs in Djibouti, and the lack of access by public transport to the north and west of Balbala, mean that accessibility is relatively concentrated in Djibouti-ville. The areas with the best level of access are in the south of the peninsula, where a concentration of transit routes and easy access to both the commercial core of Balbala and the CBD in the Djibouti peninsula allow a strong distribution of access.

The map below shows the proportion of the total employment-opportunities accessible within 45 minutes, by walking and public transport, from any given location in the city. It should be noted, that residential growth in Djibouti is not following these access patterns. Instead, new housing and commercial activity are being developed far south and west of the current built environment of the city. These regions presently suffer from very poor access to the vast majority of urban opportunities and amenities. Following the principles of maximizing accessibility and minimizing travel times and costs, instead the regions of high access should be developed and densified – this means the areas of East Balabla and South Djibouti in particular, around Fan City, L'Air, Chick Moussa and Ambouli.

Distribution of Employment Opportunity Approximations



Proportion of Employment Opportunities Accessible within 45 minutes, walking+ public transport



4.4 VEHICLE FLEET

Four types of vehicles operate as fully public transport in Djibouti, picking up passengers curbside and following set or semi-set routes. 4-door taxis also operate, but these are typically door-to-door services.

- **Midibuses** – seating 30-35 passengers, these play routes within Djibouti-ville and between Djibouti and major terminals in Balbala.
- **Minibuses** – configured for 12-14 seats, these operate throughout the city in both Djibouti and Balbala.
- **Bajaj** – 4-wheel, soft-top vehicles with two parallel benches (and also frequently carrying several passengers on the back parapet of the open 'boot') and seating 8-10 people. These operate routes primarily within Balbala and its outskirts.
- **TukTuk/Rickshaw** – 3 seater (+driver) 3 wheel vehicles operating a mix of set routes and door-to-door services, primarily in short, local routes within Balbala.



Photo 1: Tuk-Tuk/Rickshaw



Photo 2: Midibuses

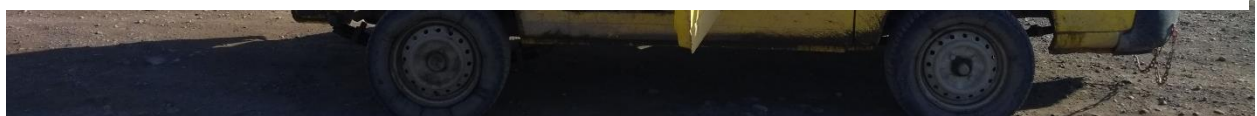


Photo 3: Bajaj



Photo 4: Minibuses, Place Harbi

4.5 TRANSPORT EXCLUSION AND AFFORDABILITY

While the above section detail the distribution of traffic and services in the city, this does not mean that all people are able to use them equally. This might be due to affordability, physical ability or because their needs are not well served by the existing system.

Furthermore, the burden of using the available services might vary highly, and is important to capture – for one household, using the bus everyday is easily affordable, but for a poorer one it may be a tradeoff between travel and other crucial needs. One individual travelling for work from Balbala to Djioubti-ville for work may have a short and convenient trip, but another may have to switch buses and spend hours commuting.

This following sections are based on a survey of public transport passengers, caught at random around place Harbi, as well as at PK12 and Hayableh. It aims to give insight into some of the following questions:

- How much time and money are people spending on transport?
- What percentage of household expenditure does this represent?
- What purposes are people travelling for, and at what times of day?

Figure 3 shows the number of buses (including minibus and midibus) taken per day, suggesting a norm of one or two return-trips per day across the sample.

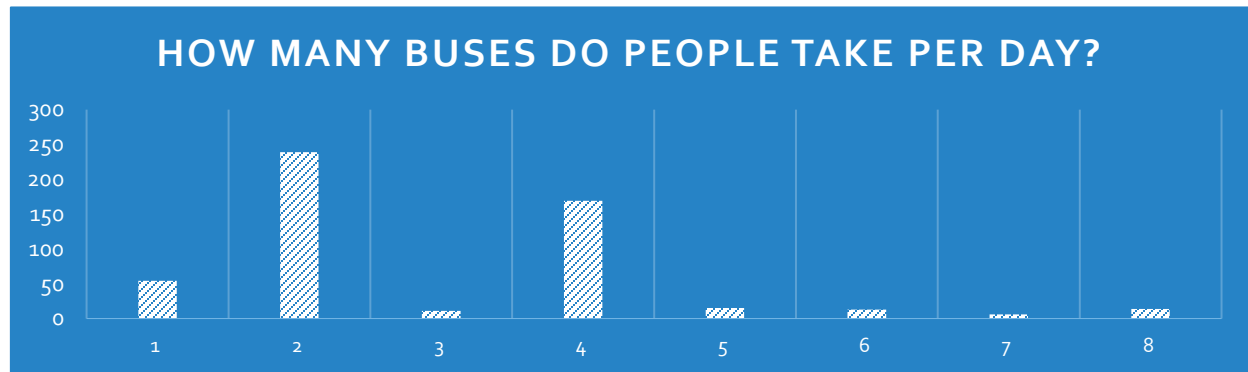


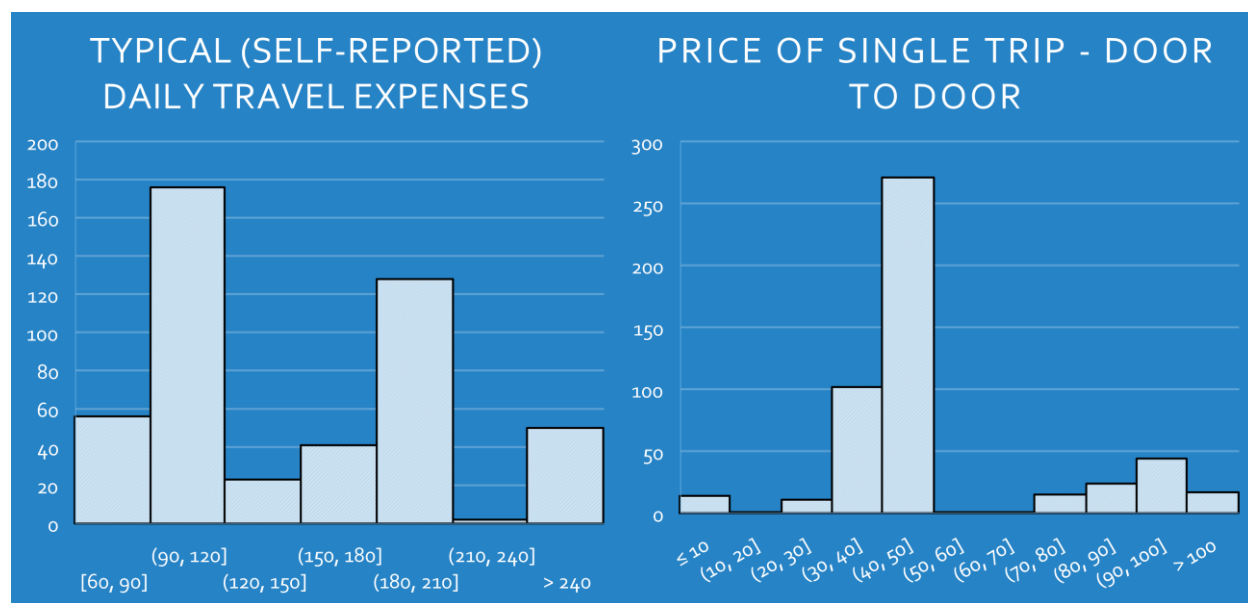
Figure 3: Number of buses taken by passenger per day

4.5.2 Travel Costs and Affordability

Of greater concern, however, is travel cost. The cost of travel in Djibouti is relatively high – this section considers the prices and expenditures of public transport users, but, more importantly, the affordability of travel for the general population and the burden of paying for transport, including for those who are not using the system.

Travel costs for passengers were assessed in two ways in the origin-destination survey: firstly, passengers self-reported their overall travel costs for a typical day, including all the modes they may have used that day. Secondly, passengers were asked specifically about the price of each leg of their current trip, being undertaken at that moment, and including all modes. The two metrics are consistent, with daily travel costs being about three times higher than single-trip costs, aligning with an average of 3 trips per day per passenger (see below). This data is summarized in the tables and graphs below:

Expenditure on Travel:



	Average	Median	in USD	in USD
Trip	62	50	0.35	0.28
Day	160	150	0.90	0.84

The average cost of daily travel, for one person, therefore is 150-160 francs, or almost one US dollar. (The median is 150). While seemingly low at first, this figure must be generalized to multiple household members and daily travel – the average household size in Djibouti is 7, and even if some of these are children who may not travel far, just three individuals, leaving the house at least 25 days out of the month, would therefore spend close to 100 dollars a month on routine, daily transportation alone. Family social activities, health trips, and children’s daily school trips are also all immediately unaffordable for a large proportion of the population.

According to the 2017 household survey conducted by the World Bank and the Djibouti Statistics Institute (http://www.dised.dj/Rapport1_resultats_EDAM4.pdf), annual per capita expenditure in Djibout-Ville is about 233,400 DJF, or 1,311 USD. A personal expenditure of 3,000 francs per month or 36,000 per year on transport, is therefore over 15% of total per-capita consumption.

However, as travel costs tend to be relatively inelastic – there is usually limited ability to reduce travel further or switch to cheaper modes – this percentage is likely to be higher for lower-income groups – indeed, the per-capita consumption spending of the lowest decile of the population is just 40,500, and the median for the entire population is 143,000 (the average is skewed upwards by a small, high-income group.)

For the lowest-income decile, a basic daily use of public transport between Balbala and the Djibouti city center, for 20 days per month, would cost 100 francs a day or 2000 francs per month, or 24,000 francs per year. This is over 50% of their expenditure. (Even for the 5th decile, the Djiboutian middle-class, 36,000 francs is a full quarter of all consumption.) With no subsidies, discounts or considerations for low income-populations available this means daily public transport use is simply beyond the reach of a significant proportion of the population due to price alone.

In fact, the passenger survey is skewed, definition, towards those who can afford to use public transport frequently. To attempt a correction of this bias, a small survey was carried out in peripheral area of Balbala and in Haramous in Djibouti, areas where public transport was identified as particularly thin. The Balbala areas are low-income, while Haramous is high-income. (For more details about survey location, see Methodology Annex, section 6.2) While non-representative, this survey is able to give a small window to the mobility of the population outside of the users of the public transport system.

4.5.3 Location, Access and Exclusion

In order to counteract the biases of the passenger survey towards those able to use public transport, a small street intercept was carried out in three areas identified as being relatively distant from public transport services: Haramous in Djibouti ad Barwaqo 1 and PK13 in Balbala. The locations of the surveys are on the map below.

