TECHNICAL NOTE I. Connecting the Dots in the Maputo Metropolitan Area: Diagnostic of urban mobility and accessibility

Fatima Arroyo Arroyo, Sr. Urban Transport Specialist, the World Bank

Contents

1. The context: Challeging urbanization and motorization, limited transport infrastructure and dominance of informal transport services

Key messages. Summary of key issues impacting poor mobility in the AMM

- **Sprawling growth:** As the area with Maputo City is mostly urbanised, recent residential and industrial growth has occurred in neighbouring Matola and Marracuene. Population density is low, estimated 37 people/ha, with an urban sprawl reaching to over 30km from the CBD2.
- **Poor accessibility** to employment, schools and hospitals. A particular challenge is connecting the low-density areas that are growing on the periphery of the city which have high rates of poverty.
- **Rise in car use:** Growth in incomes, a lack of high-quality public transport, and the relatively low-cost of private cars has led to an increase in car use and congestion. This has affected the performance of public transport, especially buses, negatively affects economic growth and damages the environment.
- **Lack of pedestrian facilities** including sidewalks, crossings and streetlights
- **Lack of parking facilities** especially in the city centre. As such cars parked on the road reduce the road capacity, and cars parked on the sidewalks impede pedestrians
- **Flooding**: affects many unpaved roads during the rainy season. Many of these roads are in the new areas on the periphery of the urban area. Flooding also affects some major roads.
- **Insufficient supply of public transport**: There is insufficient supply to meet the travel demand with many buses and minibuses overcrowded, long waiting times and illegal modes being used.
- **Poor road safety**: Many bus vehicles are old and overcrowded with poor driver handling. In many places the road condition is inadequate, with poor junction control and a lack of pedestrian infrastructure.
- **Institutions**: Governance arrangements are not aligned as the AMT, which is tasked with coordinating transport across Metropolitan Maputo, reports to the Ministry of Transport and Communication rather than the Municipalities. Furthermore, staffing levels and technical capacity is low.
- **Fragmented transport operators**: Efforts to formalise transport operators has created Cooperatives who operate large buses. However, in practice these Cooperatives largely act as collections of individual bus owners, rather than a single operating entity.
- **Investment**: Lack of investment capacity has been linked to the financial crisis of recent years, which in turn reduces the ability to mobilize the required urban infrastructure projects.

Challenging urbanization and motorization of AMM

1. **Maputo, the capital of Mozambique is the country's main financial, business, and commercial center.** In recent years, residential and industrial development of Maputo has spread to the surrounding cities and districts of Matola, Boane and Marracuene, creating the Maputo Metropolitan Area (AMM – *Area Metropolitana de Maputo*), also called Greater Maputo. The population of the AMM holds approximately 8.5

percent of the country's total population, representing more than 5 times the population of Beira, the second largest city in the country, and contributing 17 percent to the national GDP. Within the AMM, Maputo and Matola together accommodate 88.5 percent of the AMM's population. However, this predominant position in the country comes together with significant challenges of a metropolitan area that is growing at a fast pace.

2. **Economic development is associated with a rapid and unprecedented growth in urbanization and motorization, and a greater need for the mobility of people and goods**. Population of the AMM increased by 60 percent between 2007 and 2017, from 1.9 million to 3.1 million[1], and it is expected that it will increase to almost 4.0 million by 2035. Matola is the city growing at a highest pace, doubling its population over a decade, from 0.68 to 1.7 million in 2007 to 2017. It is expected that Matola continues growing at a fastest pace in the coming years (**Figure 2**). In addition to high fertility rates, rural-urban migration is also driving this population growth[2].

3. Population distribution is characterized by the densest parts are around the inner city of Maputo, and southern Matola (**Figure 1**). Significant population growth in western and northern Matola, around the areas around Matola Gare and the Circular Road has been observed in the last year, which expected increase of population on these areas. The wealthier areas of AMM are concentrated towards the south east of Maputo and south of Matola (**Figure 3**). Wealthier areas are located central to Maputo city center and they extend from here along the eastern coast of Maputo. Southern Matola also has a large wealthier area. Poorer areas are located in in the dense inner-city of Maputo as well as large areas of recent urban expansion in northern Matola (north of Circular Road) and north-east Maputo on low-lying coastal land. These areas of expansion are typically low in density and have many unpaved roads. Some poorer areas are susceptible to landslips and flooding. Jobs are mainly concentrated in south of Maputo and east of Matola. An indication of employment density is shown in (**Figure 4**)[3]. The concentration of jobs in those areas and the housing location that is growing more and more towards the periphery translates on a growing pendular movement, with mobility patterns that cross municipal boundaries, to reach opportunities in the AMM.

4. Urban sprawl is challenging the process of urbanization of AMM. Affordability of housing and the deficit in supply of housing in Maputo, exercise a significant impact on spatial dynamics, and encourage development of slums, especially in the periphery. Low- and middle-income households have been priced out of the residential market within the city and have moved out to peri-urban areas where land prices are relatively cheaper. As a result, new developments have mushroomed in several peri-urban areas of Maputo, and especially in Matola. This unplanned expansion often occurs on environmentally fragile floodplains.

---

[1] Population of AMM is calculated as the aggregated of Maputo, Matola, Boane and Marracuene and based on the 2007 and 2017 census.

[2] United Nations Department of Economic and Social Affairs - UNDESA, Population Division (2007). World Urbanization Prospects: The 2007 Revision. New York, USA, https://population.un.org/wup/Country-Profiles/>.

[3] The job distribution is computed according to the methodology used in the paper: Peralta-Quiros, Tatiana; Kerzhner, Tamara; Avner, Paolo. 2019. Exploring Accessibility to Employment Opportunities in African Cities : A First Benchmark. Policy Research Working Paper;No. 8971. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/32223 License: CC BY 3.0 IGO.
For this Maputo mapping the inputs consist of: (i) Concentration of amenities, downloaded from Open Street Map (updated to April 2019) and classified to overall and financial amenities, (ii) Proximity to bus terminals (classified as those where vehicles congregate, not just drop off locations.) and (iii) Proximity to main road intersections.

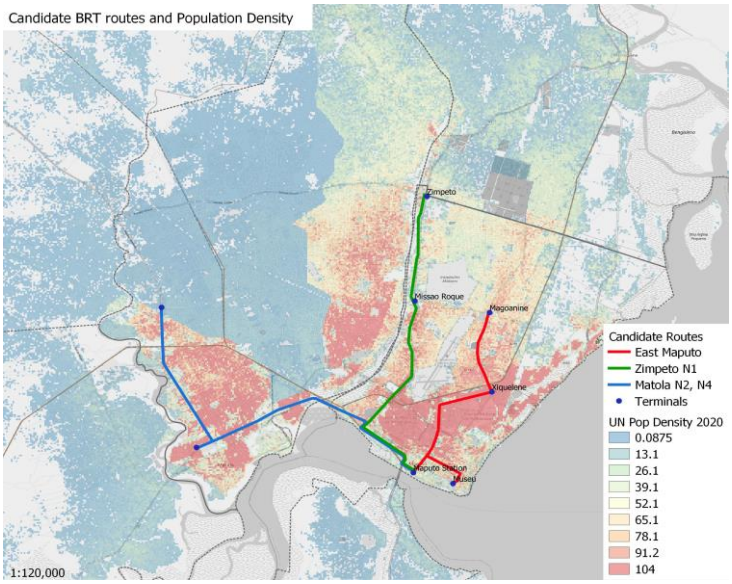


Figure 1: Population distribution in the Maputo Metropolitan Area (Source: WorldPop)

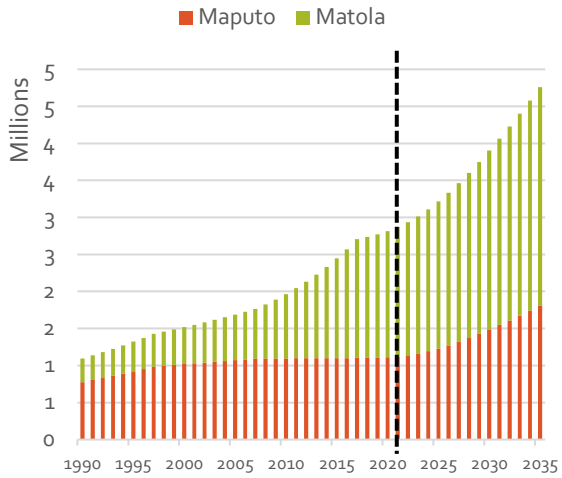


Figure 2. Historic and forecast population for Maputo and Matola (1990 - 2034). Source: United Nations Population Division. World Urbanisation Prospects

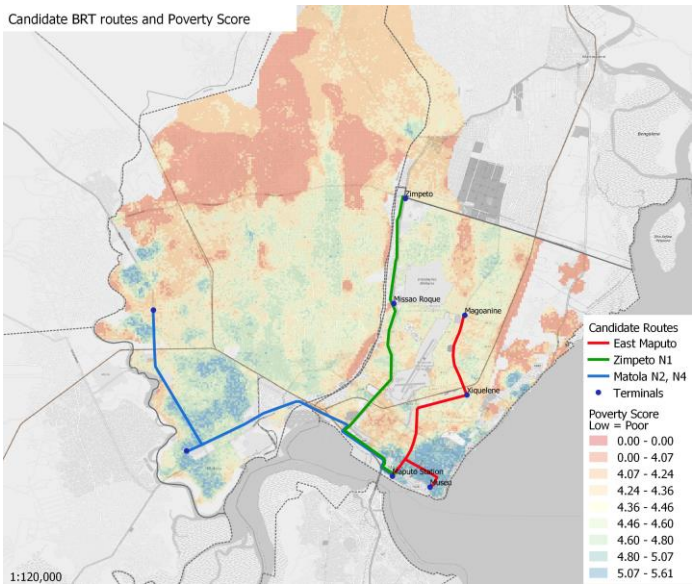


Figure 3. Poverty index (The lower the score, the poorer). Source: the World Bank

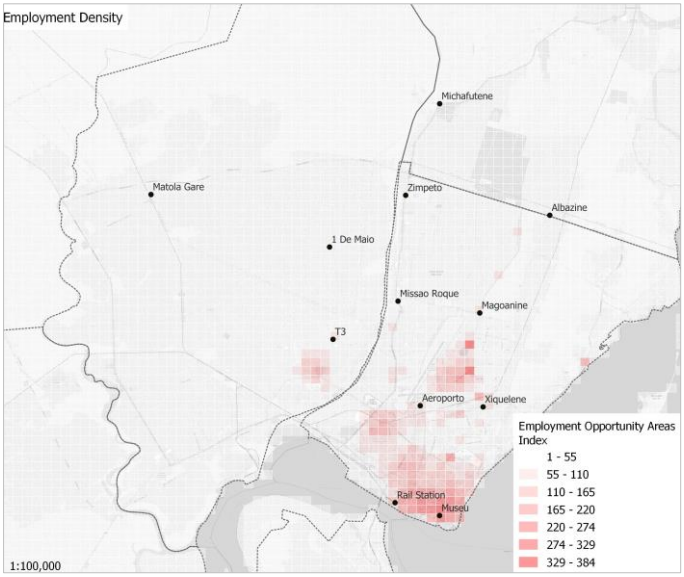


Figure 4. Employment density. Source: the World Bank

5. Demographic growth has also been accompanied by rising in household income and an exponential motorization growth, especially of private vehicle fleet, as not alternative quality public transport is available. As most large and medium-size African cities, Maputo has faced a rapid increase in motorization on a road network that inadequately strains against the supply. Vehicle ownership is generally linked to household wealth, so those households with private vehicles have more options to access opportunities. The light vehicle fleet (mainly used as private vehicle) in Maputo Province and City grew by over 332 percent between 2009 and 2019. In 2019, the country's automobile fleet continued to be concentrated in the City and Province of Maputo with 42.2% and 37.3% of the national fleet, respectively.

6. **Very few AMM households own a vehicle, emphasizing the importance of public transport and non-motorized transport in all its forms across the country** (**Figure 5**). Car ownership is low (<1.5%) all quintiles, except for the top quintile, where around 14 percent of the households own a car. Vehicle ownership is mainly concentrated in the top decile, where 23 percent of the households own a vehicle. Motorcycle or scooter and bicycle ownership are negligeable in AMM.

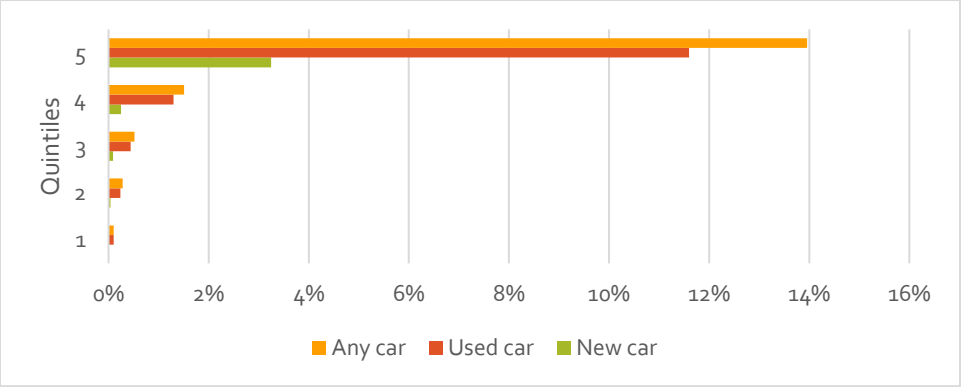


Figure 5. Car ownership in the Maputo City and Province by quintiles. Source: 2015 IOF survey

7. **The rising demand for transport has not been accompanied by needed development of transport systems and demand management measures, while transport externalities continue to grow.** Although a number of urban infrastructure works have already been carried out in the recent years (for example, the circular road, Katembe bridge was inaugurated in 2018 to better connect the Maputo metropolitan area with the rest of the southern part of the country, etc.), the rate of growth of urbanization and motorization surpasses that of transport infrastructure and public transport service supply. Investments necessary to cope with the increased demand are simply not sufficient. The underinvestment has been especially marked in the periphery areas of AMM. To be able to sustain the pace of higher economic growth, urban areas need to develop transport policies that can ensure expansion and improved performance for the transport sector – with a focus on sustainable public transport systems, non-motorized transport and managing the externalities just as emissions and congestions. However, urban areas in most parts of Africa, particularly Sub-Saharan Africa (SSA) have dramatically low levels of access and mobility with attendant major development challenges. In the absence of formal public transport, informal public transport flourished in all urban areas.