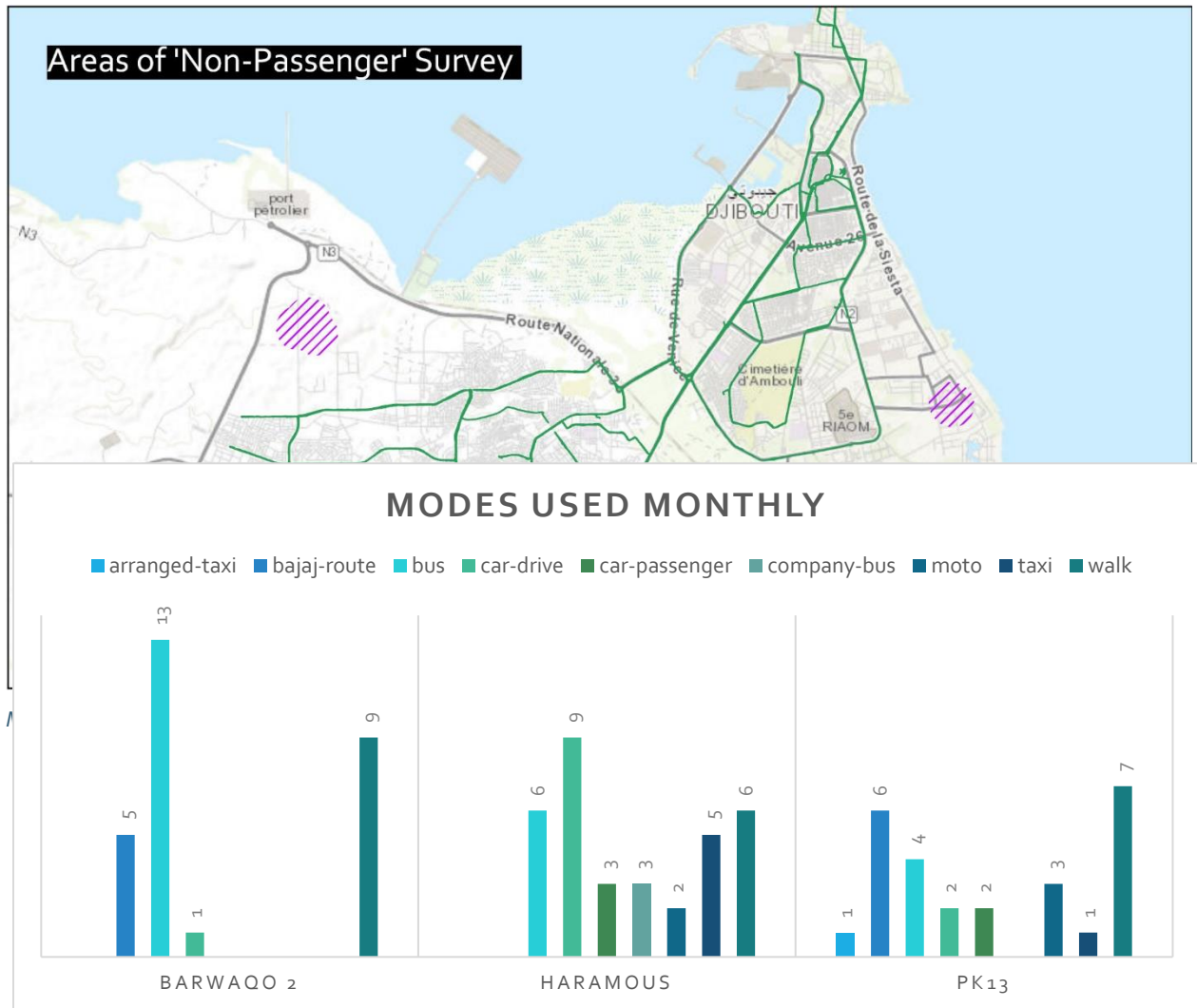


Figure 4: Modes used regularly by individuals in street intercept survey

As can be seen in the table above, even in the small sample, vehicle ownership is very different between the three sampled areas identified as being distant from public transport services: in Haramous, most households own vehicles, while this is extremely limited in PK13 and Barwaqo 2.

Focusing on the two regions – PK13 and Bawaqo 2 – where car ownership, and incomes, are lower, we find that use of public transport is overwhelmingly important in Barawqo and, to a lesser extent, in PK13. Overall, the diversity of modes used drops along with income. In PK13, the bajaj routes, which serve the areas while larger vehicles do not, are especially important.

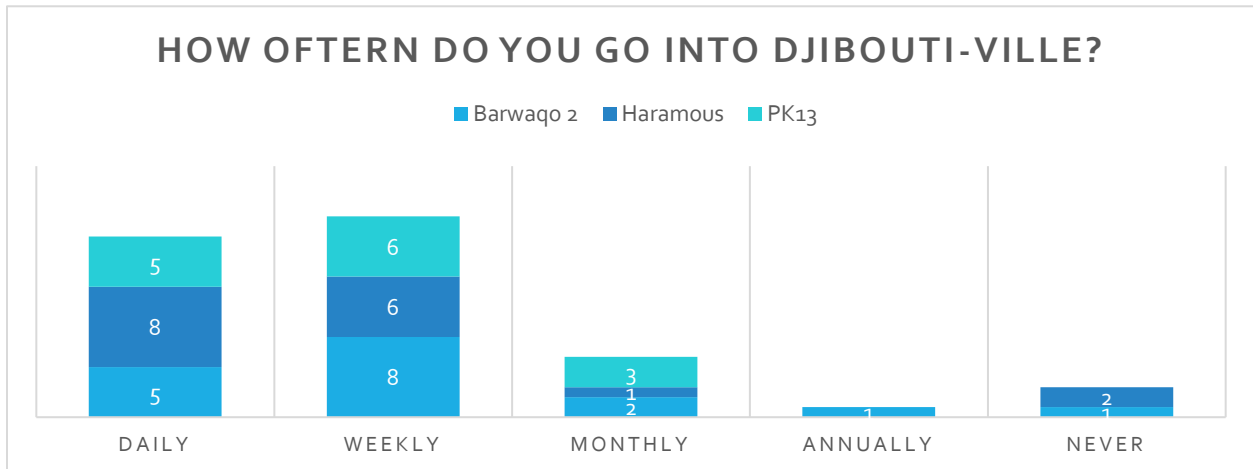


Figure 6: Regularity of travel into Djibouti-Ville

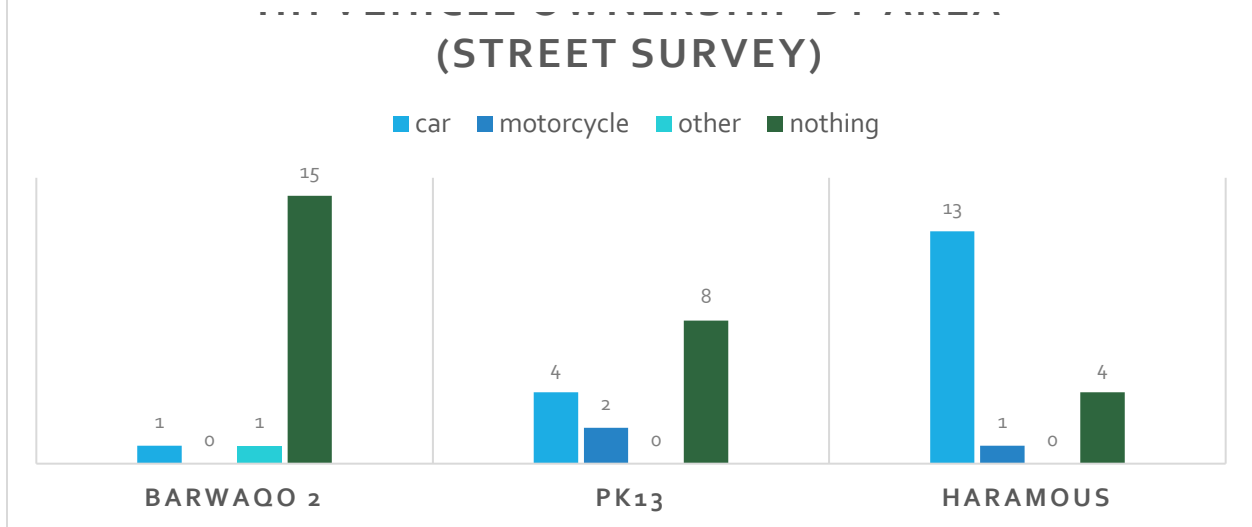


Figure 5 Vehicle ownership by HH, non-passenger survey

As well, in both PK13 and Barwaqo 2, a small but substantial number of people do not use any motorized modes at all, and all of their mobility is limited to walking. No such person was surveyed in Haramous.

While most residents travel into the city center daily or weekly, a small but significant proportion of those resident in the poorer neighbourhoods do so only rarely or never. More importantly, a substantial number of the survey respondents report having to make tradeoffs between travel in the city and other expenses, see

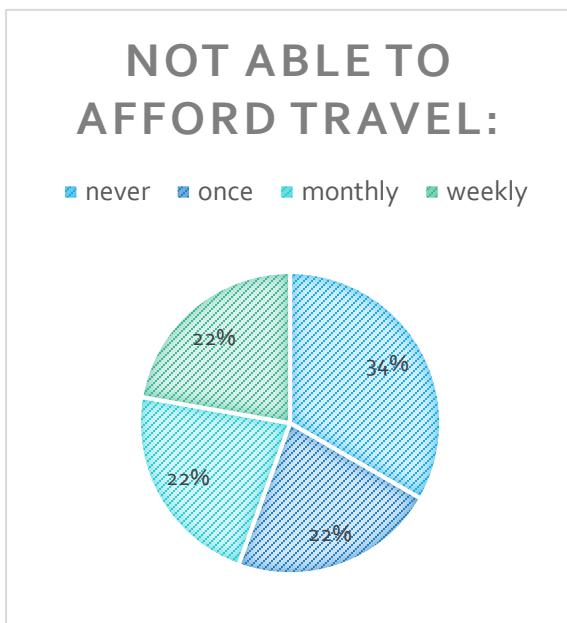


Figure 7: How often do you tradeoff travel and other things?

What activity have you missed because you were not able to get there?

- *Visite maman malade*
- *Je garde mes enfants car k'habite en face d'une rue*
- *Lors d'un mariage de mon ami*
- *Football*
- *Ouvrir un commerce mais je n'ai pas pu*

This survey is of an extremely small scale – just 49 full responses across the 3 areas – and far too small to base any conclusions on. Its main role, however, is to highlight the diversity of transport experiences and the importance of not focusing only on existing passengers of the public transport system.

4.6 PASSENGER EXPERIENCE

As well as 'technical' aspects of travel, such as time and cost, the experience and subjective reaction of passengers towards the transport system is of critical importance. The perception of convenience, dignity and comfort of travel can strongly impact individual's and households travel choices. This is especially true of women, children and vulnerable populations, who may feel unsafe in public transport and experience harassment and violence, but is also true of the entire public.

This is true of the transport system itself, but also of the stops and terminals and of the experience of walking to and from transport and waiting locations. Issues such as safety, comfort cleanliness, order, predictability and rudeness or courtesy from transport workers all strongly affect passengers experiences. Figure 8 shows the average distribution of passengers perceptions of the transport system. These are largely middling, but with particularly poor marks for driver's behavior, the comfort of the vehicles and the safety of travel, in terms of the risk of an accident. On the other hand, the system scores somewhat better on metrics of personal security, affordability, and the locations of stops. And, while passenger perceptions of the system are mediocre across the board, women's opinions on all aspects of the system are slightly lower than those of men.

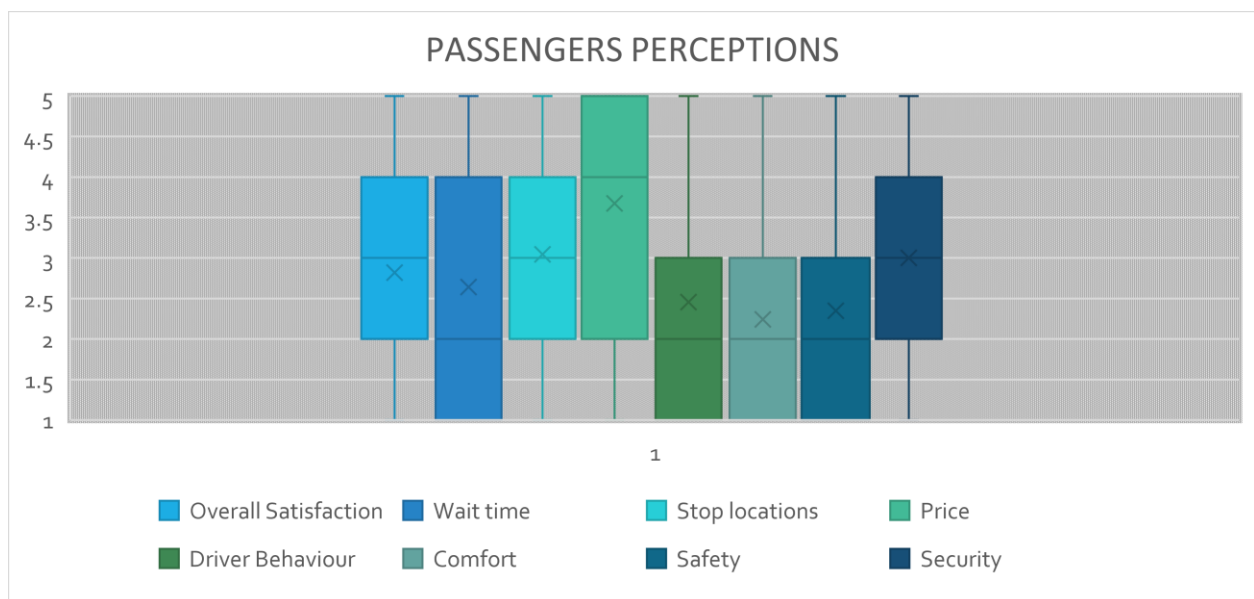


Figure 8: Passengers perceptions of the transport system, 1-5

In an analysis of qualitative, open ended responses given by passengers, summarized as a word-cloud in Figure 9, a number of qualitative issues were raised often which do not emerge from the quantitative analysis. In particular, there is a call for legibility and information - such as route numbers, numbers and destinations on buses and signage at stops.



Figure 9: Word-cloud of responses to the question, 'what would you improve in the transport system?'



Photo 5: A bus terminal/turnaround location in Balbala (Cheikh Osman)

4.7 WORKING CONDITIONS

The following section is primarily an analysis of the survey of 150 drivers and conductors conducted in 2019, focusing particularly on labour conditions and incomes of the vehicle crews. In this type of system, with drivers making many of the daily decisions shaping the transport system – including where and when to drive, hours of operations and frequency of services, safety and road behavior and behavior towards passengers – understanding their working conditions, environment and background, as well as incentives and preferences, is critical.

We look at the following types of data:

- Daily cost to operate a vehicle
- Daily revenues and profits
- Divisions of income between owners, drivers, conductors, others
- Background and experience of drivers
- Working hours and physical and psychological conditions of work
- Interests and perceptions of the system

4.7.1 Working Arrangements and Finances

23% of the sample, 37 drivers, owned the vehicle they drove. The rest, 77%, leased their vehicle on daily 'target' system, as is common across African cities. Most operating expenses – fuel, cleaning the

vehicle, paying the conductor or splitting income with him, departure and taxes – are covered by the drivers from their daily ticket revenues.

The least price has some variability, but a common pattern across types of vehicle can be seen (see graph below.) As well, drivers reported the lease can be adjusted by the owner, in accordance with rising gas prices.

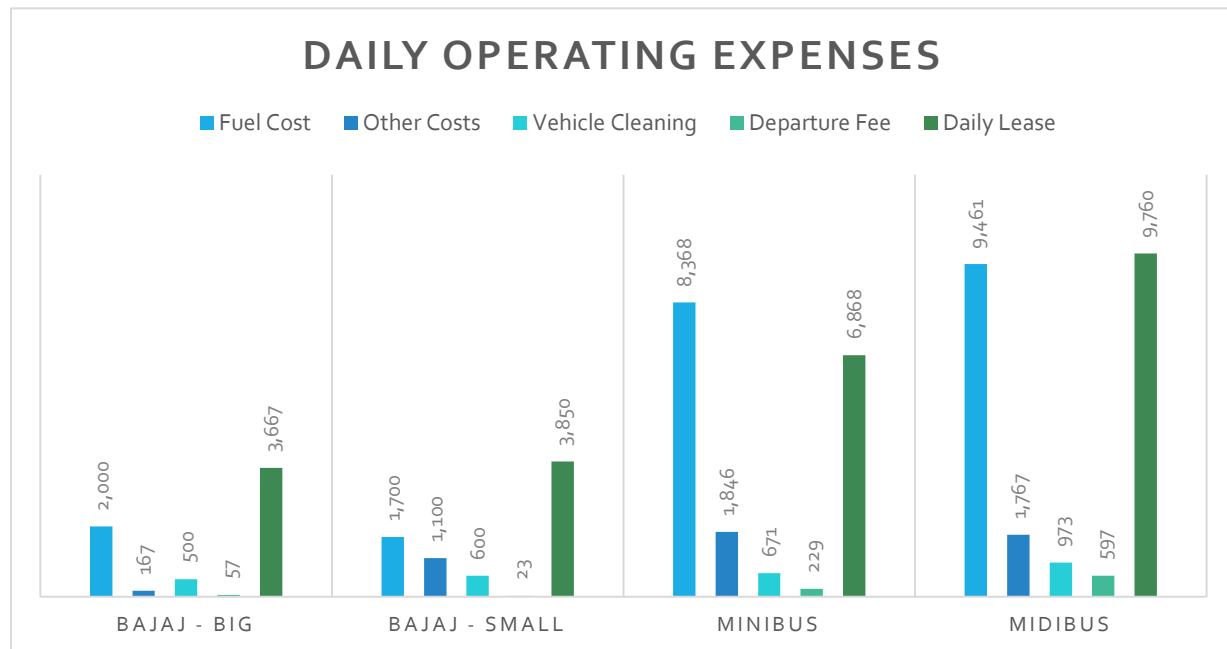
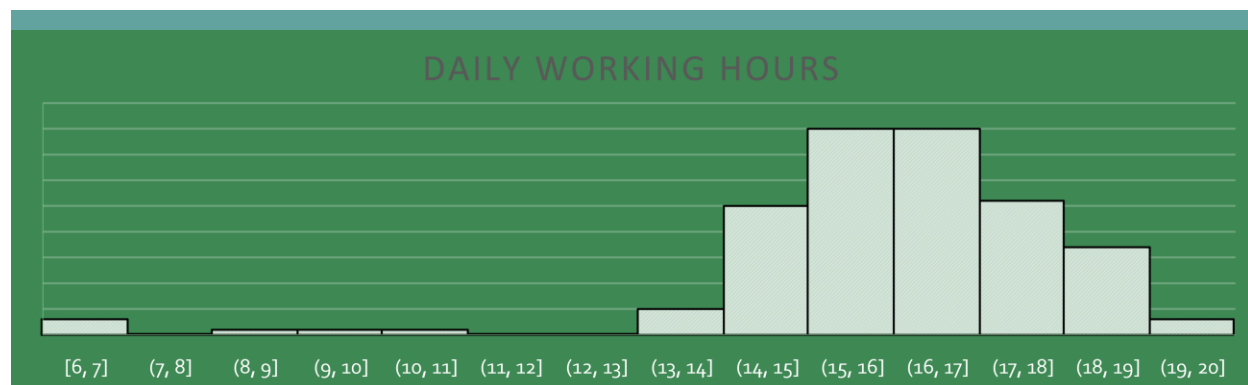


Figure 10: Operating expenses by type of vehicle

Despite the variability in terms of expenses and leases of operating different types of vehicles, there is some consistency in the final 'outcome' – the average take-home income of drivers and conductors. As **Error! Reference source not found.** shows, a midibus – the largest types of vehicle – and a small bajaj (or rickshaw) are the least profitable, while a minibus or 8-seater bajaj are the most so for drivers.

Drivers and conductors generally make only 2,500 to 4,000 Djibouti francs daily, each, or 14 to 22 dollars.



Median Working Hours: 17; Median Daily Trips: 15

Daily working hours average 17, which is extremely high, even by the standards of African transport industries. This is particularly driven by the unusually late working hours in Djibouti, with a substantial number of vehicles still operating at late at night, and up to 1 AM in some cases. This may be due to the climate and culture of Djibouti, where late night activity is important while mid-day is relatively quiet (and exacerbated by the survey being conducted during Ramadan.)

The number of daily trips is also extremely high, with a median of 15. The compact size of Djibouti means that this is possible, but some of the higher numbers reported by drivers – making up to 40 trips per day – appear unlikely.

An important issue in considering the drivers as business operators, is the viability of their operations and indeed the level of record keeping and self knowledge in the sector. Figure 11 below shows, on the X axis, the daily revenue arrived at by multiplying the number of trips reported by drivers with an estimate of the fill of the vehicle (32 for a midibus, 13 for a minibus, 8 for a large Bajaj and 3 for a small Bajaj) with a 75 Djibouti Franc ticket price. Since drivers report driving along different routes, a single ticket price per vehicle is impossible to arrive at. On the Y axis, is the cumulative self-reported revenue of drivers, which includes lease cost, fuel, tax, cleaning, other expenses (often Khat, food, drink) and end-of-day profit. As can be seen, while there is some correlation, these estimates are extremely rough.

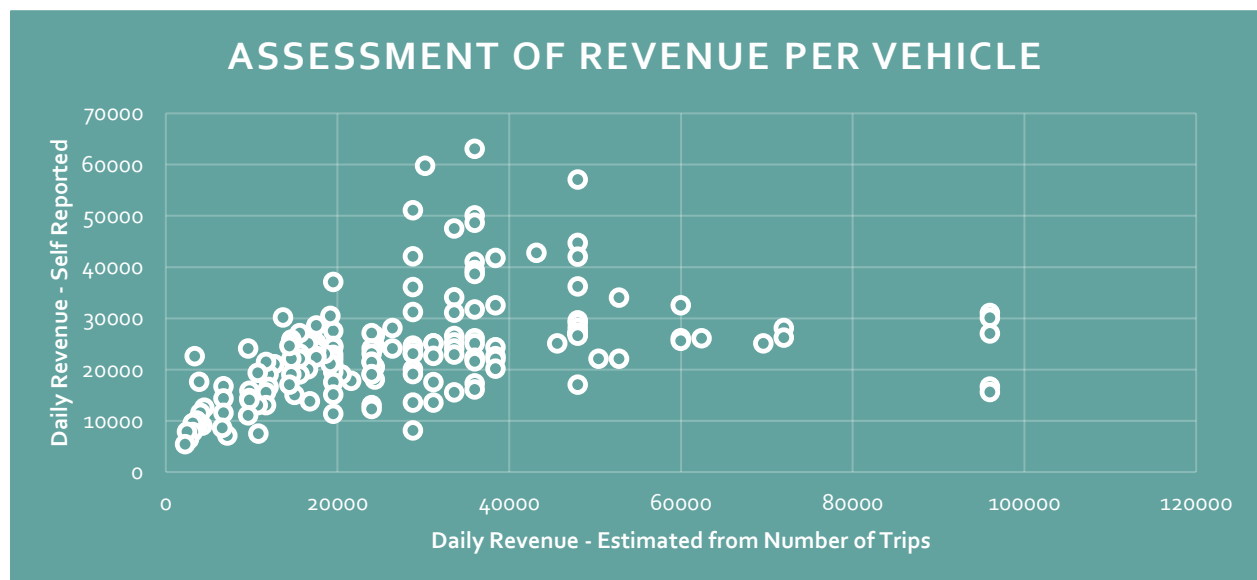


Figure 11: Competing Estimations of Revenue per Vehicle

More concerning, as the three figures below show – calculated for midibuses only, for consistency – there is little apparent correlation between drivers self-reported working hours, number of daily trips and end-of-day income. This suggests either highly variable practices within the working day or extremely poor knowledge of one's own business, revenues and profits.

With the entire industry working on a cash basis and with money coming in and out fluidly from hour to hour, this is not surprising. (Indeed, even Uber drivers in wealthy countries have been found to have

great difficulty in estimating their pay and expenses.) It raises questions as to the overall effectiveness and efficiency of the sector in finding profitable routes and promoting positive market incentives.