Very low levels of accessibility to jobs and social services challenge AMM's competitiveness and inclusion

8. **Poor people's inability to access jobs and services is an important element of social exclusion that defines urban poverty.** The bottom 40 percent depends on public transport and walking for daily travel. A common indicator to measure accessibility is the share of the city within walking distance of public transport services. In the case of Maputo Metropolitan Area, almost half of the AMM population (45 percent) does not have public transport services (either formal or informal public transport) accessible to them. Public transport is inaccessible to a vast number of the poor because of their remote location, the poor road network and highly irregular transport services. Accessibility by public transport shows major disparities among neighborhoods, as described below.

9. **Accessibility to job opportunities in Greater Maputo ranges from moderate to extremely poor. The accessibility analysis shows the scale of the difficulty of AMM of tying together low-density, peripheral**

areas with Maputo city center. In the extensive peri-urban region of Maputo, both local economic opportunities and access by public transport, remain extremely limited and dictated primarily by immediate proximity to roads and the level of service available (**Figure 6**), with particularly low access levels in low-income areas. The low-density residential growth is rapidly converting (semi-) rural and agricultural into housing plots with minimal infrastructure and facilities. The access roads in these areas are unpaved roads, which are prone to deteriorate badly in the rainy seasons. Operators of buses and minibuses are not entering these areas as they are, quite reasonably, unwilling to have their vehicles damaged by the bad road conditions. The result is that many of these residential areas lack any organized public transport, so that residents must either avail of informal and unsafe transport modes (which can be expensive) or walk long distances to where public transport is available. The population of this peri-urban region, which includes a substantial diversity in terms of the identification of poverty (Figure 7) and its travel-distance from the city mean that potential positive effects of agglomeration may be failing to materialize.

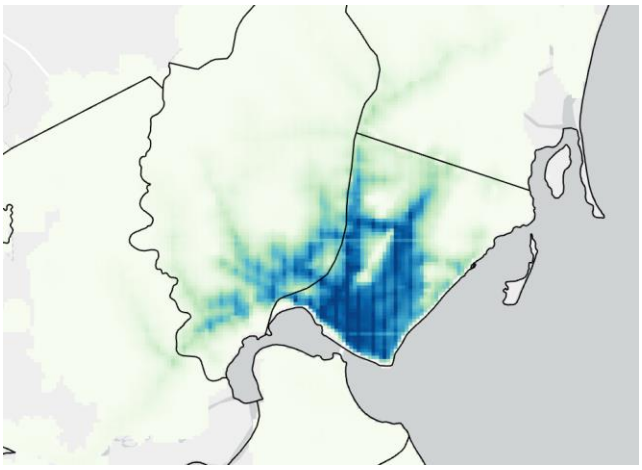


Figure 6: Accessibility to employment opportunities using public transport (60min commuting time) (darker blue=higher access, light green=lower access)

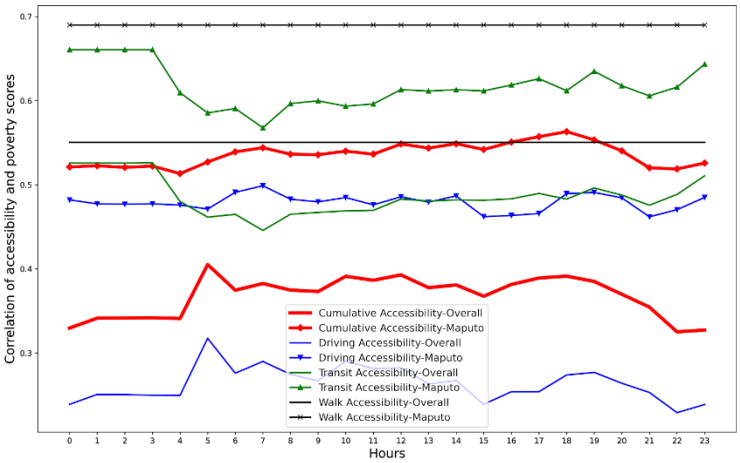


Figure 7: Correlations of accessibility with the poverty scores. All classes of accessibility, across all hours in the day, have significantly positive correlations with poverty score, implying lower poverty scores (more poor regions) have lower accessibility

10. **Accessibility to health and education facilities in Maputo poorest population is one of the lowest in Africa slowing down the development of its human capital.** A compilation of the household surveys of the last 5 years reveals that 80 % of the poorest quintile of Maputo population indicates that distance is the major constraint to seek treatment in a health facility. This is the highest values among major Africa cities followed by Monrovia (75) and Addis (68) (source: WBG[4]). The same study estimates that approximately 20% of Greater Maputo needs more than 60 mins to reach its closest health facilities by public transport (Figure 8 and Figure 9). Similarly, children in Maputo have the highest walking time to the closest primary schools, at average 56 minutes, followed by Harare at 26 min. Only 58% of children in Maputo can reach a school in less than 30 minutes of walk. When public transport is considered, the average travel time drops

[4] *Connectivity for Human Capital: Realizing the Right to Education and Healthcare through Improved Public Transport in African Cities. WBG 2020.*

to 22 minutes to reach is closest primary school, still being the highest values for African cities only tied with Harare and followed by Kigali (15 mins).

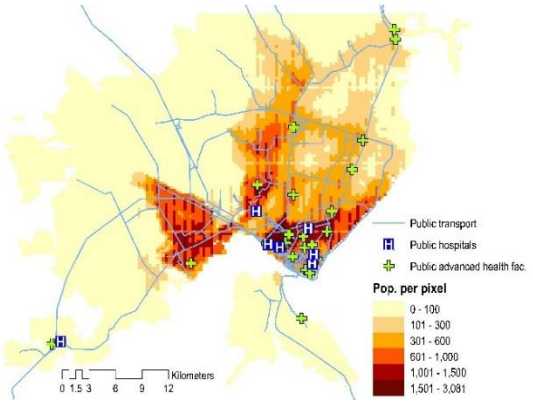


Figure 8: Location of Health Facilities and Population Density in the GM area. (source: WBG)

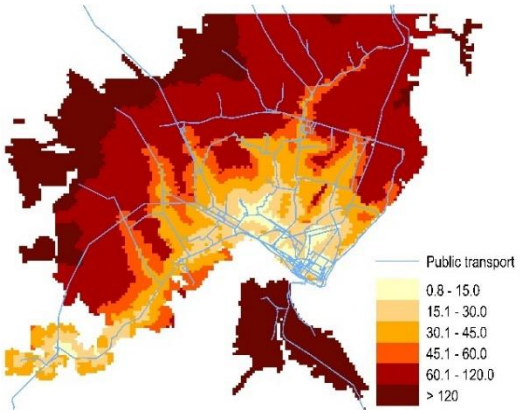


Figure 9: Travel time with public transport to Health Facilities (source: WBG)

11. **Climate change is having a direct impact on accessibility by disrupting transport services during the intense rainy season.** Current flood events prevent residents from accessing public transportation, lowering traveling speeds and creating disruptions on the network, reducing substantially the ability of people to reach their employment opportunities. In Matola, for example, due to flooding disruptions on the transport network, about 10% of people in Matola lose more than 50% of the employment opportunities due to flooding and job location (Figure 10). Unpaved roads, poor drainage infrastructure and management as well as the city's overall lack of urban planning worsens the effects of flood events. Additionally, the urbanization growth is projected to keep increasing in the Maputo and Matola areas exacerbating the risk of urban flooding events.

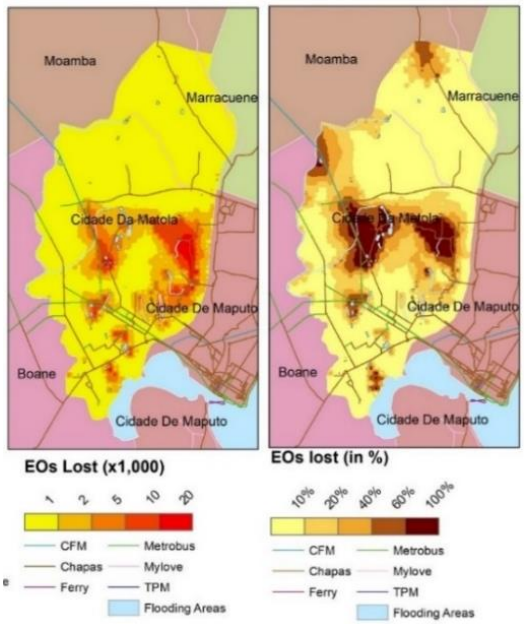


Figure 10: Flood Impacts to Accessibility in Matola, by employment opportunities lost in 60 min travel time.

12. **Access to transport services is even more challenging for women and persons with disabilities in Maputo Metropolitan Area due to their different transport characteristics.** Safety and security constitute a major concern for women in influencing their choice of mode, time and place of travel. Persons with disabilities (PWD) are another vulnerable group that experiences barriers to accessing opportunities. There have been so far limited efforts to address the specific needs of PWD. In addition to service quality, design considerations, social dynamics and enforcement are crucial for an inclusive public transportation system.

Poor quality public transport and dominance of the informal private operators

13. Public transport provision in the AMM is characterized by inadequate supply of public transport and a dominance of informal minibuses. Passenger transport services in the AMM are provided by a mix of regulated and unregulated modes, and a combination of public and private operators. The public transport system is mainly comprised of bus and minibus routes, with a small number of rail and ferry services. The bus and minibus sector is fragmented across a large number of vehicle owners that are coordinated through associations and cooperatives. There is also a municipal bus operator, EMTPM, and a formal operator called MetroBus which operates some commuter rail services and a handful of connecting bus services. As of 2021 and based on surveys in selected locations of the AMM[5], the share of motorized trips carried out by minibuses (also known as "*chapas*")[6] in the selected locations was approximately 44 percent, the balance being accounted by large bus operations (37 percent), and private cars (18 percent). Common forms of informal public transport, such as Myloves[7], were not captured in the surveyed areas and therefore, their shares are unknown.

14. The formal transport supply is significantly less than is required in Greater Maputo. It currently consists of about 350 large buses, and a limited commuter rail service. This is well below what would be required, and the effective capacity is further reduced by the major loss of productivity at peak times due to traffic congestion. The consequences is visible in the grossly overcrowded public transport vehicles at peak times and in the proliferation of informal transport services that cater to the unfulfilled demand.

15. The minibuses have emerged in the last decade as the main form of informal public transport, with the gradual decline in state provided services. Chapas are minibuses operating under a route license issued by the relevant municipality. Whilst the majority of chapa operators are part of an association, operations are conducted wholly on an individualized basis, with vehicles purchased and managed by individual owners rather than by the associations. The arrangements are typically informal, lacking any contractual relationship between the owner and driver.

16. There is an urgent need to increase transport supply. High-capacity investment projects, even if started immediately, will only deliver extra capacity in the medium- to long-term. Additional supply is also required in the immediate term that can deliver capacity in through practical measures that can be delivered quickly. This will inevitably depend on bus services and low-infrastructure/traffic management measures.

17. While volume of supply is the "crisis" issue, there is also a pressing need to improve service quality and comfort. Otherwise it will be difficult to attract or retain users that have the possibility for personal transport, potentially exacerbating the traffic situation.

---

[5] Based on surveys of motorized vehicles conducted in selected locations (Ave de Mocambique N1 and Ave Julius Nyerere) in 2021.

[6] *Chapas* is the collective term used by the people of Mozambique for privately operated vans and minibuses, mostly 15-seater but some 26-seater vehicles.

[7] *"Myloves" are open-backed vans and small trucks in which passengers are carried in the rear, sitting on the side panels or stand on the open interior. They get their name from the need for passengers to frequently grab on to other passengers to stay upright or to avoid falling out of the vehicle.*

Table 1. Public Transport modes in AMM

Mode	Ownership	Typical capacity	
Chapas	Private owners formed into associations	Small, 15-person 90% of Chapas	
		Large, 29-person 10% of Chapas	
Bus	Private owners formed into co-operatives & municipal companies	Small, 53-person 20% of Buses	
		Large, 90-person 80% of Buses	
MyLove	Private owners	20 to 35-person	
Photo source: Cartamz 2020, Club of Mozambique 2019			

18. In this context, the Government of Mozambique has initiated reforms for professionalization of the sector. In an effort to professionalize public transport sector, in 2016 the Government introduced the cooperatives model, aiming to provide formally-organized and privately-operated bus service in the AMM. Currently, there are 10 cooperatives operating 350 large buses under agreement with the Maputo Metropolitan Transport Agency (AMT) and the Transport and Communications Fund (FTC). These cooperatives are legal entities, formed from chapa (minibus) operators, based on the current associations. Since end of 2020, AMT has been in the process of putting in place a card-based fare collection system for the cooperatives and for the Municipal Company of Transport of Maputo (EMTPM) services[8].

[8] The FAMBA fare collection system is a PPP in which a private sector consortium provides the full technical, customer-facing and back-office systems, under 10-year contract to AMT. The in-vehicle system was rolled out across the Cooperative routes during February to May 2021. The goal is to move to a fully cashless payments system in which customers will be required to have a card or a QR-code ticket when boarding. Revenue will be centralized under AMT control and then distributed to the operators, after AMT and the system provider have each received an agreed percentage. Among other things, this will provide AMT with a secure source of funding. Uptake of the cashless option has been moderate to date and is required to accelerate during late-2021 and into 2022.