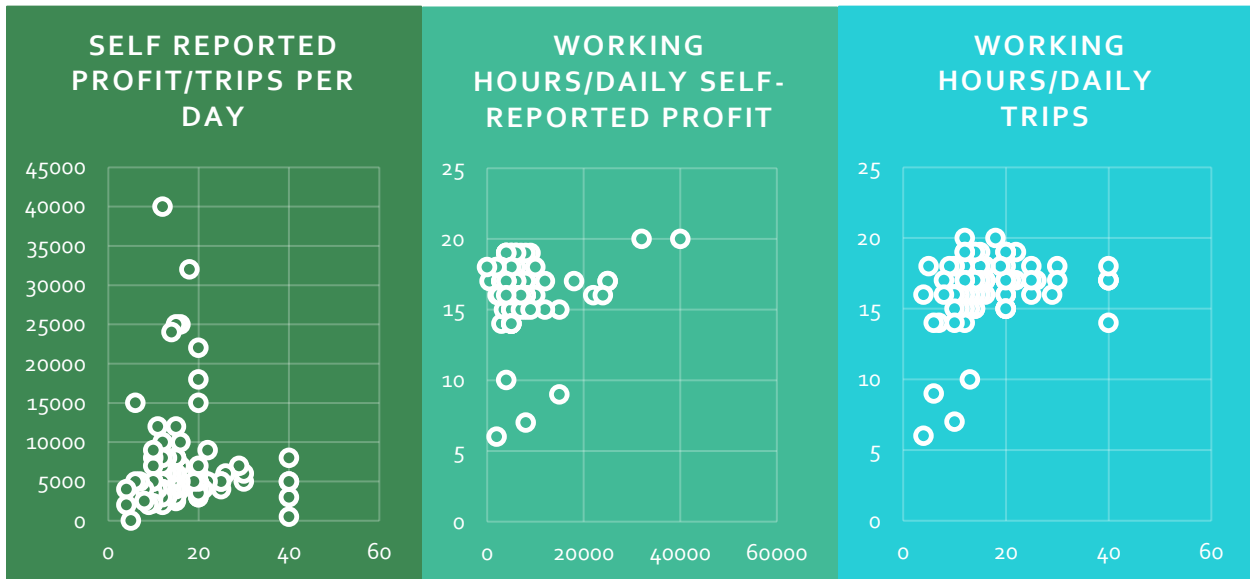
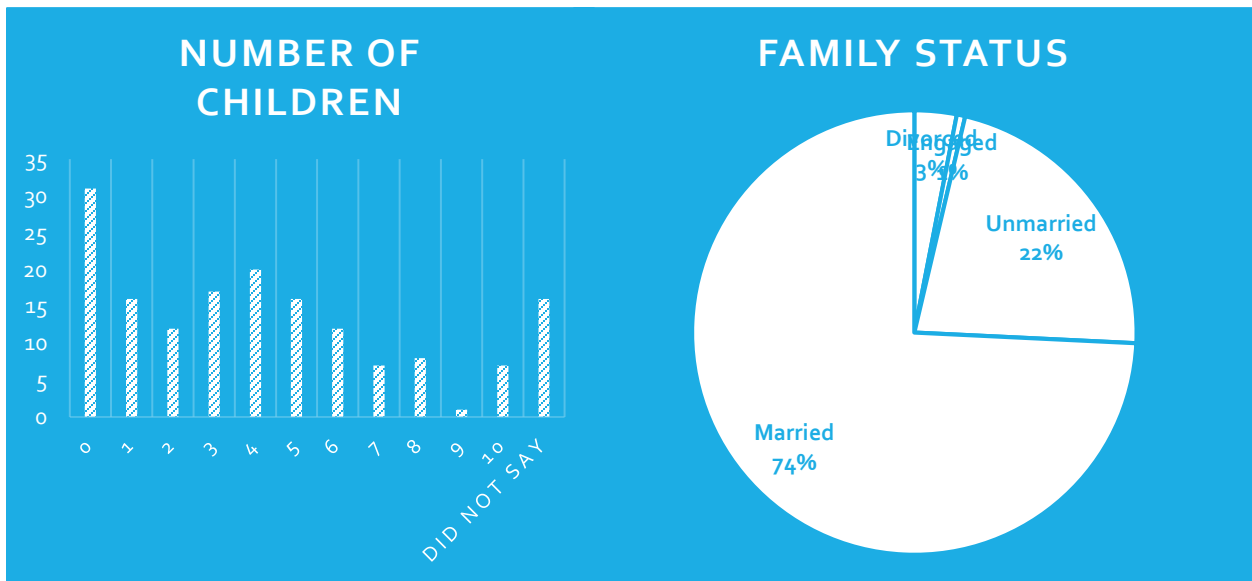


Figure 12: Driver's Self-Assessed Daily Operations

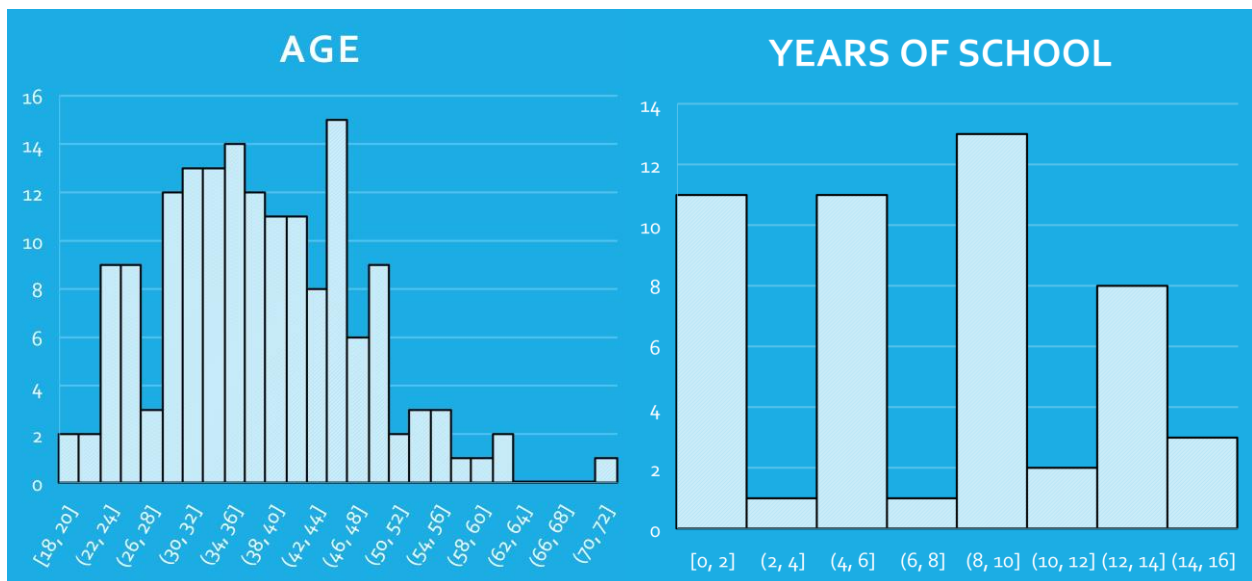
In particular, this means that many consideration do not appear to be fully, if at all, factored in operations, including vehicle depreciation , bus crews working time and remuneration per hour.

4.7.2 Driver Demographics

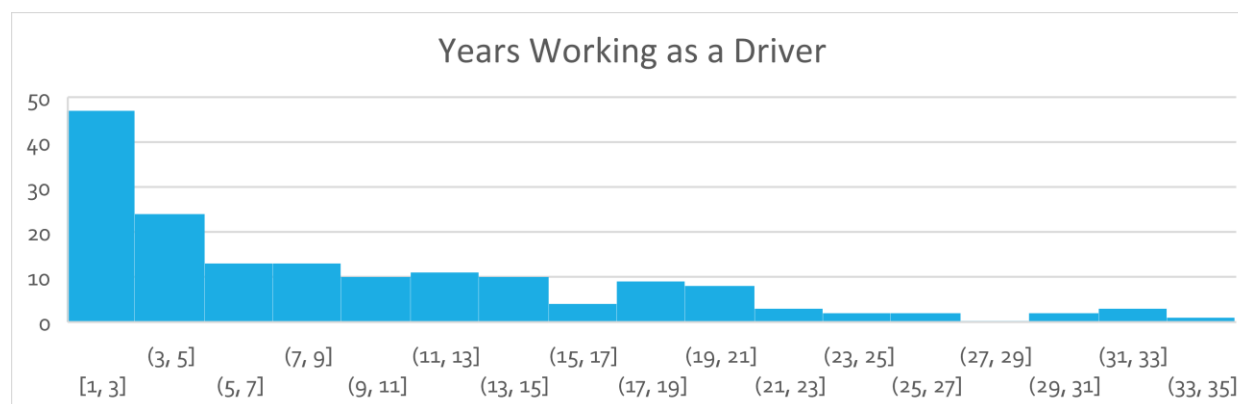
Drivers are, for the most part, married men with children, low to medium levels of schooling. They are primarily in their 30s and 40s, and have worked as drivers for an average of almost 10 years. While education levels of many drivers are low, a significant proportion have secondary, and in some cases, even tertiary education.



37 drivers out of 163, or 23%, owned their own vehicles. This group were slightly better educated average - 7.5 years vs. 6.3 years for those who leased their vehicles, but almost exactly the same age – 38.1 for owners vs. 38.7 for leasers. Those owning their own vehicles have on average been working as drivers longer – 11.9 years vs. 8.7 years.



Some longevity in the sector may contribute to the likeliness of becoming a vehicle owner, but this does not appear to be terribly significant – it may be that those who own their own vehicles are likelier to stay working longer, rather than suggesting there is an available path between lease and ownership.



While the average number years of working as a driver is 9.5, almost a third of the drivers surveyed had been working for less than 3 years. This suggests that while there is a group of drivers who have substantial longevity in the profession, it is also a field with significant churn and turnover, and high dropout and entry rates for new workers.

The high number of different owners many bus drivers have worked for also suggests tenuous and fraught relationships. In interviews, drivers reported arguments and disagreements usually leading to the breakup of the owner-driver contract.

These two aspects, alongside limited training, low levels of education and difficult working conditions directly impact the quality of service for passengers, as well as safety and driving.

4.8 OPERATIONS AND OWNERSHIP

As mentioned, the structure of operations of the public transport system in Djibouti is based on private ownership of vehicles, which are either driven by owners, or leased daily to a driver in return for a fixed daily sum.

Interviews were conducted with a number of vehicle owners in order to understand their perspectives and challenges. These were not able to be representative, but are able to illustrate some key points and expand on the picture of the sector available through research with drivers and passengers.

4.8.1 Limits on Developing Capital and Passenger Market

While, at first sight, the ownership of a bus or minibus would appear to be a straightforward business, with a flat daily income guaranteed to vehicle owners, in fact the high level of depreciation and maintenance costs means that, in the medium and long term, bus ownership is difficult to profit and particularly capitalize further.

That is, vehicles, once imported, remain roadworthy for only a few years. The income received from the lease of a vehicle will cover its purchase costs, maintenance, insurance and registration, but often will not stretch much further. This explains the proliferation of small owners and lack of large firms in the sector. Most simply, by the time the purchaser of a vehicle has paid off the cost of it, it is likely to be near retirement.

This high attrition and short vehicle life is due to several, compounded issues – vehicles are second hand to start with, meaning their operating lives are short. Road infrastructure in Djibouti is often poor, leading to high maintenance costs and high levels of damage to vehicles. Small capacity (15 and 35 seaters) are difficult to develop good profit margins for. The import of larger vehicles is difficult due to lack of capital and competitive pressures within the sector. Attempts to operate larger vehicles in the past were pressured out by smaller, rival vehicles operating on the fill-and-go system.

Trip costs are regulated, not allowing operators to charge higher fees and higher leases, but, as detailed in the passenger exclusion section, prices may in fact be too high for a substantial section of the population, lowering the potential market of the transport sector significantly. Meanwhile, fuel and maintenance costs are too high to lower prices for passengers and generate further demand. Finally, a poorly trained and overworked workforce – drivers and conductors – are not incentivized to care for vehicles.

This an unfortunate equilibrium is arrived at, where the sector cannot expand its profits either through expanding the quantity or the quality of its services.

This has several impacts, most notably the difficulty of expanding capacity in the sector, as there are limited funds and motivation for substantial expansion of the vehicle fleet, and particularly upgrade to better quality and higher capacity vehicles.

4.8.2 Difficult Working Relations with Drivers

Vehicle owners are generally also employed or in business in another capacity, meaning they have limited scope, ability and training to provide detailed management of their transport businesses. In fact, with the low levels of long term profitability, it may be counter-productive for them to dedicate too much time or effort to these – they must be, to an extent, 'self-managing.'

The consequences of this are the present arrangement of daily contracts, where vehicle crews – drivers and conductors, de-facto manage most business and financial decisions: where and when to operate and how to drive. For owners, managing these crews is often fraught and difficult. Daily payments are not always made, trust between crews is extremely poor, and turnover is very high. Counterproductively, then, this leads to greater overheads for owners in terms of the effort and time they must put into the business.

Owners have a strong expressed preference for a better trained and more stable workforce, and highly value high-quality, reliable drivers. However, the present structure makes these relatively rare, with volatility and poor training being the norm instead.

As owners are unable or unwilling to substantially change working relations or invest in the training of the workforce, they are turning to digital tracking technologies, such as installing GPS trackers on vehicles. While this may assist in giving owners a sense of security with regard to the locations and doings of the vehicles, it is also an added cost and an added management task. Furthermore, recent research in Nairobi where similar technologies were tested revealed substantial negative effects, with drivers increasing their already extremely long working hours and putting passengers at greater risk.¹

¹ Kelley, E.M., Lane, G., Schonholzer, D., 2018. The Impact of Monitoring Technologies on Contracts and Employee Behavior: Experimental Evidence from Kenya's Transit Industry.

4.8.3 Lack of Regulation Stymying Growth Efforts

Perhaps surprisingly, the vehicle operators interviewed, in fact expressed a preference for more regulation from the public sector. Their difficulties in retaining drivers, the competitive environment and the lack of demarcation of routes or stops means that vehicle operators feel constrained and stuck in a barely-profitable sector, with little ability or incentive for growth and professionalization in management and operation patterns.

Operators argue that they have made calls for greater regulation from the state, which would help, to their perception, ameliorate some of the most difficult barriers. This includes the lack of driver certification and training, the competitive environment for routes and the barriers to greater, effective collaboration between different operators.

Discussion of how these points may be addressed through effective policy measures are discussed in the recommendations section.

5 CONCLUSIONS OF DATA GATHERING AND ANALYSIS

Overall, the state of urban mobility in Djibouti and Balabala presents substantial concerns, but also performs strongly in a number of key areas and offers some cause for optimism.

Firstly, the city is overwhelmingly reliant on public transit, and this system is relatively well distributed spatially throughout the city. Most urban residents live within a short walk of a public transport route, and these operate throughout the day and allow relatively short travel times, with an average door-to-door trip taking 44 minutes and most trips not requiring transfers between vehicles. Motorization rates are presently very low – only 4% car ownership.

As well, it is a great cause for concern that travel costs are substantial, at an average of 150 francs per day per person, which means many lower income, and even middle class, households will be struggling with transport costs and are very likely restricting their travel to far below what would be optimal from a personal and greater economic development standpoint.

Alongside its ubiquity, however, the public transport system of Djibouti also has some very poor qualities. The high prices have already been mentioned, but the level of comfort of the vehicles is especially poor and this was marked out in particular by passengers. The vehicle fleet is old and uncomfortable, with vehicles primarily operating when they are full and unadapted to the hot Djiboutian climate. This makes journeys extremely uncomfortable, tiring and even unhealthy.

With continued urban growth and land-use decisions which are, at present, not being supported by sustainable public transport services, the short travel times and low car ownership will soon erode. Understandably, with the discomfort of public transport and its lack of reach to newly developing areas at the edge of the city, middle class Djiboutian will soon buy cars. This will lead to further congestion, pollution, and further negative affects on urban density and walkability.

To finalize this analysis, a secondary phase should be conducted, which will allow the formulation of recommendations for improvement, particularly in terms of spatial planning and balancing of demand throughout the city, and in terms of institutional and financial reforms of the transport sector which will support improvement of the quality of the vehicle fleet and of access and affordability issues.

6 METHODOLOGICAL APPENDIX



Photo 6: Surveyors' equipment and badge for data collection phase

The data presented in this report was gathered during May 2019 by the consultant in collaboration with the University of Djibouti.

12 Master of Logistics students and 3 Ministry of Transport personnel underwent one week of training in the following:

- Academic background on transport planning, with an emphasis on African and Middle Eastern case studies and best practice
- Training in using GPS tracking apps via smartphones in order to trace routes of vehicles
- Training in delivering the survey protocols developed for this research.

The training materials are below in sections 6.1 and 6.2.

The survey formats used are in sections 6.3.

6.1 ROUTE MAPPING TECHNOLOGY

After downloading the App "GPS Essentials" from the play store, open it from the home screen.

Télécharger l'appli **GPS essentials** à partir de la Google Play Store.

Taper l'icône dans l'écran d'accueil.



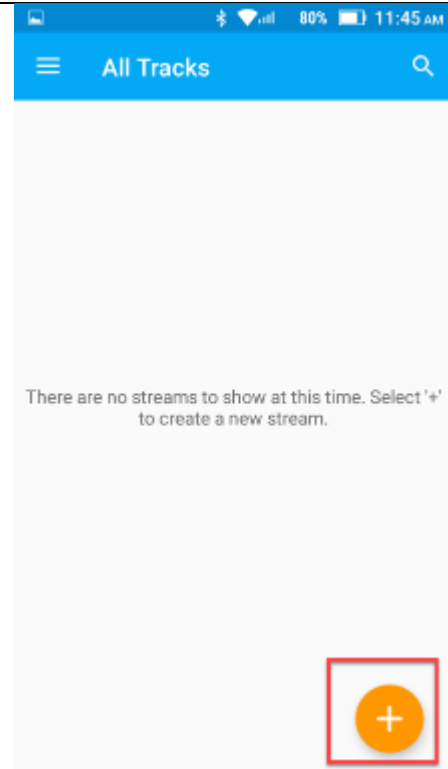
From the App's main menu, select "Tracks"

Dans le menu principal, taper « Tracks »



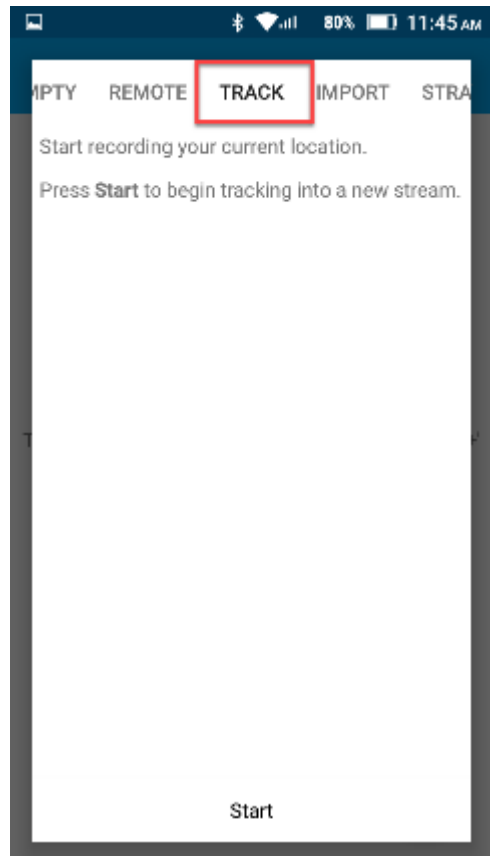
Click on the Plus button to add a new track

Taper le bouton " Plus " pour ajouter une nouvelle route.



On the Streaming Type Dialog, scroll to the right until you choose "Track". Then click on "Start".

Vous arrivez a le « Streaming Type Dialog ». Faire défiler (Scroll) vers la droite jusqu'à « Track » et taper le bouton « Start »

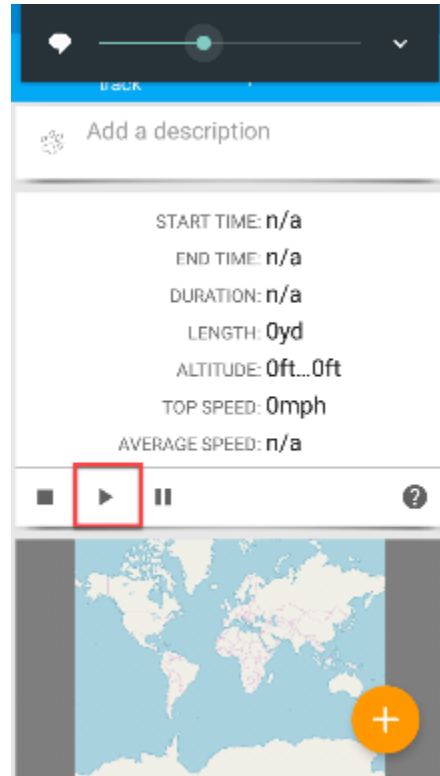


Start recording your trace by clicking the play button. Make sure you start recording as soon as the vehicle starts moving from its origin. Also Make sure your phone's location is turned on.

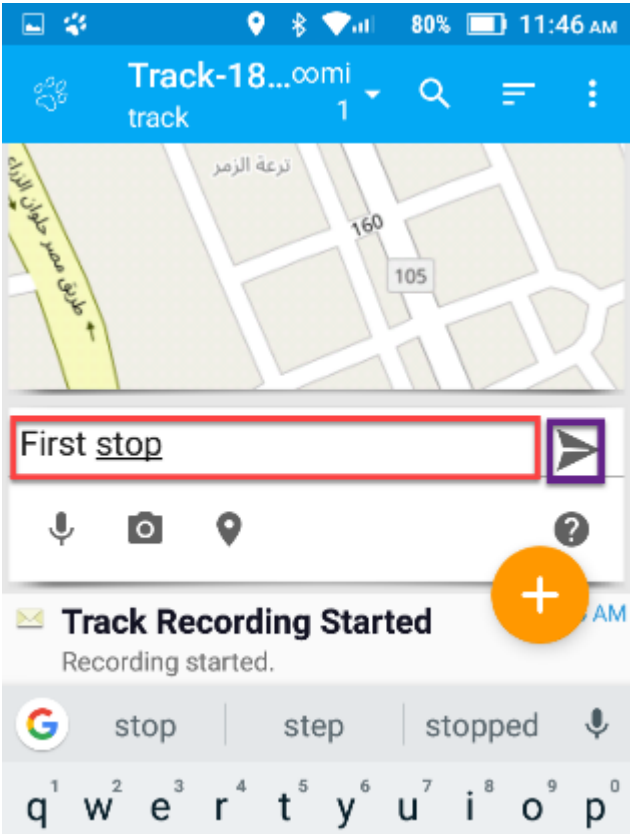
Commencez à enregistrer votre trace GPS. Taper sur le bouton "Play".

Assurez-vous de commencer à enregistrer votre trace le moment où le véhicule commence à partir de son station d'origine.

Important : Assurez-vous que « location » de votre smartphone est allumé, ça ve dire le GPS marche bien !



While recording your trace, add the stops you come across by typing the stops' name in the textbox and clicking on the small button next to the textbox. Afterwards you should see the stop added at the bottom of the recording screen.