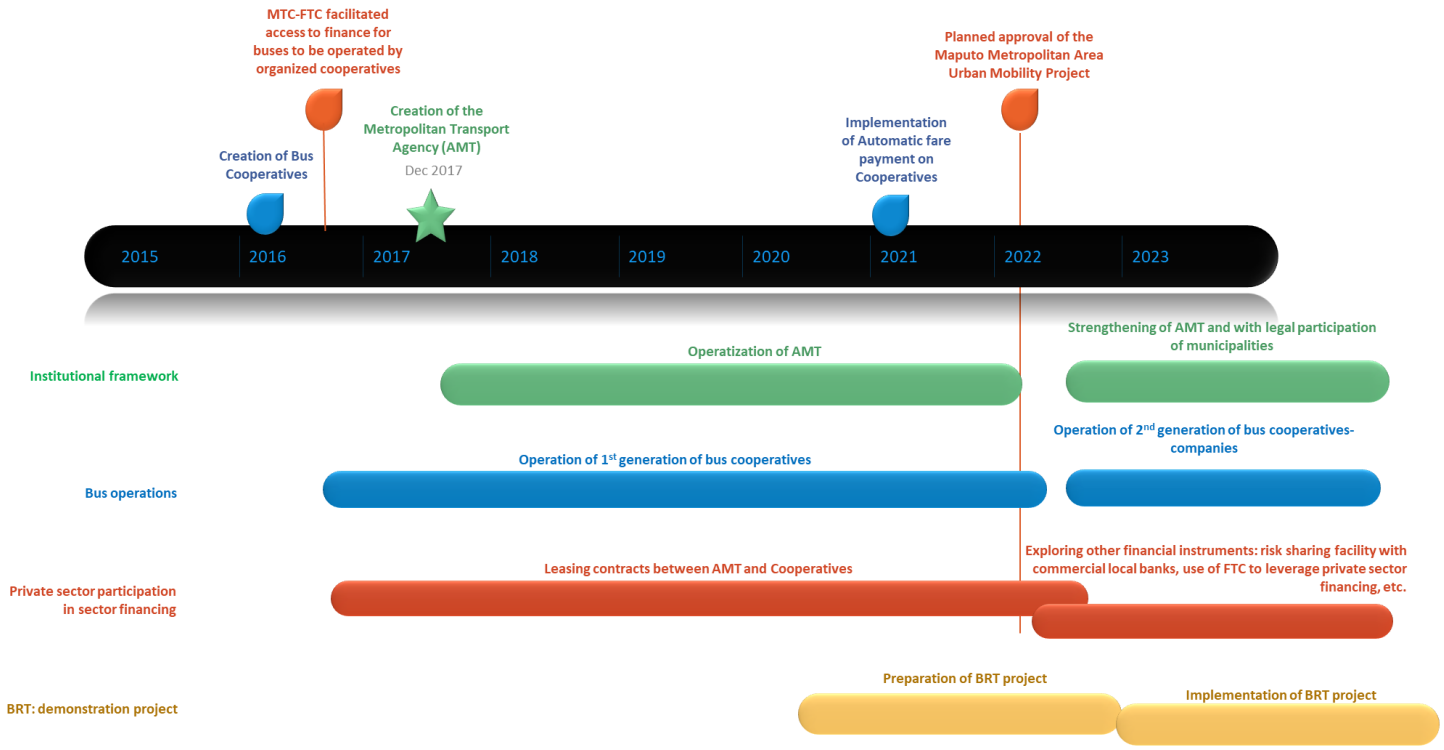


Figure 11. Timeline of sectoral reforms in urban transport in the Maputo Metropolitan Area

2. Understanding citizen's mobility and their experience in AMM

Key messages:

- Mobility patters in AMM are characterized by a strong concentration of trips going to/from central Maputo. Long distance trips to Central Maputo are common, especially from Marracuene, west and north Matola and from areas in north Maputo such as Zimpeto and Magoanine.

- When comparing how women and men travel, the findings from the traveler interview survey show that women in Maputo tend to make trips covering a wider range of purposes. Women may make more trips that align with 'duty of care' purposes including shopping, taking children to school and visiting other relatives. As women make more journeys to support family and home life this can leave less time for them to participate in employment opportunities. This may contribute to only 37% of trips for women being to/from work.

- Women are more likely to travel with children with 4% travelling with children compared to 1% of male respondents. Women (3%) are also more likely to travel with luggage compared to men (1%). 85% of men can be found travelling alone compared to 75% of women, this could be due to escorting children to places or travelling with friends. It is likely that this survey under-reports the proportion of women who do travel with dependents as these women may have sought to avoid questioning.

How do people move in AMM?

19. To understand the demand for travel in the AMM, this study has used a combination of innovative big data methods (using phone data) to understand mobility patterns and on the ground survey plan (including traveler surveys, vehicle counts, public transport frequency and occupancy survey, and Boarding and alighting survey). The traveler survey included 2,000 public transport passengers; 51% of which are female and 49% male and 66% were Chapas users, 20% Urban bus users with the remainder a mix of other modes.

20. **Mobility patterns in AMM.** Mobility patters in AMM are characterized by a strong concentration of trips going to/from central Maputo. Long distance trips to Central Maputo are common, especially from Marracuene, west and north Matola and from areas in north Maputo such as Zimpeto and Magoanine. The Origin and Destination (OD) of trips are presented in Figure 13 (from GPS cell phones)[9]. The ODs show a significant number of trips that cross municipal binderies on a daily basis, which reinforce the importance of a metropolitan planning of urban mobility in AMM.

21. The average trip conducted on public transport is 11.8 km long and takes 105 minutes - this distance and trip duration are comparatively long relative to other cities. Figure 12 presents the distribution of trip lengths for different modes derived from the traveler interview.

[9] Because the data is not factored up, the maps present the relative difference in the sizes of movements and trip ends.

Figure 12. Distribution of trip distance by main mode

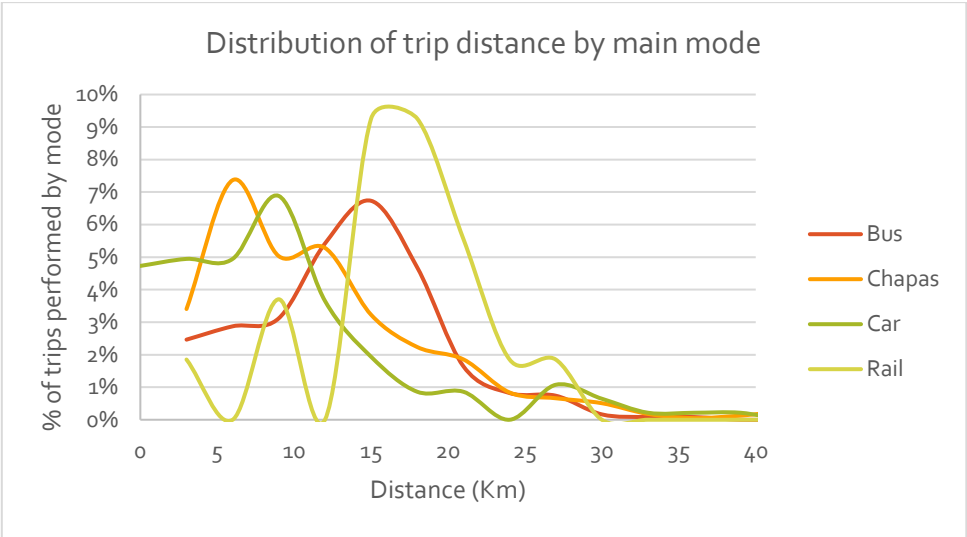
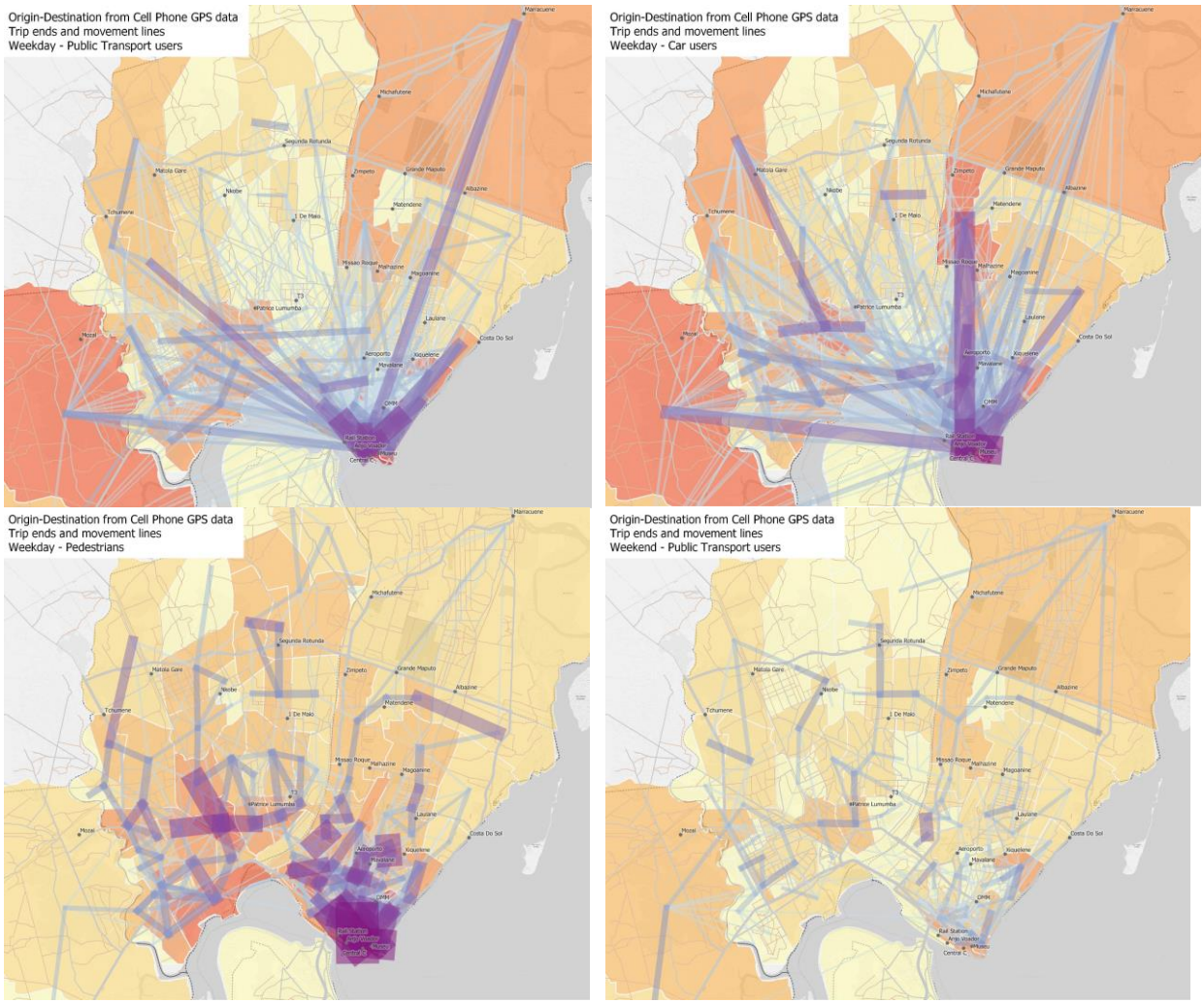
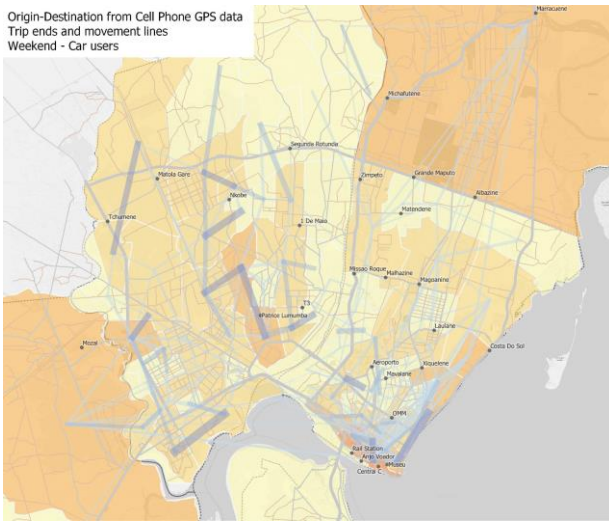
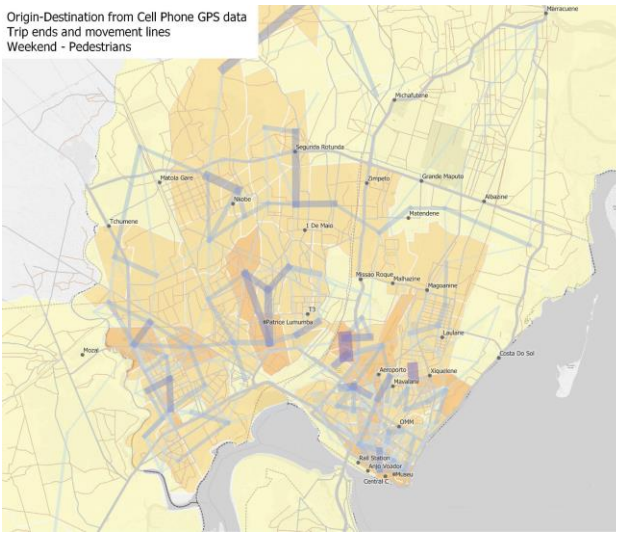


Figure 13. Origin-Destination pattern from Smart Phone GPS. Source: the World Bank

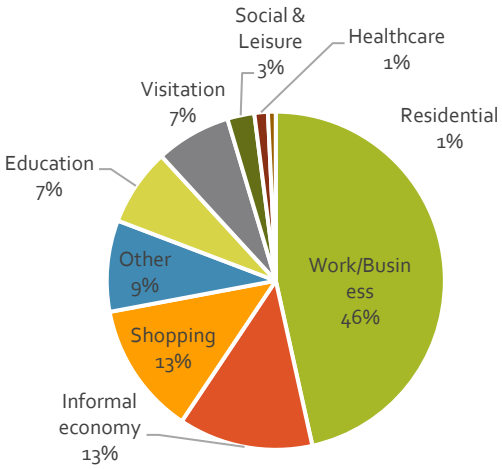






22. **Trip purpose.** The traveler interview shows that ~60% of trips are travel to/from work, including informal economy work (13%). Shopping comprises 13% of trips and education 7%. These proportions are similar to other Sub-Sahara African cities, however this survey was conducted during Covid-19 pandemic period, which appears to have suppressed educational, social and family (residential) trips. As a result, this has left a larger proportion of work-based trips.

Figure 14. Trip purpose share



23. **Daily profile of travel.** Figure 15 details the profile of vehicles observed through the day at the 2 classified vehicle count sites, it shows a marked AM peak for car users between the hours of 7am and 8am and a PM peak between 4pm and 5pm. Figure 16 presents the daily profile of public transport passengers passing the 4 public transport survey sites. Due to the need to abide to a Covid-19 curfew, the survey was conducted from 6am to 7pm only. It is likely that relatively high passenger flows also occur before 6am, and after 7pm.