Track-18...comi
track 1

First stop

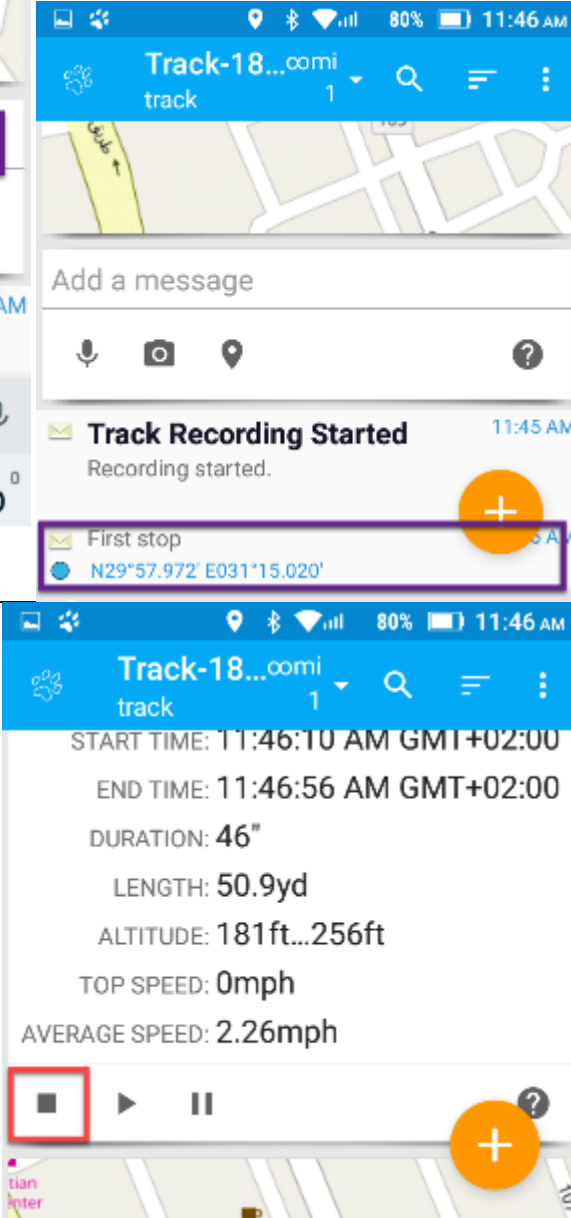
Track Recording Started
Recording started.

stop | step | stopped

Pendant l'enregistrement de votre trace, ajoutez les arrêts (stop) que vous rencontrez en tapant le nom des arrêts dans le fenêtre de texte. Après, taper le petits bouton à côté du fenêtre de texte. Ensuite, vous devriez voir l'arrêt ajouté en bas de l'écran d'enregistrement.

After the vehicle arrives at it's destination, stop the recording and finish your trace by clicking the "Stop" button

Quand vous arrives a votre destination, arrêtez l'enregistrement de votre trace. Pour terminer, taper le bouton « stop ».



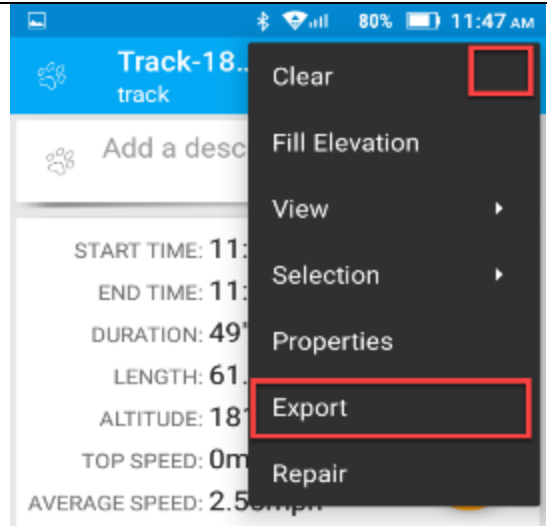
Track-18...comi
track 1

START TIME: 11:46:10 AM GMT+02:00
END TIME: 11:46:56 AM GMT+02:00
DURATION: 46"
LENGTH: 50.9yd
ALTITUDE: 181ft...256ft
TOP SPEED: 0mph
AVERAGE SPEED: 2.26mph

First stop
N29°57.972' E031°15.020'

Now you need to share the trace you just recorded with the Data Collector manager. Click on the three dots icon on the upper right corner of the screen to open the menu, and click "Export".

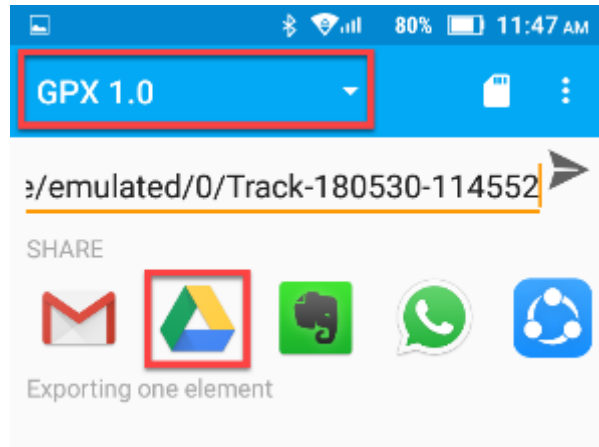
Il faut chaque fois partager votre trace avec les enseignants. Taper l'icône à trois points dans le coin supérieur droit de l'écran pour ouvrir le menu. Puis, taper sur « Export ».



Make sure to make the export type "GPX 1.0" -not 1.1-.. Then click on the Google Drive Icon to share.

Selectionnez le type d'export « GPX 1.0 » et pas « GPS 1.1. » !

Taper l'icône de Google Drive pour partager.



Make sure to name the file according to the naming convention you agreed on with your Data collection Manager. Then Make sure you select the folder from your google drive that you shared with the Data Collection Manager earlier. Make sure the google account is the one that is sharing the folder with the Data Collection manager. Finally click "Save"

Le nom de fichier est tellement important pour organiser les traces de tous le monde. Assurez-vous de nommer le fichier conformément à la convention d'appellation que vous avez convenue avec les enseignants.

Ensuite, selectionez le google drive créé pour le projet, et assurez-vous de choisir le dossier partager avec votre enseignants.

Enfin, tapez le bouton « Save ».

Save to Drive

Document title
Track-180530-114552.gpx

Account
tfcdata4@gmail.com

Folder
GPS esd

CANCEL SAVE

6.2 TRAINING PRESENTATIONS

6.2.1 Presentation 1: Project Introduction

Slide 1



Slide 2

Contact

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- tamarak@berkeley.edu
- Téléphone / Whatsapp : +254 7744 2963

Slide 3

Les transports publics a la ville de Djibouti - **Quels sont les problèmes ?**

- Est-ce qu'il sert tout le monde ?
- C'est trop lent ?
- Les véhicules sont-ils en bon état ?
- C'est sans danger ?
- Est-il efficace ?
- Est-ce que c'est cher ?

Comment pouvons-nous faire face à tout cela ?



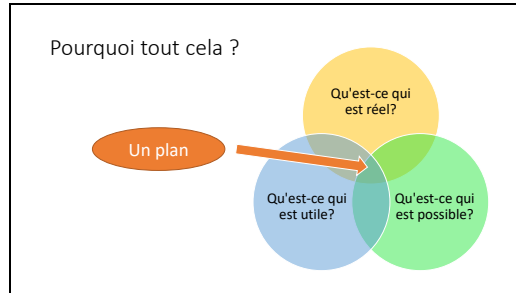
Slide 4

Objectif du projet : Collecter des données pour une analyse du secteur des transports dans la ville de Djibouti

Trois parties :

- une cartographie des services de transport
- la compréhension de l'expérience des passagers et de leurs besoins
- informations sur la réglementation et l'économie du secteur des transports

Slide 5



Slide 6

Planification du transport et données

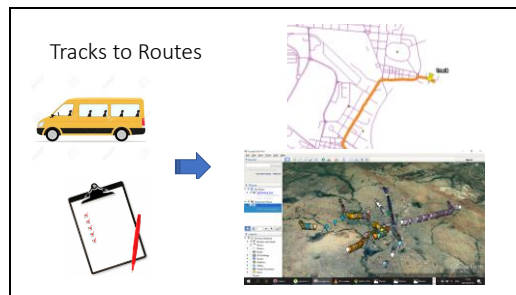
- Où vivent les populations ?
- Où travaillent les populations ?
- Combien sont-ils ? Où ça ? Demander ?
- Quelle est la croissance démographique prévue ?
- Combien les gens peuvent-ils payer ?
- Combien de temps cela prend-il ?
- Comment préfèrent-ils y aller ?

• Comment pouvons-nous en faire une approximation ?

Slide 7



Slide 8



Slide 9

Lignes + Information

Pour chaque ligne :


- distance
- prix
- fréquence
- nombre de voyageurs
- horaires de fonctionnement

En octobre - Incessant en ramadan

Slide 10


Partie 2: Enquete des passagers et des non-passagers

- Enquête sur l'origine, le mode et la destination des voyages
- Entrevues et groupes de discussion avec des passagers, des femmes et des non-passagers
- Les cartes mentales des transports
- Groupes de discussion avec les chauffeurs d'autobus
- Groupes de discussion avec des exploitants d'autobus



Slide 11


Partie 2: Enquete des passagers et des non-passagers



- Qualité de service
- Intégration de différents modes
- Sécurité, harcèlement
- Besoins non satisfaits

Slide 12

Parte 3: la réglementation et l'économie des transports



- Finances des autobus
- Combien de passagers sont nécessaires pour rentabiliser une ligne ?
- Quelles sont les conditions de travail ?
- Quelle est la durée des heures de travail ?
- Quel est l'investissement nécessaire pour acheter un nouvel autobus ?

Slide 13

16th	18th	19th	20th
0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Welcome and introductions	0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Urban transport in Africa and the Middle East	0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Transport for Cairo: Mapping data and policy in Cairo World Bank Conference Room	0.00 0.10 0.20 0.30 0.40 0.50 0.60 0.70 0.80 0.90 1.00 Survey and interview methods
1.00 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 Introduction of the workshop and project goals and methods	1.00 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 Break	1.00 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 Travel	1.00 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 Survey pilots
2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90 3.00 Break	2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90 3.00 Methods and project/research design	2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90 3.00 Break (back to university) Practice data upload, develop workflow	2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90 3.00 Survey feedback round
3.00 3.10 3.20 3.30 3.40 3.50 3.60 3.70 3.80 3.90 4.00 Break	3.00 3.10 3.20 3.30 3.40 3.50 3.60 3.70 3.80 3.90 4.00 Break	3.00 3.10 3.20 3.30 3.40 3.50 3.60 3.70 3.80 3.90 4.00 Break	3.00 3.10 3.20 3.30 3.40 3.50 3.60 3.70 3.80 3.90 4.00 Break
4.00 4.10 4.20 4.30 4.40 4.50 4.60 4.70 4.80 4.90 5.00 Intro to the GIS toolkit	4.00 4.10 4.20 4.30 4.40 4.50 4.60 4.70 4.80 4.90 5.00 mapping exercise and setting up phones	4.00 4.10 4.20 4.30 4.40 4.50 4.60 4.70 4.80 4.90 5.00 Transport regulation and reform - planning exercise	4.00 4.10 4.20 4.30 4.40 4.50 4.60 4.70 4.80 4.90 5.00 Conclusion and expectations and critiques for data gathering phase

Slide 14

Le plan de travail peut toujours s'ajuster !

21st	22nd	23rd	24th
voyager en autobus	examen des données		
	voyager en autobus	examen des données	
		Qu'avons-nous trouvé ? Quels sont les problèmes ? Quelle est la qualité de notre carte ?	

Slide 15

Problèmes et questions !

Slide 16



Slide 17

- Personne ne veut nous parler
- Les lignes d'autobus sont trop fluides, changeantes
- Nous n'avons pas assez de temps

6.2.2 Presentation 2: Background theory on urban transport planning

Slide 1

Le Transport Urbain and la
Planification

Slide 2

Pourquoi les personnes voyagent-elles ?

• Le transport est une demande dérivée : nous **marchons / conduisons / prenons un bus / avion** pour nous rendre **quelque part** :

travailler	loisir
scolariser	famille
commerce	vie en société
shopping	vie publique
de santé	...et presque tout le reste

Slide 3

Qu'est-ce qu'un bon transport ?

Le transport est une nécessité fondamentale pour participer à la société - économiquement et personnellement.

<p>Mobilité</p> <ul style="list-style-type: none"> • J'ai une voiture ? • J'habite à côté d'un arrêt de bus ? • Je peux marcher ? 	<p>Accessibilité</p> <ul style="list-style-type: none"> • Le trafic est-il très dense ? • L'autobus s'approche-t-il de mon travail ? • Ai-je les moyens d'acheter un billet de train ?
---	--

Slide 4

La théorie de l'exclusion des transports:

Est-ce que mon transport me permet de participer à des opportunités ?

Affordabilité ?
Langue ?
Technologie ?
Culture ?
Familiarité ?
Incapacité physique ?

Source: Litvin (2012), cited in Pothari et al. (2013)

Slide 5

Transport et qualité de vie

L'accès au travail, à l'école - mais aussi...

- Santé
- Santé mentale, stress
- Temps libre
- Choix du lieu de résidence
- Confort
- Dignité

Slide 6

Que font les gens quand ils ont un mauvais transport ?

Ils sont exclus : Impossible d'accéder à l'emploi, à l'école, à la vie sociale, etc.

Ils souffrent : Perdre de l'argent, du temps, de la santé,

Ils achètent une voiture

Slide 7




Slide 8



Slide 9

La Ville des voitures

- Besoin de grandes infrastructures
- Faible densité pour les residences, les services, les commerces, les parcs, etc
- Besoin de conduire plus
- Plus de traffic
- Besoin de grandes infrastructures

A blue curved arrow pointing from the text to the right, indicating a flow or relationship between the listed points.

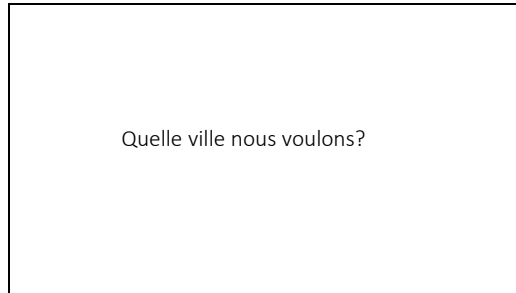
Slide 10



Slide 11

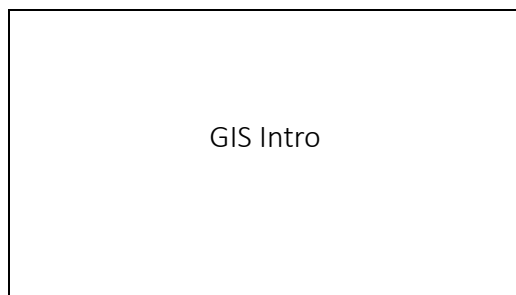


Slide 12

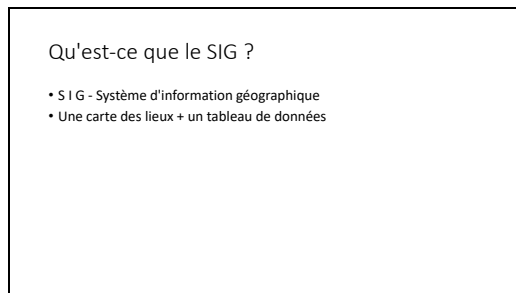


6.2.3 Presentation 3: introduction to GIS

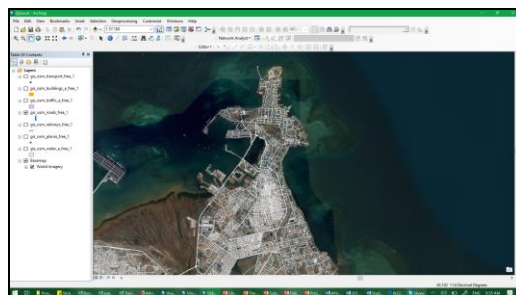
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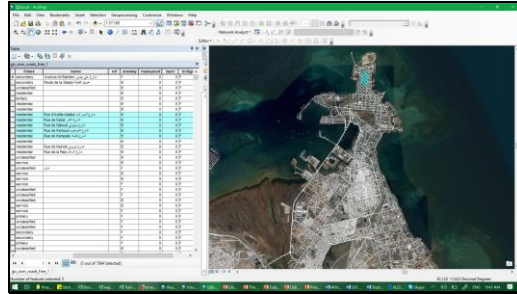
Slide 2



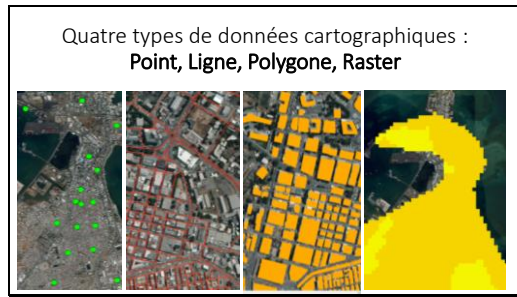
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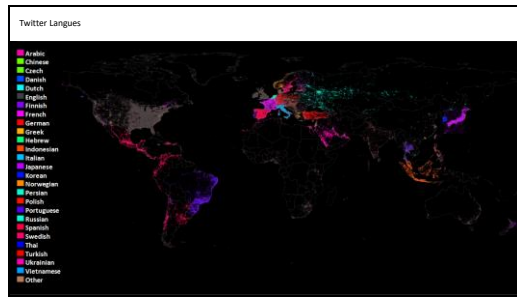
Slide 4



Slide 5



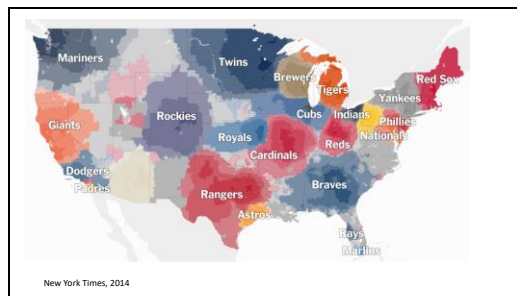
Slide 6



Slide 7



Slide 8



Slide 2



Slide 3



Slide 4



Slide 5

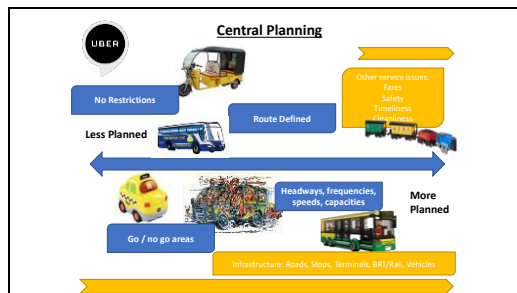
City (country)	Passengers (millions/year)	Date source	Date source
Kampala (Uganda)	100	<2008	Kumar and Borrao 2008
Kigali (Rwanda)	99	<2008	Kumar and Borrao 2008
Diar el Saboun (Tanzania)	98	<2013	Rose 2013
Dakar (Senegal)	97	<2008	Kumar and Borrao 2008
Douala (Cameroon)	95	<2010	UMTP 2010
Cotonou (Benin)	93	<2008	Kumar and Borrao 2008
Burkina (Mali)	91	<2008	Kumar and Borrao 2008
Lagos (Nigeria)	89	<2008	Kumar and Borrao 2008
Nairobi (Kenya)	87	<2008	Kumar and Borrao 2008
Dzougbelegu (Burkina Faso)	86	2000	Gedard 2008
Accra (Ghana)	86	<2008	Kumar and Borrao 2008
Algiers (Algeria)	83	2004	Gedard 2008
Nairobi (Kenya)	81	1997	Gedard 2008
Windhoek (Namibia)	81	<2010	UMTP 2010
Johannesburg (South Africa)	79	2002	Cig 2013
Nairobi (Kenya)	65	2010	Gedard 2013
Abidjan (Ivory Coast)	41	1998	Gedard 2008
Cape Town (South Africa)	38	2013	CapT 2013a
Cairo (Egypt)	32	1998	Gedard 2008
Casablanca (Morocco)	28	1998	Gedard 2008
Addis Ababa (Ethiopia)	26	<2008	Kumar and Borrao 2008

Data source: After Robert Ferry personal communication (2014).

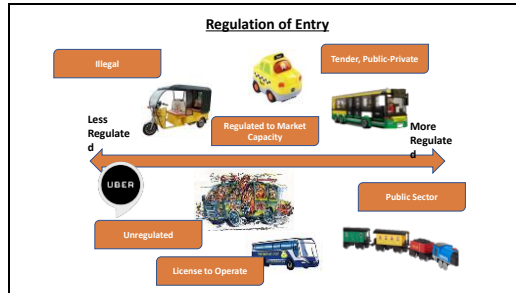
Behrens et al, 2016

- Le transport artisanal est d'une importance cruciale en Afrique
- Les statistiques et la compréhension du secteur sont encore médiocres

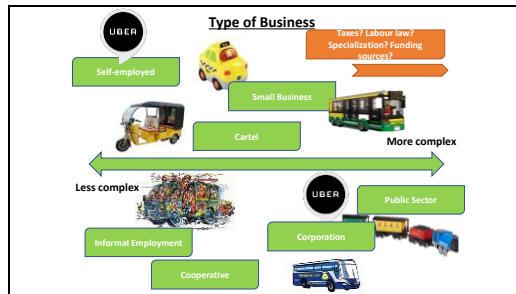
Slide 6



Slide 7



Slide 8



Slide 9

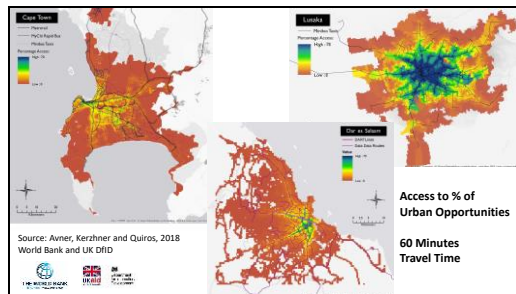
Transports existants, informels, artisinals:

Hypothèses :

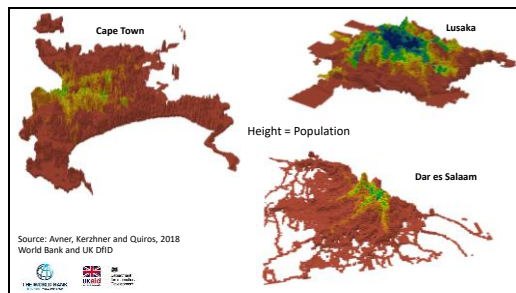
- Répondre à la demande
- flexible, réactif
- remplissage de niches
- couvrent tous les passagers