Figure 15. Daily profile of vehicles moving at count sites (Count sides are Ave Julius Nyerere and N1 Ave de Mocambique)

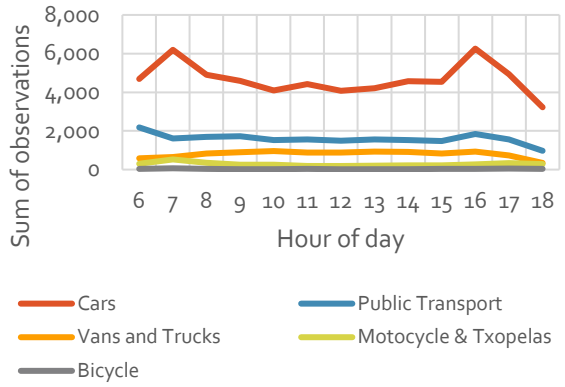
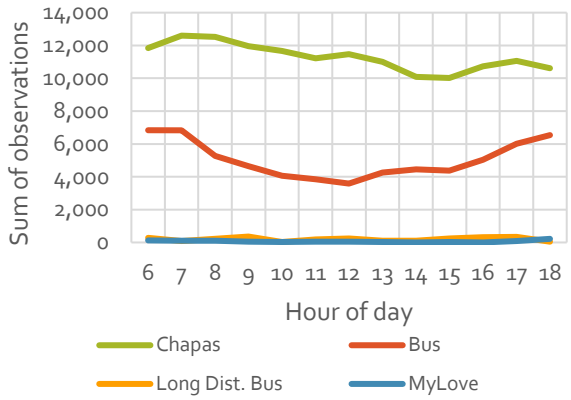


Figure 16. Daily profile of public transport passengers



24. The number passengers carried by Chapas appears to be fairly flat throughout the day, even declining as the day goes on, whereas passengers using bus services present a clearer AM and PM peak. The reduction in Chapas passengers matches a reduction in frequency of Chapas services as the day goes on. It is possible that higher afternoon congestion impacts on Chapas operating speeds and/or that Chapas drivers are opting to exit the market once they have sufficient takings for the day.

25. The AM and PM peak for public transport passengers is much flatter compared to car users. This indicates a peak-spreading for public transport passengers. This is likely caused by capacity limitation in the supply of public transport, as well as the need for public transport passengers to start their trips earlier as they take longer to complete, especially if an interchange is required.

Figure 17. Modal share (Passenger Car Units, PCU)

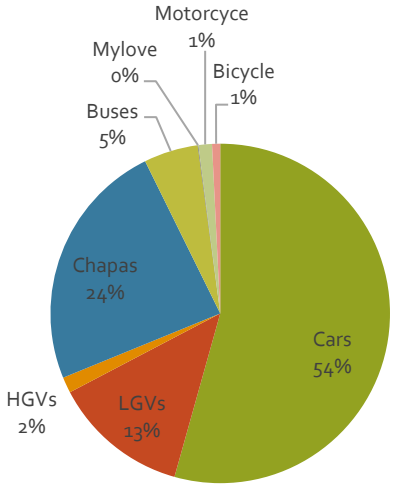
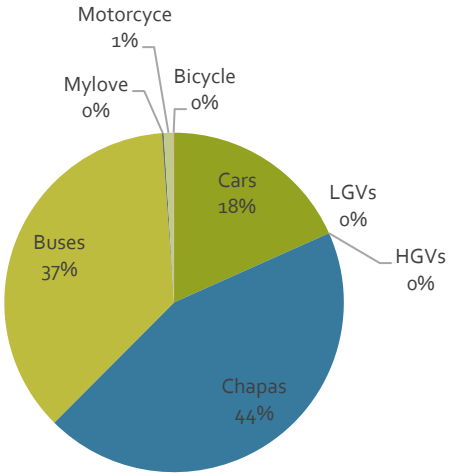


Figure 18. Modal share (% of passenger)



26. **Modal share[10].** Cars present the least efficient use of road space. They account for 54% of the road space used and carry only 18% of passengers. Buses present the most efficient use of road space. They account for 5% of the road space used and carry 37% of passengers. Chapas account for 24% of road space used and carry 44% of passengers. Light Goods Vehicles and heavy Goods Vehicles account for 15% of road space used at the count sites. Figure 17 presents the mode share of vehicles passing the count sites in terms of Passenger Car Units (PCU). Figure 18 presents the mode share of the number of passengers carried.

How is the travel experience for users in AMM?

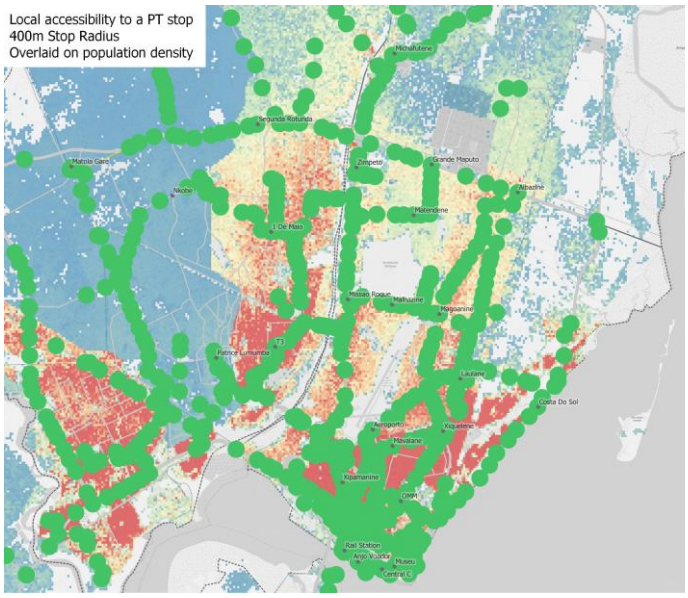
a) Walk and wait time

27. Walk time is typically 13 minutes for the whole trip - this is at the top end of acceptability. This indicates that many people live far from their nearest transit stop. Waiting times of 36 minutes for Bus and 24 minutes for Chapas are very high. This includes the time waiting for the first bus boarded and also time waiting to interchange. Figure 19 shows how much of the total journey time was spent walking to/from the transit stop and waiting at the stop.

28. Walk time is related to how close an origin or destination is located to a well-served transit stop. Figure 20 maps the 400m radius (expected walk distance) around every PT stop in the city. This is overlaid on top of population density. Many areas of the city are located far from the nearest public transport stop, especially in the new suburbs, as well as some dense inner-city areas of Maputo and a large area of high population in Matola.

Figure 19. Breakdown of journey time by main mode

Figure 20. Local accessibility to transit stops



[10] The mode share data collection was collected in count sites (Ave de Mocambique N1 and Ave Julius Nyerere). These counts also omit pedestrians which are likely to represent a large proportion of trips. Due to limited sample, the surveys conducted were too limited to capture the mode share for the whole city, however they provide an updated estimation of modal share on key corridors of the city.

b) Requirement to interchange

29. The requirement to make an interchange can add a significant time penalty to a trip. The typical public transport journey in Maputo requires 1.7 stages to complete. Journeys conducted by Chapas are the most likely to require an interchange, whereas journeys conducted by Bus are much more likely to be completed in a single stage. Table 2 shows how many stages it took to complete a PT trip in Maputo – for this analysis a walk of over 15 minutes is counted as its own stage.

Table 2. Number of stages taken to complete PT trip by main mode

Main Mode	Number of Stages				Average number of stages
	1	2	3+	4 or more	
Rail	67%	11%	17%	6%	1.6
Bus	80%	12%	6%	2%	1.3
Chapas	54%	26%	14%	6%	1.7
All PT trips	**63%**	**24%**	**13%**	**5%**	**1.7**

c) Passenger demand on services

30. The interrelation between the supply of Public Transport (PT) and trip demand determines how the PT service are used, this includes the loading on each route and where passengers board and alight the services. Analyzing supply and demand data in the corridors analyzed in the travel survey, we can observe the following:

31. Observations for the buses:

- The busiest bus routes are Baxia-Albazine, Zimpeto-Praca dos Combatentes, Baixa-Magoanine (via N1) and Baixa-Magoanine (via Mavalane) which each carry over 10,000 passengers per day.
- The major co-operatives operating these routes are Coralba, Contrac 1, Cootrazima as well as the municipal bus company EMTPM.
- The AM peak frequency for these busy routes range from 6 to 9 vehicles per hour, which equates to a headway of between 10 and 7 minutes for each route. The routes vary in length from 12 to 19km.
- The buses routes that were captured in on-board surveys have operating speeds of around 15kph in the AM peak.

32. Observations for Chapas:

- The busiest Chapas routes are Praca dos Combatentes-Anjor Voador (via Malavene), Praca dos Combatentes-Anjor Voador (via OMM), Praca dos Combatentes-Xipamanine and Museu-Malhazine (via N1) which each carry over 30,000 passengers per day.
- The AM peak frequency for these busy routes range from 45 to 85 vehicles per hour, which equates to headway of around 1 minute for each route. The routes vary in length from 7km to 17km.
- The Chapas routes that were captured in the on-board surveys have operating speeds of around 16kph in the AM peak, with slower speeds in the PM peak.

d) Fare

33. The median public transport fare paid is 20 MZN (0.35 USD). Direct journeys, which involve 1 stage only, cost on average 12 MZN (0.21 USD). Table 3 presents the average fare paid for a whole trip (including interchanges) by trip purpose. Table 4 presents the fare paid for trips involving different numbers of stages.

Table 3. Average one-way fare paid by trip purpose

Trip purpose	One-way Fare (MZN) incl. interchanges
Work/Business	20
Informal economy	18
Shopping	18
Education	22
Visiting Friends/family	23
Social & Leisure	14
Healthcare	20
Home to home	12
Other	20
Average	**20**

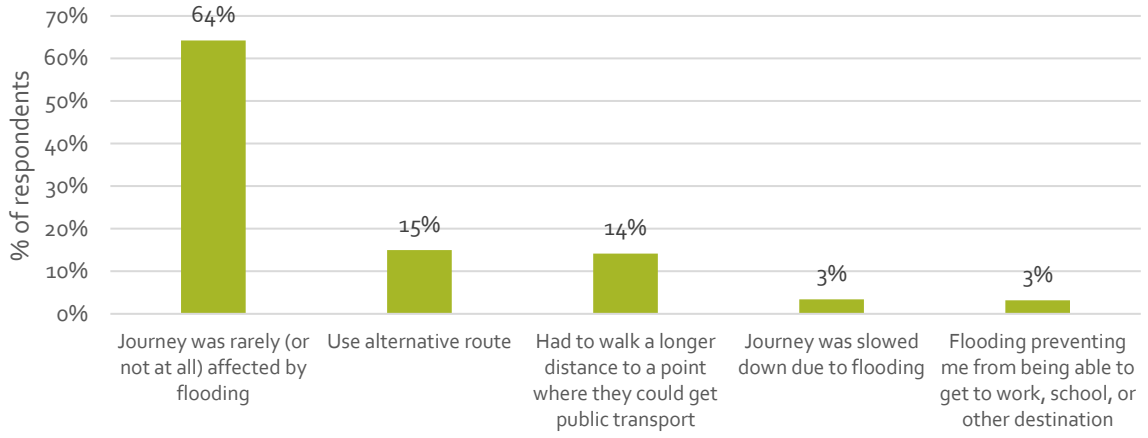
Table 4. Average one-way fare paid by number of stages

Number of stages	One-way Fare (MZN) incl. interchanges
1	12
2	25
3	34
4 or more	44

e) Impact of flooding

34. Figure 21 presents the results of the travel survey where Respondents were asked how much flooding affected their travel during the previous rainy season. The results show that flooding affected the travel of 36% of respondents. 3% of these were unable to reach their destination at all.

Figure 21. Impact of flooding upon travel – How much did flooding affect your travel the in previous rainy season?



f) Quantifying passenger experience

35. To better understand the passenger experience, interviews were held with approximately 2,000 travellers on the street in Maputo. These interviews asked travellers about the characteristics of their last journey, what decisions guided their transport choices and their opinions on travelling in Maputo.

36. The most concerning aspects across all modes, and particularly so for Bus and Chapas, were long wait times, long journey times and uncomfortable services. The modes considered to provide the poorest service are Taxi and MyLoves followed by Bus and Chapas. Table 5 presents the results of passengers' rating of different aspects of their journey conducted in relation to the mode used.

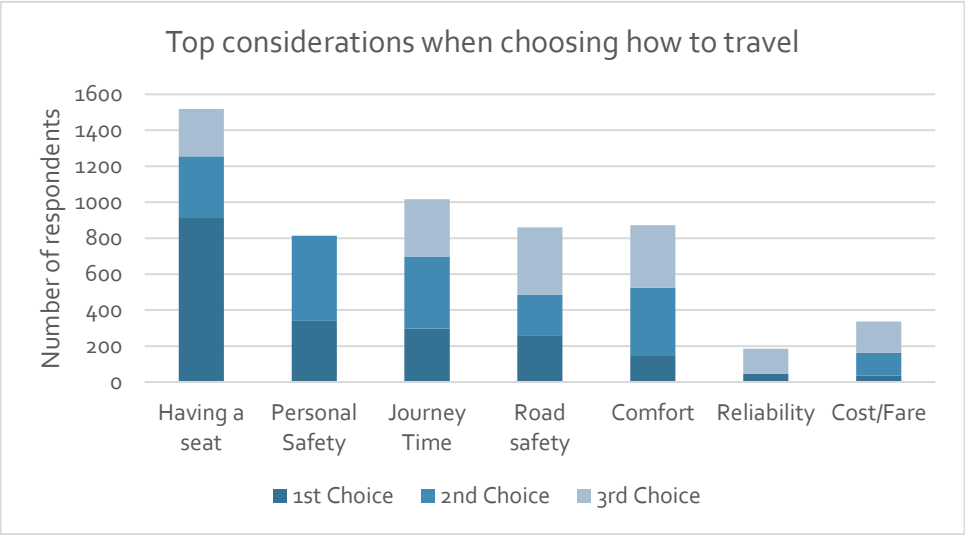
Table 5. User rating of each transport mode (out of 5)

	Rail	Bus	Chapas	Mylove	Car	Saloon Taxi	Walk	All
Too long	2.7	3.0	2.7	2.8	2.3	3.0	2.3	**2.8**
Uncomfortable	2.5	3.2	2.9	3.8	2.1	3.0	2.9	**2.9**
Expensive	2.4	1.9	2.2	2.2	2.0	5.0	1.5	**2.1**
Wait time	1.9	3.5	3.3	3.3	2.9	4.0	3.8	**3.3**
Personal safety concerns	2.2	2.3	2.5	4.0	1.7	3.0	2.1	**2.4**
Vehicle safety concerns	2.1	2.3	2.4	3.5	1.9	4.0	1.8	**2.4**
All	**2.3**	**2.7**	**2.7**	**3.3**	**2.1**	**3.7**	**2.4**	**2.7**

Rating out of 5: 5 = major problem, 1 = not a problem. Ratings only provided by users of that mode

37. Figure 22 presents the most important considerations for travelers in Maputo. Getting a seat comes top, which indicates there are capacity issues. This is followed by personal safety, journey time and road safety. Cost/fare is not considered to be a top consideration for most passengers.