En théorie - nous dit où effectuer le transport de masse

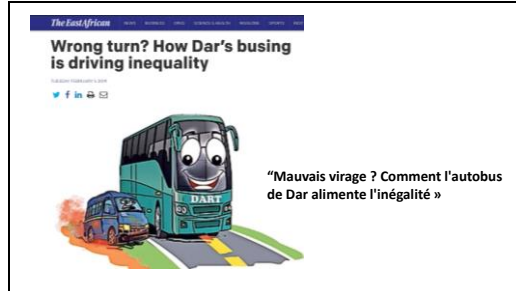
Slide 10



Slide 11



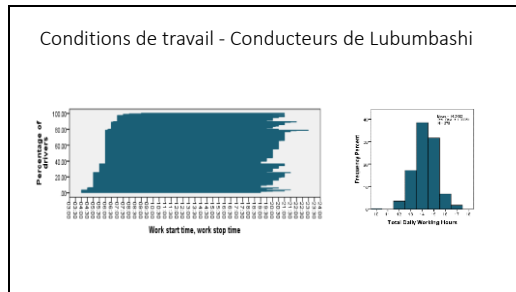
Slide 12



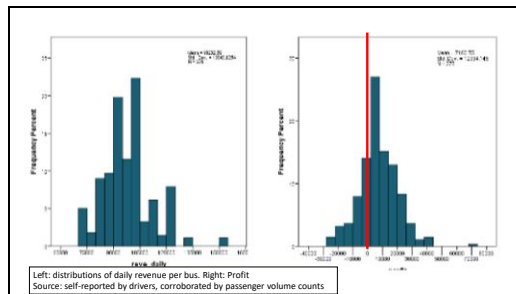
Slide 13



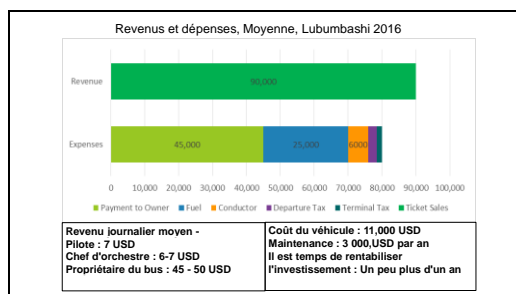
Slide 14



Slide 15



Slide 16



Port
Doraleh
Autre
Autre:
Lequel de ces itinéraires empruntez-vous au cours d'une semaine typique ?
PK12
Hayableh
Cheikh Osman
L'air
Heron
Ecole Nassir
SOJIG
WahleDaba
Ambouli
Hodan
Pompier
PK13
Campus Balbala
Port
Doraleh
Autre
Autres:
Comment décidez-vous habituellement quel itinéraire choisir ?
J'ai quelques itinéraires préférés et je ne conduis que sur eux
Certaines routes sont plus rentables et je ne choisis que celles qui
Je vais là où la ligne au terminal est la plus courte
Je choisis au hasard
Autre
Autre:
Quelle est la meilleure route à suivre ?
PK12
Hayableh
Cheikh Osman
L'air
Heron
Ecole Nassir
SOJIG
WahleDaba
Ambouli
Hodan
Pompier
PK13
Campus Balbala
Port
Doraleh
Autre
Quelle est la deuxième meilleure route ?
PK12
Hayableh
Cheikh Osman
L'air
Heron
Ecole Nassir
SOJIG
WahleDaba
Ambouli
Hodan
Pompier

PK13
Campus Balbala
Port
Doraleh
Autre
Quelle est la troisième meilleure route ?
PK12
Hayableh
Cheikh Osman
L'air
Heron
Ecole Nassir
SOJIG
WahleDaba
Ambouli
Hodan
Pompier
PK13
Campus Balbala
Port
Doraleh
Autre
Vous arrive-t-il de changer d'itinéraire, d'en " inventer " de nouveaux ?
Jamais
Si plusieurs passagers demandent
Parfois, je me promène en voiture à la recherche de passagers.
Parfois, nous suivons des itinéraires " spéciaux ", comme des étudiants ou des ouvriers le matin.
Autre
si Autre:
Depuis combien d'années travaillez-vous comme chauffeur ?
Pendant ce temps, avec combien de propriétaires d'autobus différents avez-vous travaillé ?
Combien de jours par semaine travaillez-vous habituellement ?
Combien payez-vous pour louer le véhicule par jour ?
Combien payez-vous pour le carburant par jour ?
Combien payez-vous pour le nettoyage de l'autobus par jour ?
Combien payez-vous pour les " frais de départ " par voyage ?
Avez-vous d'autres dépenses ?
Si oui, combien payez-vous pour cela ?
Combien de voyages par jour faites-vous ? (Dans une direction)
Quelle est la somme que vous avez généralement pour vous-même à la fin de la journée ? (Driver+conducteur)
A quelle heure commencez-vous à travailler ?
A quelle heure finissez-vous habituellement de travailler ?
Quel âge avez-vous ?
Vous êtes marié ?
Oui
Non
Fiancés
Vivre ensemble
Veuf(ve)
Divorcé
Combien d'enfants avez-vous ?
Combien d'années avez-vous fréquenté l'école ?
Dans quel quartier habitez-vous ?
Quel est le plus grand changement nécessaire dans le secteur des transports à Djibouti ?

6.3.2 Passenger Survey Format

Location de enquête

Pourquoi avez-vous voyagé aujourd'hui?

Itinéraire pour les arpenteurs

École / Collège / Université

Travail

Shopping

Visite sociale (famille, amis, etc.)

Visites administratives (médicales, bureau du gouvernement, etc.)

ala Maison

Pour Business, travail, commerce

Autre

Où avez-vous commencé pour arriver ici?

Votre Origin

Votre destination finale?

Votre destination

Quelle Modes utiliser vous dans cette journey?

La Mode du Journey

Marcher a pieds

attendre

bus ou minibus

voiture - chaffeur

voiture - passager

taxi

Bajaj - ligne, collectif

Bajaj - taxi, ala votre destination

Autre

combien de temps

Combien cela coûte-t-il (francs)?

5. Quels jours de la semaine utilisez-vous cette route?

Cochez toutes les cases qui s'appliquent

lundi

mardi

mercredi

jeudi

vedredi

samedi

diamanche

combien de voyages par jour faites-vous (pas le week-end) ?

Combien payez-vous pour le transport en une journée normale ? (pas le week-end)

Êtes-vous satisfait de ce service de bus ?

1 - très malheureux, 5 - très heureux

Êtes-vous satisfait des temps d'attente ?

Êtes-vous satisfait de l'emplacement des points d'embarquement et de débarquement sur cet itinéraire ?

1 - très malheureux, 5 - très heureux

Êtes-vous satisfait du tarif que vous devez payer ?

1 - très malheureux, 5 - très heureux

Êtes-vous satisfait de la conduite du conducteur et chauffeur?

1 - très malheureux, 5 - très heureux

Êtes-vous satisfait du confort du véhicule ?

1 - très malheureux, 5 - très heureux

Êtes-vous satisfait du risque d'accident de votre moyen de transport ?

1 - très malheureux, 5 - très heureux

Êtes-vous satisfait du niveau de sécurité de votre environnement de transport ?

1 - très malheureux, 5 - très heureux

Si vous avez un téléphone cellulaire sur vous, seriez-vous prêt à l'utiliser pour payer ?

Oui

No

Je n'ai pas un téléphone 'smartphone'

Je n'ai pas un téléphone cellulaire

Quelle est la chose la plus importante qui devrait être améliorée dans les services de transport vous utiliser?

Résumez la réponse du répondant en 1 à 5 sentences

Quelle est votre profession ?

Étudiant

Employé(e)

Sans emploi

Retraité

à son compte

Votre Profession- detail

À quel groupe d'âge appartenez-vous ?

2. Sexe du répondant (A remplir par l'enquêteur)

Femme

Homme

6.3.3 Non-Passenger Survey Format

Location de enquette

Location de enquette

Qu'est-ce qui vous a amené dans cet Quartier?

Itinéraire pour les arpenteurs

École / Collège / Université

Travail

Shopping

Visite sociale (famille, amis, etc.)

Visites administratives (médicales, bureau du gouvernement, etc.)

ala Maison

Pour Business, travail, commerce

Autre

J'habite ici

Où avez-vous commencé pour arriver ici?

Votre Origin

Votre destination finale?

Votre destination

Quelle Modes utiliser vous dans cette journey?

La Mode du Journey

Marcher a pieds

attendre

bus ou minibus

voiture - chaffeur

voiture - passager

taxi

Bajaj - ligne, collectif

Bajaj - taxi, ala votre destination

Autre

combien de temps

Combien cela coûte-t-il (francs)?

Combien de fois par semaine quittez-vous ce quartier ?

La plupart des jours

Plusieurs fois par semaine

Quelques fois par mois

Quelques fois par an

Jamais

Dans votre foyer, y a-t-il un :

Un Voiture

Moto

Bicyclette

Au cours d'une semaine, quels types de transport utilisez-vous ? (sélectionner tout)

Marcher

Voiture - Je conduis

Voiture - Je suis passager

Bus/Minibus

Taxi

Bajaj - route

Bajaj - taxi

Taxi pré-arrangé

Bus d'entreprise

Moto

Bicyclette

Autre

Quels autre modes utilisez-vous ?

Lorsque vous quittez votre voisinage immédiat, à quelle temps/distance marchez-vous habituellement ?

dans minutes

Combien de fois allez-vous à Djibouti-Ville ?

La plupart des jours

Plusieurs fois par semaine

Quelques fois par mois

Quelques fois par an

Jamais

Qu'est-ce qui vous a amené dans Djibouti-Ville?

Itinéraire pour les arpenteurs

École / Collège / Université

Travail

Shopping

Visite sociale (famille, amis, etc.)

Visites administratives (médicales, bureau du gouvernement, etc.)

Pour Business, travail, commerce

Autre

J'habite la bas

Combien de fois allez-vous à Balbala?

La plupart des jours

Plusieurs fois par semaine

Quelques fois par mois

Quelques fois par an

Jamais

Qu'est-ce qui vous a amené dans Balbala?

École / Collège / Université

Travail

Shopping

Visite sociale (famille, amis, etc.)

Visites administratives (médicales, bureau du gouvernement, etc.)

Pour Business, travail, commerce

Autre

J'habite la bas

À quelle fréquence visitez-vous d'autres destinations ?

La plupart des jours

Plusieurs fois par semaine

Quelques fois par mois

Quelques fois par an

Jamais

Où sont-ils?

Qu'est-ce qui vous a amené dans autre locations?

École / Collège / Université

Travail

Shopping

Visite sociale (famille, amis, etc.)

Visites administratives (médicales, bureau du gouvernement, etc.)

Pour Business, travail, commerce

Autre

J'habite la bas

Other

Combien payez-vous pour le transport en une semaine normale ?

Avez-vous déjà eu à choisir entre payer pour aller quelque part ou payer pour d'autres choses ?

Oui, plusieurs fois par semaine

Oui, plusieurs fois par mois

Oui, une fois

Non, jamais

Au cours du dernier mois, avez-vous voulu aller quelque part mais n'avez pas été en mesure de le faire ?

Oui, plusieurs fois par semaine

Oui, plusieurs fois par mois

Oui, une fois

Non, jamais

Pouvez-vous décrire certains des événements ou activités que vous avez manqués ?

Pourquoi n'avez-vous pas pu y aller ?

Ça prendrait trop de temps pour y arriver.

Je n'aurais aucun moyen de rentrer (par exemple, tard le soir)

C'était trop cher

Je ne savais pas trop comment m'y rendre

J'avais besoin de l'aide de quelqu'un d'autre, et ils n'étaient pas disponibles.

Il n'y avait pas assez de place

Je n'avais pas le droit d'y aller (par exemple, seul dans le bus)

Autre

Si vous aviez un meilleur moyen de transport ici, le feriez-vous :

Cherchez-vous un emploi/un autre emploi ?

Démarrer ou améliorer une entreprise ?

Aller à l'école ?

Suivez des cours ou de la formation ?

Consulter les services de santé plus souvent ?

Faire du shopping plus souvent ?

Rendez visite à vos amis et à votre famille plus souvent ?

Faites-vous d'autres activités sociales (allez dans un café, allez voir un film) ?

D'autres choses ?

Je ne changerais rien dans ma vie.

Quelles autres choses ?

Quel est votre plus grand rêve ?

Quelle est la chose la plus importante à améliorer dans le transport ici ?

L'emplacement et la disponibilité des transports publics

La fréquence et les heures d'ouverture des transports publics

Le prix des transports publics

La qualité des véhicules - sécurité, confort, etc.

La qualité des routes et des trottoirs ici

Quelque chose d'autre

Quelle est la chose la plus importante qui devrait être améliorée dans les services de transport vous utiliser?

Résumez la réponse du répondant en 1 à 5 sentences

Quelle est votre profession ?

Étudiant

Employé(e)

Sans emploi

Retraité

à son compte

Votre Profession- detail

À quel groupe d'âge appartenez-vous ?

Sexe du répondant (A remplir par l'enquêteur)

Femme

Homme

7 REFERENCES

DISED, 2018. RESULTATS DE LA QUATRIEME ENQUETE DJIBOUTIENNE AUPRES DES MENAGES POUR LES INDICATEURS SOCIAUX (EDAM₄-IS). http://www.dised.dj/Rapport1_resultats_EDAM4.pdf