Figure 22. Top 3 considerations when choosing how to travel



Are there gender differences in the mobility patterns and travel experience in AMM?

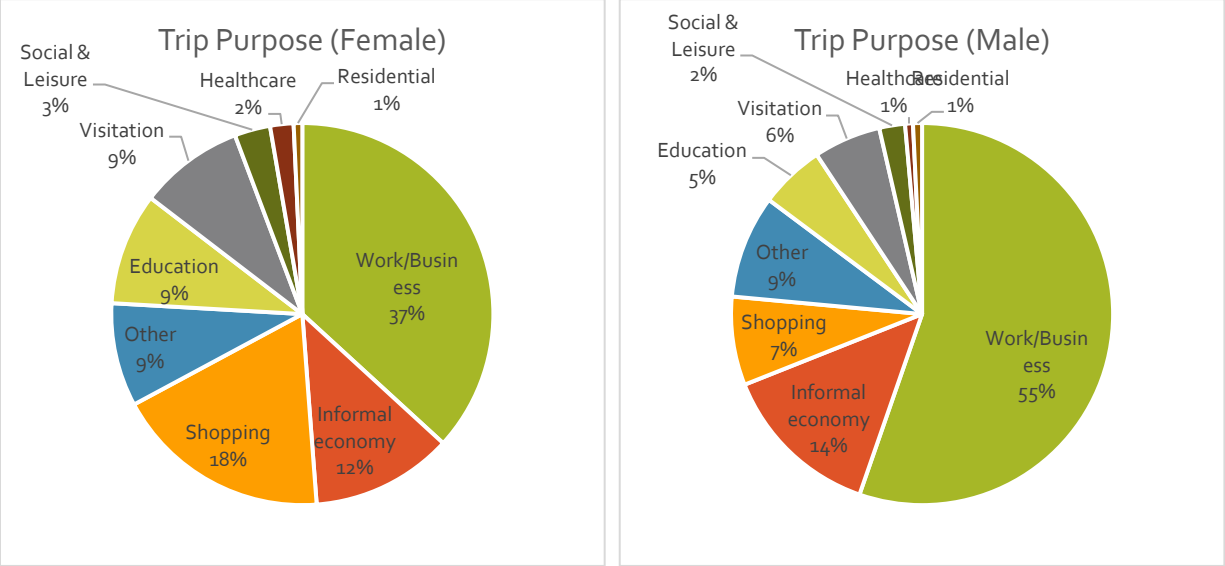
38. **Access to transport services is even more challenging for women in the AMM due to their transport behavior and travel needs.** Women in Maputo tend to make trips covering a wider range of purposes. Women may make more trips that align with 'duty of care' purposes including shopping, taking children to school and visiting other relatives. Women are more likely to travel with children and luggage compared to men. A recent study conducted in Maputo[11] found that while work or business-related trips represent the largest type of trip for males and females, for men business trips are over half of their total trips (55 percent) and for women these are about 37 percent. Another disparity is observed in trips labeled as shopping, where the survey found that women's share of shopping trips is more than double of that of men, 18 percent vs 7 percent respectively. The same study also found that 85% of men in AMM can be found travelling alone compared to 75% of women, this could be due to escorting children to places or travelling with friends

39. **Among females, girls are the most at risk group**. A study conducted by the Eduardo Mondlane University in two densely populated districts of Maputo found that approximately 60 percent of female respondents have experience violence in their lives. However, when comparing the share of responses disaggregated by age, 65.7 percent of girls between 12 and 17 years old indicated having experience some form of violence in a public space, compared to 54.4 percent of women that are over 18 years old. The study also revealed that one of the conductive factors for BVH is good public lighting, because even if almost all respondents mentioned that public illumination is available in the streets, 43 percent mentioned is not satisfactory. One study estimated that of those reporting never using public transportation, car or taxis, 70 percent were women, and another survey revealed that over 90 percent of girls feel unsafe when traveling after 10pm. Safety and security constitute a major concern for women, and it influences their choices on travel mode, time and origin and destination, or not to travel at all. For those who travel, doing it by modes, such as the open trucks, locally called "mylove" because of the close contact between passengers, represents a significant safety and security risk, that affects women disproportionally.

40. When comparing how women and men travel, the findings from the traveler interview survey show that women in Maputo tend to make trips covering a wider range of purposes (Figure 23). Women may make more trips that align with 'duty of care' purposes including shopping, taking children to school and visiting other relatives. As women make more journeys to support family and home life this can leave less time for them to participate in employment opportunities. This may contribute to only 37% of trips for women being to/from work.

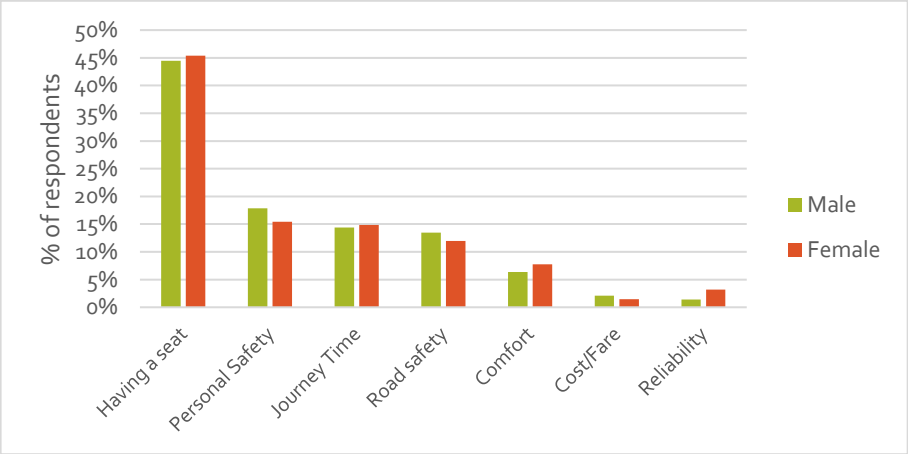
[11] To better understand the passenger experience, interviews were held during project preparation with approximately 2,000 travelers on the street in Maputo. These interviews asked travelers about the characteristics of their last journey, what decisions guided their transport choices and their opinions on travelling in Maputo. 2021. The World Bank.

Figure 23. Comparison of trip purpose, female and male



41. Figure 24 indicates that the comparisons of top considerations for men and women are comparable. This supports reports of a lack of PT capacity and overcrowding is the key issue in Maputo.

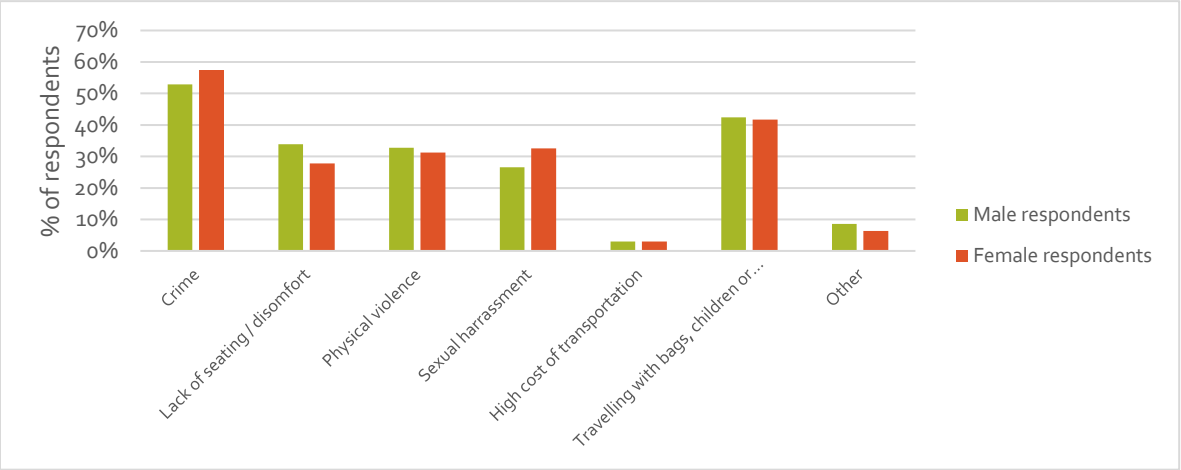
Figure 24. Comparison of top considerations when choosing how to travel



42. Women are more likely to travel with children with 4% travelling with children compared to 1% of male respondents. Women (3%) are also more likely to travel with luggage compared to men (1%). 85% of men can be found travelling alone compared to 75% of women, this could be due to escorting children to places or travelling with friends. It is likely that this survey under-reports the proportion of women who do travel with dependents as these women may have sought to avoid questioning.

43. Respondents were asked what they considered to be the biggest challenges faced by women when using public transport - this question was asked to both men and women (Figure 25). The biggest challenges are thought to be crime and travelling with dependents/luggage, followed by sexual harassment, physical violence and 'getting a seat'.

Figure 25. Biggest challenges faced by women when using public transport



3. Institutional fondation: Institions, policy and legislation for urban transport in AMM

Key messages:

- Urban mobility in Maputo Metropolitan area deferred by the existing fragmentation between national and local governments. Multiple government ministries and departments are responsible for planning, financing, management, implementation and enforcement in the urban transport sector.

- The establishment of the Maputo Metropolitan Agency (AMT) has been an important step to address the institutional coordination and public transport regulatory issues in AMM, nonetheless it remains substantially under-staffed to fulfill its mandate and the municipalities do not have a formal role in AMT's governance.

- There is not a comprehensive urban passenger transport policy and accompanying for Greater Maputo. The Comprehensive Urban Transport Master Plan for the Greater Maputo (2014-2035) provided a well-developed strategy in 2014 but implementation was to all intents and purposes shelved as a result of the national financial crisis. It could still provide the platform but it will first require revision to cater for the huge growth in population in Matola and to the north of the city, the new possibilities enabled by the Katembe Bridge, the emergence of the cooperatives, and alignment of investment projects with realistic projections of available funding.

- The core remit of AMT is to "*coordinate and implement the Maputo Metropolitan Area Transport and Mobility Master Plan*", which provides an essential starting point for update of the Master Plan and for its implementation. However, that needs to be translated into action and the updated Master Plan developed as a matter of urgency. Otherwise, it risks that investments and projects are advanced by their promoters rather than implemented as part of a structured program, with due regard to the best value-for-money allocation of available funds.

- It will be necessary to align the Maputo Metropolitan Area Transport and Mobility Master Plan with the Municipality Development Plans. Currently, each of the Municipalities and Districts has its own development plan, AMT does not yet have an updated comprehensive and integrated plan, so the task is to coordinate AMT actions with the established plans to the extent possible. For the next planning cycle, say 2025-30, the updated Master Plan would be available and the Municipalities and Districts would have their own plans that are well aligned with it. By the third cycle, say 2030-35, there may be a comprehensive Metropolitan Plan, while the individual Municipality/District Plans articulate its implementation at the local level. Thus, over perhaps three cycles there would be a gradual transition to a Metropolitan-level planning approach that incorporates and aligns local needs, backed by localized implementation plans.

An institutional and governance structure that is unable to respond to the complex mobility issues in AMM

44. **Multiple government ministries and departments are responsible for planning, financing, management, implementation and enforcement in the urban transport sector.** The key stakeholders relevant to urban transport in the AMM are (i) the Ministry of Transport and Communication (MTC); (ii) the Local Governments from the Municipalities of Maputo, Matola and Boane, and from the Districts of Marracuene and Matutuine; (iii) State Agencies, such as the AMT, the Transport and Communications Fund (FTC), the National Institute of Road Transport (INATRO) ; (iv) State-owned enterprises, such as National Port and Railway Company (CFM), and the Municipal Bus Enterprises; and (v) private entities such as the privately owned bus cooperatives operating in Greater Maputo, the minibus associations, the Federation of Road Transport Associations of Mozambique (FEMATRO), and the private railway operator Metrobus. It may be noted that other Ministries are relevant, such as Ministry of Finance for budget allocation, but they do not have a direct relationship with urban transport planning or provision. Likewise, technical regulatory agencies such as INATRO are tasked to set standards and to have oversight of safety, etc., but do not have any direct role on the transport service planning or provision. Table 1 provides an overview of the roles of the key institutions in urban transport in AMM, more details are provided in Annex 1 and 2.

Table 6: Overview of institutional entities with role in urban transport in Greater Maputo

RELEVANT ENTITIES	KEY ROLES REGARDING URBAN TRANSPORT IN GREATER MAPUTO
Ministry of Transport and Communications	• Formulation and direct development of road sector policies that cover safety and intermodal transport and of railway sector policies • Establishing norms and standards in the transport sector and ensuring compliance • Certification, licensing and approval of vehicles, systems, equipment and infrastructure used in road transport • Regulate, inspect and monitor railway concessions and use of railway infrastructure • Safeguard the rights of transport users • Preparation and allocation of budget for transportation • Oversight of the state agencies and enterprises • Appraisal and oversight of major investment projects
Maputo Province	• Cross-municipal bus route licencing
Municipality of Maputo Municipality of Matola Municipality of Boane District of Marracuene	• Local Government Body for its defined area • Urban transport policy and strategy • Preparation of Urban Development Plans and Transport Plans for its area • Regulation and supervision of public transport in its area, including Bus and route licencing and regulation of fares • Traffic and parking management and enforcement in its area • Transport infrastructure prioritisation and delivery
Maputo Metropolitan Transport Agency (AMT)	• Coordination of public transport planning and management across the Maputo Metropolitan area • Issue and manage contracts for urban bus cooperative routes • Organize services of integration of the urban public transport, including ticketing and information • Contracting agency for FAMBA fare collection
Transport and Communications Fund (FTC)	• Generate and distribute funds for the transport and communication sector • Has mobilized finance for large buses in Maputo area
INATRO	• Regulation, inspection and monitoring of road and railway concessions

	• Regulation, inspection and licensing of operators involved in the provision of surface transport • Promote safety, evaluate and monitor the efficiency and quality of public passenger transport services • Note that the Railway regulatory function is established within INATRO, but in practice the role is not currently exercised
CFM	• Provide, maintain and manage the railways infrastructure and signalling systems • Operate passenger rail services (note that virtually all of CFM's business is freight) • Oversight of contracted private operators of rail services • Manage concession and PPP projects for rail and ports

45. **Human capital in ministries, local government and government agencies in the transport sector lacks capacity, resources and proper institutional coordination.** Different levels of government have limited capacity in terms of manpower, specialized skills, and expertise in urban transport planning, regulation, management and financing.

46. **The establishment of AMT has been an important step to address the institutional coordination and public transport regulatory issues in AMM, nonetheless it remains substantially under-staffed to fulfill its mandate and the municipalities do not have a formal role in AMT's governance.** Urban growth within multiple jurisdictions in the Maputo Metropolitan Area renders difficult urban mobility planning and regulation in an area with metropolitan commuting. AMM has strong functional interaction between the periphery and the key commercial and administrative hubs located in the city center of Maputo, but handicapped without a proper metropolitan planning and without a transport system capable of providing access to people and goods in a safe, efficient and affordable manner. To tackle the issue of interjurisdictional and institutional coordination, in 2017 the MTC created by decree the AMT as a "regional institution with jurisdiction over the municipalities and districts of Maputo Metropolitan area[12]", aiming "to coordinate and implement the Maputo Metropolitan Area Transport and Mobility Master Plan". While the functions of AMT are comprehensive and well-defined, the Decree does not provide a role for the municipalities and districts in the governance structure, nor any protocols for how the AMT would interact with them, nor clarify how the overlapping mandates of AMT and the municipalities are to be aligned in matters such as authorization, award or management of bus routes. Furthermore, the technical capacity of AMT to lead and add value throughout the urban passenger transport system in the AMM remains an issue due to the limited human and financial capacity of the institution.

Limited resources and funding for urban mobility in the AMM

47. Resource allocation to the operation of AMT and municipalities in AMM is insufficient to develop specialized functions. At AMT level, the institution was supposed to be funded through part of the cooperatives operating revenues. However, the challenges implemented the FAMBA card complicates the trace of funds and allocation for AMT. At a municipal level the allocation for the transport-related departments is insufficient to cover the specialized functions of these departments. Local authorities are pressured to mobilize their own resources to meet the cost of implementing developmental objectives and service delivery; however, revenue collection usually falls short of its estimated amount and, once collected, its mobilization and management are deficient.

[12] Specifically, Maputo, Matola, Boane, Marracuene, and neighboring districts.

48. Capital investment projects in urban mobility have been limited. Investments in urban transport systems have mainly focused on road improvements, with low investment allocated to improve the operational environment of public transport, pedestrian facilities and formalization of informal transit. Other significant investments included procurement of rolling stock to operate in AMM by cooperatives and municipal bus companies. The national financial crisis of recent years had a significant impact in the capital investment in the sector and almost totally reduced the capacity to mobilize funds for urban transport infrastructure projects.

49. Investment finance is also required to acquire new bus fleet for service expansion, to renew existing fleet as the reach the end of their economic life and for facilities such as terminals, depots and technology systems. Operators currently cannot access the needed finance on reasonable terms, if at all. FTC has stepped in to mobilize finance for the existing Cooperative buses. The finance lines need to be put in place for the next wave of bus and facility acquisitions and renewals, whether through loan schemes for the operating companies, a new FTC facility, or a PPP arrangement such as n operating lease facility.

50. The potential to mobilize private sector financing in urban transport has not been fully operationalized in AMM. Experience gathered from around the world identified potential for private sector participation in urban transport in multiple areas such as infrastructure, vehicles, stations, depots, terminals and parking financing and operation, among others. Although some attempts were initiated, these were beset by a lack of successful precedents in Mozambique on private sector engagement in urban transport.

AMM and municipalities count with strategic government policies and plans on urban mobility, however, there has been limited progress in their implementation

51. **Mozambique transport strategy and plan (2020-2024).** The MTC is responsible formulation and direct development of transport sector policies that cover safety and intermodal transport. The MTC developed its strategy for a 5-year period. The document sets the boundaries for and outlines transport development goals. The strategy targets establishment of an attractive, competitive, and sustainable transport system comprising of road, rail, air-transport and maritime systems. Interpretation of these strategic aims and their application to the geography of Mozambique[13] translates into a transport network dominated by maritime and rail in the North-South direction and by road and river in the East-West direction. At the delivery level, the MTC strategy is articulated in the form of a 5-year plan (2020-2024).

52. **Comprehensive Urban Transport Master Plan for the Greater Maputo (2014-2035).** In 2014, the GoM developed the Comprehensive Urban Transport Master Plan for the Greater Maputo with target 2035, which examined the expanding Greater Maputo urban area and formulated a comprehensive transport master plan and listed priority projects that were identified. Pre- feasibility studies were conducted for the priority projects. The vision for the development Master Plan was: "Socially and Environmentally Sustainable Urban Transport Systems facilitating the International Gateway Capital." To achieve this vision, the following development strategies were agreed:

- Increase mobility/accessibility by improving public transport systems (related to Public Transport)
- Road network development with consideration to functions/hierarchy (related to Road Network)
- Better use of road space and improve vehicle/pedestrian environment (related to Traffic Management)

[13] Rail is assumed to be more competitive mode than road on distances of over 500km (e.g., North-South corridor)

53. The Comprehensive Urban Transport Master Plan for the Greater Maputo identified priority urban mobility policies, institutional enhancements, and specific priority projects for the Maputo Metropolitan Area. The progress on the implementation of recommendations has been mixed.

- The main institutional enhancement recommendations included the creation of the Maputo Metropolitan Transport Agency and the creation of a traffic and parking management agency/department/company dependent on the municipality of Maputo. Both institutional recommendations were implemented since 2014. However, both institutions remain understaffed and with limited capacity to developed their mandate.

- Among the priority projects identified, there has been progress in the development of road improvements. However, there has been limited progress on the development of public transport project identified (Figure 26 presents the priority mass transit projects identified in the Master Plan, among the public transport priorities). Limited progressed has been seen also on recommendations related to the improvement of traffic and parking measures in Greater Maputo. The priority projects identified are presented in Annex 3.

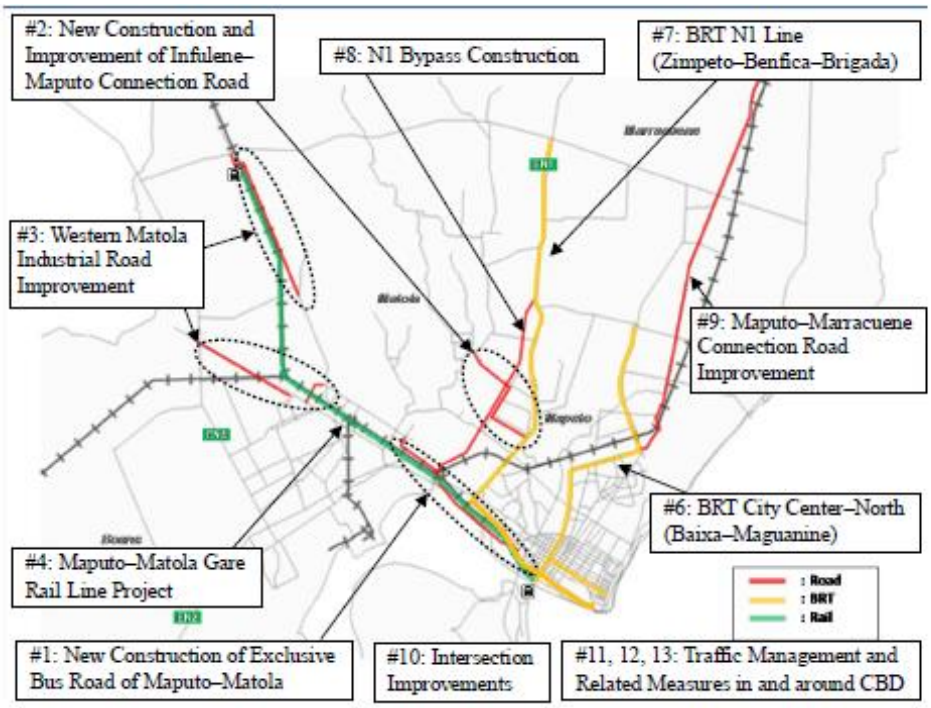


Figure 26. Map of priority project included in the Comprehensive Urban Transport Master Plan

54. **Maputo Municipal Development Plan (Plano de Desenvolvimento Municipal, PDM) (2019-2023).** The PDM for Maputo City aims to materialize the vision and political strategy of municipal governance for the Municipality of Maputo in the 2019-2023 term and to present the main lines of action to operationalize the commitments assumed in the *FRELIMO Electoral Manifesto* endorsed by the citizens in the fifth Local Elections held on October 10, 2018. The PDM is articulated as 6 pillars and 57 Strategic Objectives. Pillar 5 deals with "Development of Infrastructure and provision of basic Municipal Services). The transport and mobility projects are included in the Pillar 5 of infrastructure and service provision, and they are structured around three strategic objectives: (i) ensure the implementation of the transport and transit mobility director's plan with a view to improving the strategic and operational management of public and private

urban transport in the AMM, (ii) promote the use of collective mass transport means, (iii) promote improvements in the functioning of the public and private transport system. Annex 3 includes the list of projects within the PDM.

55. **AMT Strategic Plan.** In January 2020, the AMT published their Strategic Plan, which includes the proposal of the main projects that may eventually appear in its five-year plan, which has been submitted to the Government. Most of the proposed projects follow the recommended priority projects in the Comprehensive Urban Transport Master Plan for Greater Maputo. The project included in AMT Activity Plan are:

- Introduction of the BRT System
- Introduction of the surface metro linking Maputo – Matola
- Modal Integration and System Tariff (Road and Rail) and consolidation of the system's feeder lines
- Acquisition of buses powered by Natural Gas
- Consolidation of the use of mixed vehicles
- Consolidation of Electronic Ticketing in Urban Public Passenger Transport
- Acquire buses with different capacities adjusted to demand that are environmentally sustainable
- Transform current cooperatives into properly structured transportation companies to operate in the Maputo Metropolitan Area
- Expansion of night transport and creation of a specific company
- Capacity building and professional training in the areas of defensive driving, management and operation of transport and maintenance
- Readjustment of the network to meet the new hubs of attraction and generation of trips and construction of shelters at stops in coordination with the Municipalities
- Traffic control and management room creation
- Hiring qualified technicians for the sector

4. Maputo public transport industry structure and business models

Key messages:

- Urban Passenger Transport in Maputo Metropolitan Area is at an intermediate phase of development. The urban passenger transport is almost entirely road-based, with just very limited provision of commuter rail services. The road transport consists of regulated or semi-regulated route-based services operated by both large buses and minibuses (chapas); of regulated for-hire taxis, 3-wheelers and 2-wheelers; and of illegal services operated with open trucks (myloves) and by unauthorized motorcycle taxis.

- The *chapas* (minibuses) have emerged in the last decade as the main form of informal public transport, with the gradual decline in state provided services. Chapas have served an important purpose in providing mobility to people on a daily basis and employment to a vast number of migrant and low-income populations. However, they have also contributed to negative externalities such as air pollution, greenhouse gas (GHG) emissions, and poor safety and security.

- In an effort to professionalize and formalize public transport sector, in 2016 the Government introduced the cooperatives model, aiming to provide formally-organized and privately-operated bus service in the AMM. Currently, there are 10 cooperatives operating 350 large buses under agreement with the AMT and the Transport and Communications Fund (FTC). Operator business and management capacity is limited, for different reasons at the Cooperatives. The Cooperatives are not currently availing of economies of scale, in part due to having below-optimal fleet size, in part due to not adapting to a more corporatized model, and in part due to their relative lack of experience in large bus operations.

- Rail passenger transport represent a small portion of modal share in the AMM, and it is provided both by the National Rail Company (CFM) and the private company MetroBus.

Table 7. Overview of urban passenger transport modes in Maputo Metropolitan Area

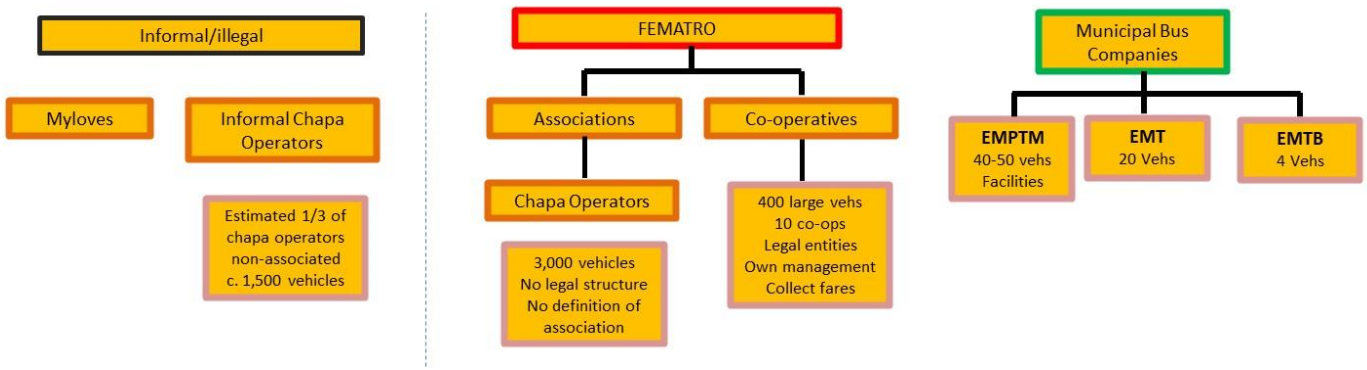
	MODE	OVERVIEW	APPROXIMATE SCALE
Road-based operators	Urban Bus – Public (regulated)	Bus routes on primary corridors and other routes operated by Municipal-owned enterprises	3 enterprises operating c. 60 buses daily
	Urban Bus – Private (Cooperatives) (regulated)	Bus routes on primary corridors by the Cooperatives	10 Cooperatives operating c. 350 buses on 6 corridors
	Minibus services (*chapas*) (regulated)	Minibus services operated on fixed routes by Associations of private operators	Number uncertain, believed to be about 2,000, of which about 1,100 ply entirely within Maputo Municipal area; the balance operates both internally within the other Municipal areas and from them to Maputo.

	Taxis (regulated)	For-hire saloon car taxis, nominally associated with a specified "home" location.	In Maputo, about 1,000 taxis associated with 124 specified locations throughout the Municipal area. Numbers in the other municipalities unknown.
	3-wheelers (regulated)	For hire auto-rickshaws ('tuk-tuks'), nominally associated with a specified home location	In Maputo, about 200 3-wheelers associated with 15 specified locations. Numbers in the other municipalities unknown.
	Open trucks (illegal)	Open-backed trucks (myloves) that ply from suburban areas to central Maputo, taking advantage of the inadequate public transport; plus plying in the suburban areas that are unserved by public transport due to unpaved roads.	Number unknown, but significant even on the main corridors and downtown Maputo.
	Motorcycle taxis (illegal)	Motorcycle taxis mostly plying in suburban areas that are unserved by public transport due to unpaved roads.	Number unknown; believed to be predominantly in the outer suburban areas (e.g. Matola); stated to exist in Maputo but not to any great extent.
Rail-based operators	Commuter Railway - Public	Regional commuter services, operated by CFM	c. 10 services per day
	Commuter Railway - Private	Suburban commuter services, operated by MetroBus (private)	c. 4 services per day

4.1. Road based public transport operators

57. The main road based public transport operators operating in Maputo include: (i) Public Large Bus Operators; (ii) Co-operatives – Representing the Private Large Bus Operators; (iii) Chapa Operators – Operating within Associations; and (iv) Other (non-associated Chapa operators and other informal/illegal operators).

Figure 27. Road Based Public Transport Operating Structure and Engagement Objectives



4.1.1. *Public operators*

58. Each of the municipalities within the study area has a municipal bus company operating large buses: (i) The Maputo Municipal Bus Enterprise (EMPTE) is the largest of the public bus companies, which operates around 40 buses within Maputo Municipality; (ii) Matola Municipal Bus Enterprise (EMT) operates with a fleet of

c.40 buses in Matola; and (iii) Boane Municipal Bus Company (EMTB) is a fledgling enterprise operating a very small fleet of vehicles.

Maputo Municipal Bus Enterprise (EMPTE)

a) Current operations

59. Whilst this public operator has been in existence for over 80 years, the scale of operations of EMPTE have been in recent decline and reducing market share, with a fleet of between 40-50 vehicles currently operational from the overall fleet of 225 vehicles owned in 2016, the point at which ownership transferred from State-Owned Enterprise under the national Ministry of Transport to Maputo Municipality.

60. EMPTE is able to continue operations with heavy dependence on subsidy provided by the Ministry of Finance. The scale of this subsidy sits close to the scale of farebox revenues collected (pre-COVID) at c. 9 million MT ($150,000) per month compared to a fare revenue of 11 million MT ($180,000) per month (2018/19 figures, Finn 2019).

61. Ridership figures based on the 2018 annual reports reported 10.3m passengers carried annually, down from over 15m passengers carried in 2016 and 2017. Of these trips, 1.5m were concessionary trips, representing more than a 50% reduction from the 3m+ concessionary trips carried in 2016.

b) Commercial performance

62. EMPTE has reported loses for the years 2016 to 2018 of 88m MT, 186m MT and 91m MT respectively, despite the aforementioned subsidies.

63. A tariff increase in 2018 helped to stem increasing loses. Before this, tariffs had not increased in real terms since 2011. In 2018, revenues only covered 60% of the cost of production, although this was a great improvement on the 28% cost recovery achieved in the previous year.

c) Summary

64. The present instability of EMPTEs financial position and the dependence on subsidy, which although reduced in recent years, remains similar in magnitude to the overall revenues earned. The company is considered overstaffed and the survival strategies which have been put in place by the management, including the pursuit of higher return activities such as private hire risk undermining the socially-desirable aspects of existing operations, including provision for concessionary travelers. Based on observed commercial and operational performance, transformational changes to the corporate structure and management would be required for EMPTE.

Matola Municipal Bus Enterprise (ETM)

65. Matola Municipality also has an established municipal bus enterprise when Maputo Public Transport Company was abolished, with 75% of the company forming EMPTM and 35% becoming ETM. The company currently has 178 employees including in-vehicle crew and operates with a fleet of 42 buses (of which 40 are currently operational

Boane Municipal Bus Enterprise (EMTB)

66. Boane municipal bus enterprise was established in 2018 and presently operates with a small fleet of 4 buses.

4.1.2. Private operator organizations - FEMATRO and the chapa associations

FEMATRO

67. FEMATRO is the nationwide umbrella organization for passenger transport, freight and taxi operators. Established in 2003, FEMATRO represents a single point of liaison between the Government and the many chapa associations and also the bus operating co-operatives, acting as a representative and advocate for operator interests and in some cases mediating in disputes between individual chapa associations.

68. Associations and co-operatives have no formal requirement to become members of FEMATRO, but most opt to become members. A membership fee is payable by both association and co-operative members, currently set at 3,000 meticais ($50) per month. There has been moves towards raising the fee for co-operative membership as they have benefitted from the concessional bus leasing under the government scheme, but a pricing differential has not been enacted to date.

69. Whilst FEMATRO's role to date has remained one of advocacy, earlier interviews highlighted a desire to take a more active role in providing capacity building support to the bus operating co-operatives and even to provide management of collective facilities such as maintenance workshops.

Chapa associations

70. Operator associations are prevalent within the operating sector, functioning as a collective of individual chapa operators[14]. These associations are numerous and tend to be route-level entities established for the purpose of co-ordinating and managing operations on one or more of chapa routes. Associations operate without legal status, and without a common or prescribed structure.

71. While it is estimated that around 70% of chapas belong to associations and are licensed, there are a substantial number of chapas which are not licensed. This number is estimated a 1,500 at metropolitan level, the majority in more peripheral areas.

72. Based on interviews with lead members of associations, the functions of the associations would appear to be as follows:

    - Act as a collective for operators plying particular routes (albeit without any formal status, or regulated license to undertake this function)

    - Manage operations along these routes, managing the terminals, assisting with and co-ordinating the dispatch of vehicles, protecting association members from 'illegal' competition, and policing driving behaviour.

73. Associations charge fees to members which may include a one-off joining fee, regular periodic membership fees (eg a monthly contribution to association overheads) and/or daily fees for operation on the route. Daily fees may be levied per vehicle or per member (irrespective of number of vehicles owned by member).

[14] We use the term 'operator' in this instance as the chapa vehicle owner as opposed to the in-vehicle crew (driver or collector)

4.1.3. Private operators

Co-operatives and the Government Bus Scheme

74. Following the presidential announcement in 2016 of the government's scheme to procure buses to be put into operation around the country, existing chapa operators with membership under FEMATRO with were incentivised to form legal entities in order to participate in the scheme. There are 10 co-operatives which have received government procured buses under the scheme. The co-operatives only operate large buses – chapa operation remains with the associations.

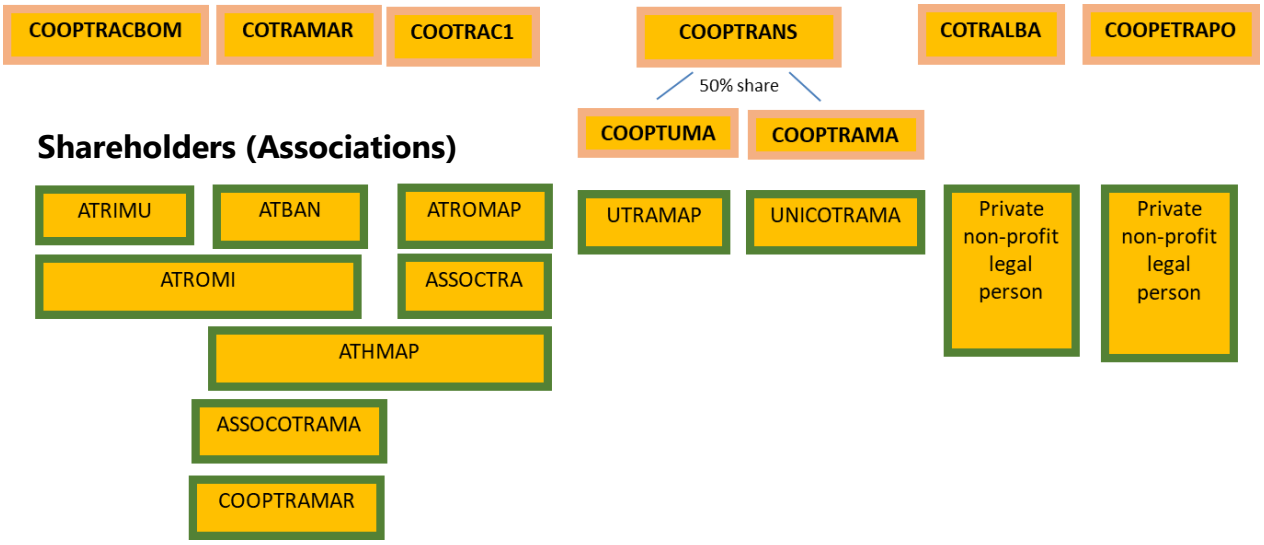
75. Cooperatives are legal entities formed from groups of chapa operators in order to engage in programmes of publicly procured vehicles provided by FTC. Cooperatives have a formal management structure, with an average of between 30-40 members enjoying voting rights and a management structure featuring a chairman and board of directors. Since 2017, Cooperatives have acquired buses from FTC on the condition of repayment of a loan component and certain other requirements around use of the bus on a specific route and compliance with route licensing terms. Within cooperatives, bus operation remains on an individualized basis, with responsibility for each bus assigned to a bus manager, who is responsible for employing drivers and fare collectors, and collecting fare revenue (subject to paying a proportion to the cooperative for their management functions and bus financing repayment). In reality, there are high rates of payment delinquency by cooperatives to FTC/AMT, with cooperatives citing low fares affecting profitability. Delinquency has also had an impact upon the ability of FTC to provide contractual vehicle maintenance.

a) Co-operative Structure

76. The co-operatives have generally been formed from the existing chapa associations. The figure below sets out the shareholding structure of the most relevant co-operatives, showing the relationship between existing chapa associations and the new co-operatives.

77. The industry structure, as presented below, is complex and interconnected, with various overlaps and inter-relationships between the associations and co-operatives. This extends also to the individual members of the co-operatives, many of whom will also maintain membership of one or more chapa associations, and continue to operate chapa as well as managing buses under the co-operative.

Figure 28. Co-operate shareholding structure



b) Operating arrangements

78. Operating arrangements vary by co-operative, but the typical form of operations inferred from the interviews may be outlined as follows:

- The bus vehicles are typically operated by individual members or 'Bus Managers' or 'Beneficiary'. Bus managers may have a single vehicle up to about 5 vehicles to manage.

- The bus manager is usually responsible for employing the driver and collector, although there is an example of direct employment via the co-operative (COOTRAC-1). The bus manager is responsible for fuelling and maintaining the vehicle and collecting the revenue from operations. From this, a proportion of revenue is paid to the co-operative to cover the vehicle financing and co-operative administration functions.

- Bus routes were determined by AMT with close engagement with FEMATRO and the co-operative. Route tendering was undertaken, with co-operatives tendering for operation on the tendered routes. Successful tenders were however closely linked to the presence of particular associations on the new bus routes – ie the incumbent chapa operator associations formed into new co-operatives to tender to operate buses along the existing route and were ultimately successful in maintaining their presence on the route.

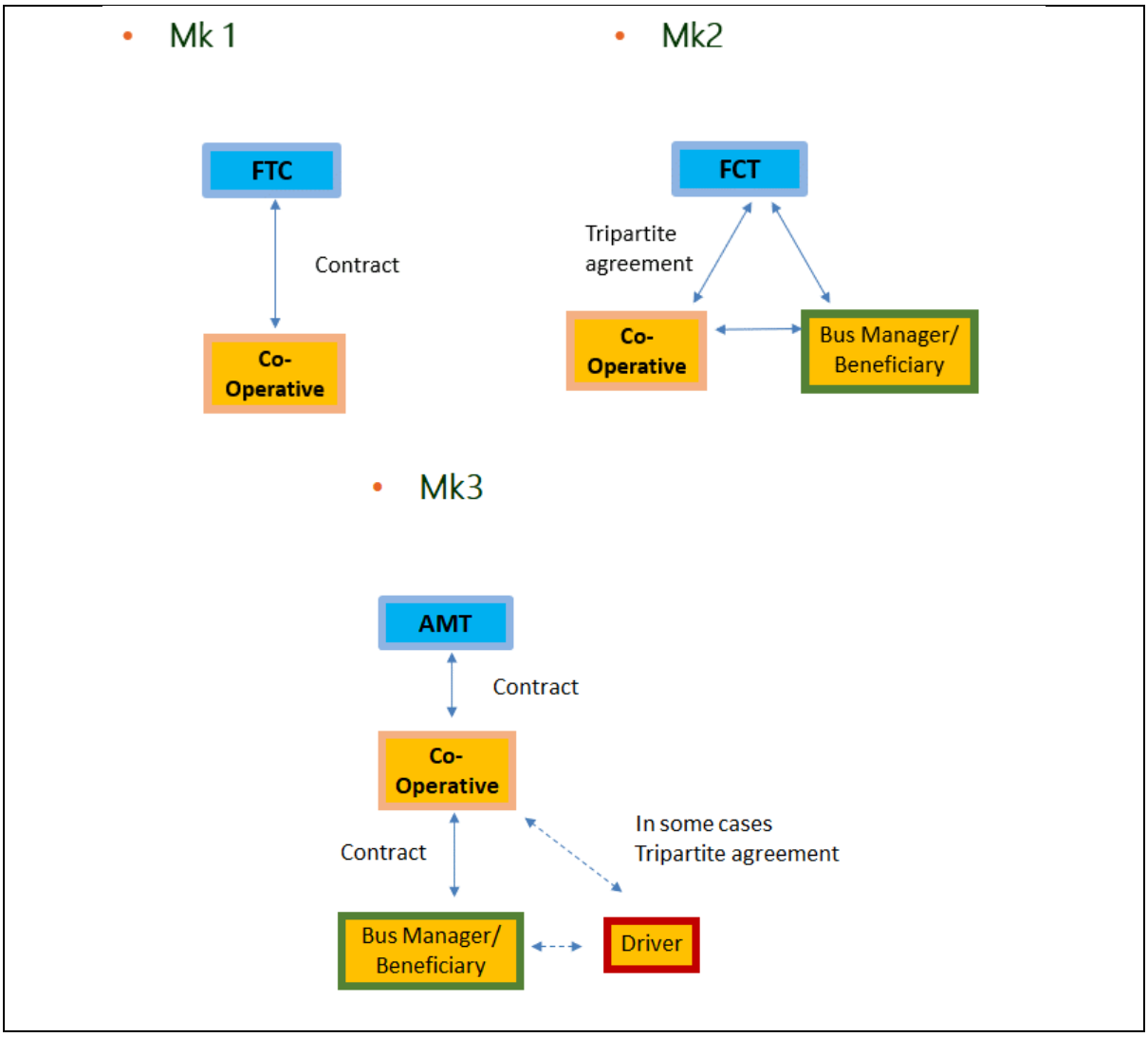
- The bus manager typically has a contractual arrangement with the co-operative, to operate the vehicle, make the required regular contribution to the co-operative to support the vehicle repayments and co-operative functions. Some co-ops have moved to a tripartite agreement between the co-operative, the bus manager and the driver to address issues with bus-managers failing to take adequate responsibility for driver performance and compliance with labor laws. Contractual arrangements differ by co-operative and even within different tranches of bus vehicle allocation. Further details on contractual arrangements is provided below.

c) Co-operative contractual arrangements and evolution

79. The contractual arrangements between the government (either through FCT or AMT) and the co-operatives have evolved since the first fleet of 50 vehicles were allocated to COOTRAC 1 in 2016. A detailed review of the contractual arrangements in presented in the 'Contractual Arrangements Report' and not repeated in full here. The summary of the diagnostic is provided however, as this has important implications for the BRT system contractual arrangements.

80. The figure below sets out the study team understanding of this evaluation, with three types of contract which we have labelled the Mk1, Mk2, and Mk3 contract. All of the route contracts are net-cost contracts with no subsidy for operations beyond the preferential repayment terms of the vehicle financing agreement (with the full repayment of the 60 instalments covering as little as 40% of the vehicle value).

Figure 29. Contractual arrangements for co-operative bus operators



81. **MK1 Contract:** The early contract, although directly between the FTC and the co-operative, failed to allocate the expected burden of responsibility for meeting the contractual conditions to the collective members of the co-operative as ownership and responsibility for operations remained with individuals, as under the previous owner-operator arrangements of the chapa associations.

82. **MK2 Contract:** Inclusion of the beneficiary/bus manager within the tripartite contract, whilst seeking to address the lack of accountability, did not achieve a move to collectivised operation, beyond transfer of the responsibility for channelling vehicle financing payments to FTC.

83. The **MK3 contract** reverts to a direct contractual relationship between government (via AMT) and the co-operative, placing the accountability back with the co-operative. However, this has again not achieved collectivisation of operations, as the co-operative then has sub-contract with vehicle managers rather than taking full responsibility of operations. However, as reflected in the contractual performance, cooperatives are not meeting contractual obligations and with the continuation of individualised operation, there remains scope for the transfer of responsibility and blame to individual members.

d) Vehicles

84. The vehicles were procured by the government and allocated to the co-operatives via FTC, in close consultation with FEMATRO. A total of around 400 vehicles have been procured and distributed to the co-operatives, of the following brands:(i) VW; (ii) Yutong; (iii) Tata; and (iv) Zongtong. Vehicle capacities of the Yutong, Zhong Tong and VW are 90 passengers and Tata 110 passengers (max capacity, seated and standing).

85. The vehicles are provided to the co-operative under a leasing arrangement over 60 months, after which (subject to completion of the repayments) the vehicle ownership should transfer to the bus manager. To date however, despite some early distributed vehicles reaching the 60 month leasing period, no transfer has taken place due to incomplete lease payments by the co-operative/bus managers.

Source: Fim De Semana, LDA

86. With the earliest co-operative established in 2015, the vehicle fleet are all relatively young. Encouragingly, the co-operatives interviewed reported that the majority of the distributed bus fleet remains operational, with most co-operatives reporting just a small number of vehicles of the road for a variety of reasons. One of the earliest scheme participants, COOPTRAC-1 however has a poorer record with 20% of its fleet of 79 vehicles currently off the road.

87. Operators provide positive reports on the VW and Yutong reliability. Ensuring effective maintenance remains an issue. The buses should be serviced under contract at one of two government approved garages. There has been reports however that one garage has been refusing to service vehicles due to non-payments from FTC.

e) Commercial characteristics of private bus operators

88. Vehicle lease payments. The vehicle leasing arrangements are defined by FTC, with monthly repayments dependent on the vehicle type. The lease payments have always been concessionary, and not set to cover the full value of the vehicle. The scale of the repayment has been adjusted (downwards) on a number of occasions, to reflect the operating realities since scheme implementation, including the recent impact of COVID on ridership. At these levels, the lease payments represent only c. 30% of the cost of the bus. However, even at this reduced rate, there has been a poor record in co-operatives meeting the lease payment requirements.

89. Contributions to co-operative. Bus manager contributions to the co-operative vary, but a typical regular payment of c. 2,500-7,000 meticais/vehicle/month is made to cover the services and facilities provided by the Co-op which may including parking for vehicles, light and water, minor vehicle repairs and to cover salaried staff and administrative services.

90. Ridership and revenues. Daily ridership under the scheme, based on an early study, was anticipated to be 1400 passengers per bus per day. Upon commencement of operations, the ridership achieved was in practice 1100-1200 passengers per bus. With COVID, some co-operatives report ridership dropping further, with reports of 1000-1100 passengers per day.

91. On-bus surveys conducted for this study corroborates the operator estimates of ridership under COVID conditions. The number of passengers carried per vehicle trip is high, typically at more than 100 passengers. Analysis of loading profiles shows some seat turnover within this figure, with maximum loadings of 70-80 typical. Across the day, based on round trip times and operating period (see below), estimated daily ridership ranges from c. 975-1,175 passengers.

92. At an indicative average fare of 12 meticais (fares typically vary from 10-15 meticais according to the route and distance travelled), a daily ridership of 1,075 equates to a daily farebox revenue of c. 12,900 meticais ($220). Operator reported revenues under COVID conditions sit below this estimate, with self-reported per bus revenues stated to be within the range of 10,000-13,000 meticais per bus.

f) Operating characteristics

93. Operating hours varies by route, but 18-20 hour operating days (pre-COVID) were typical, with operations sometimes commencing at 4-5am and operating sometimes until midnight. These hours have been shortened due to COVID, with operations ceasing at 8pm or 8.30pm to meet the 9pm curfew. The daily operated kms varies by route also, with operator reported estimates ranging from 180-360km per day. The shortened operating period has reduced operator kms to ~200km per day, with one co-operative reporting that a typical 6-8 round trips in pre-covid times has reduced to 5-6 round trips in COVID times.

94. The following table summarizes the main operational data inferred from the co-operative interviews and from surveyed operating patterns.

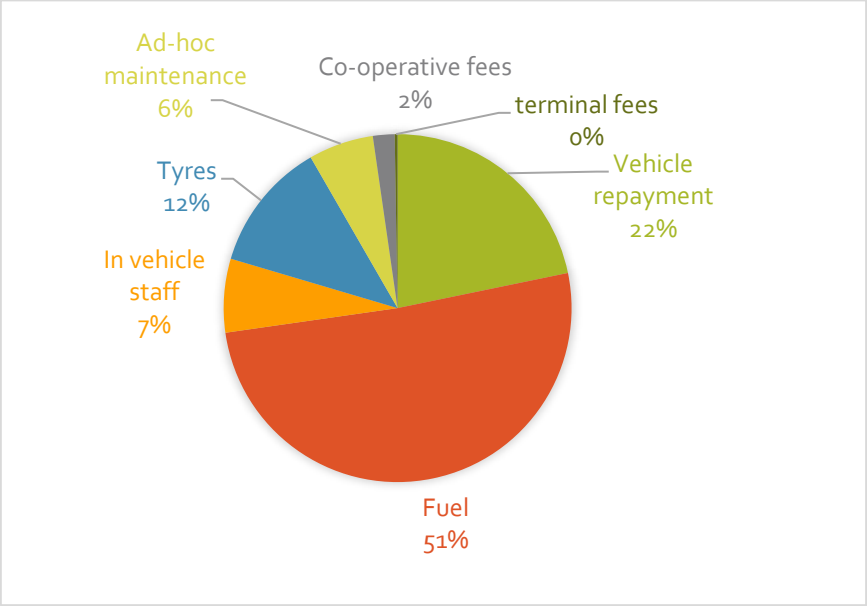
Figure 30. Commercial and operational parameters for Co-operative buses

Item	Value	Comments
Operating days	Monday to Sunday	Sunday – smaller fleet
Operating Hours	18-20 hrs of operation: 05:00 – 23:00 (pre-covid) With COVID early finish at 20:30 to ensure 21:00 curfew is met	One shift of about 14 hours per driver and fare collector. Team works every one or two alternative days to allow resting
Round trips	6-8 (pre-COVID) 5-6 (COVID)	Average

Item	Value	Comments
Fare/trip	10-15 meticais depending on route	Single trip
Daily kms per vehicle	180km-360km depending on route/distance	Surveyed routes suggest daily operations of c. 200kms
In-vehicle staff	Driver and fare collector	Driver and fare collector in few cases employed by co-operative, mostly by bus manager
Staff salaries	Variable, but broadly mindful of minimum wage for Drivers, collectors and officials.	**Driver** receives 9500+ meticais salary per month (potential for bonuses) **Collector** receives 6850+ meticais (minimum wage) salary per month (also potential for bonus) **Supervisors** receives 6850+ meticais (minimum wage) salary per month. All cooperatives employ permanent supervisors but sometimes use part-time supervisors on need basis
Fuel	average 90-110l per day with range of 80l-140l reported per day depending on route and vehicle type	Fuel paid by manager
Terminal fees	30 meticais/bus/day (applicable on some routes)	Payable to Municipality
Total revenue per bus	12,000-13,000 meticais normal conditions 10,000-12 000 meticais (COVID)	Operator reported revenue lower than estimate based on on-bus survey.
Number of pax/vehicle/day	1,000-1,100 COVID 1,200+ est under normal conditions	Ridership under COVID conditions validated by on-bus surveys
Bus speed	17 km/h	Speed surveys from 3 bus routes
Bus Overheads		
Vehicle financing instalments (60 mth)	VW = 55,000/month TATA = 55,000/month Yutong and Zhongtong = 30,000/month	
Maintenance	every 10,000 km sent to workshops.	Oil, filters and insurance is all paid by government. It is done monthly
Tyres	17,000 meticais/each Last c. 4 months	Locally bought tyres are poorer quality

95. Fuel represents the single most significant operating cost component. Co-operatives report significant variation in fuel consumption between models and this will also vary by route. Improving operating efficiency through improved operating speeds offers potential to reduce the fuel cost component, with scope to reduce the cost of service delivery.

Figure 31. Co-operative vehicle operating costs



96. A high-level assessment of the reported operating costs set against revenues (based on ridership which has been subject to an element of independent validation) finds operating costs to exceed estimated revenues, making the commerciality of operations unviable. This explains to an extent co-operative rebuffal on making lease repayments at the required level. A summary of the estimated vehicle revenues and operating costs is shown in the table below:

Figure 32. Estimated average vehicle revenues and operating costs

	Daily (meticais)	Monthly (meticais)	Monthly (USD)
Fare revenues	**11,000**	**242,000**	**4,102**
Vehicle repayment*	2455	54,000	915
Fuel	5750	54,000	915
In-vehicle staff	773	17,000	288
Tyres	1364	30,000	508
Ad-hoc maintenance	682	15,000	254
Co-operative fees	227	5,000	85
Terminal fees	30	660	11
Operating costs	**11,280**	**248,160**	**4,206**

* Vehicle repayments not being made presently at the required repayment terms

Chapa operations and business model

97. Chapa operators require a license to operate which is issued by the relevant municipality depending on the route operated. The license is specific to the vehicle rather than the operator, so replacement of the vehicle would require reapplication for a license.

98. Whilst the majority of chapa operators form part of associations and pay their dues as outlined above, chapa operations are conducted wholly on an individualised basis, with vehicles purchased and managed by individual owners rather than by the associations.

a) Operating arrangements

99. There are two prevalent models of chapa operation: (i) Vehicle rented to 'self-employed' drivers for a daily fee; and (ii) The vehicle owner employs a driver to operate the vehicle. Under either scenario, the arrangements are typically informal, lacking any contractual relationship between the owner and driver. In addition to the driver, a fee collector will be taken on to collect fares. The collector will typically be employed by the vehicle operator (ie owner) or in some cases selected by the driver.

b) Commercial characteristics

100. Data collected from discussion with associations and with chapa operators provides the following insight into the commercial aspects of operations.

101. Vehicles. The chapa vehicles are minibuses of 15 seat capacity or midi-buses/Coasters with a higher 29 seat capacity. Vehicles can be purchased at around 500,000-600,000 meticais ($7,500-$9,000) or potentially cheaper for older vehicles. The vehicles are typically purchased using the operator's own equity/savings, with credit/loans not mentioned as a source of finance amongst those interviewed. Most vehicles are imported from Japan after reaching the end of their economic life there. The industry structure is highly fragmented, with the majority of chapa operators small in scale, owning just one a single vehicle. There are some slightly larger scale chapa operators who may own a larger vehicle fleet of perhaps 5 chapa vehicles, whilst some chapa operators are also participating in the government bus scheme and potentially 'managing' the operation of 1-5 buses in addition to their chapa operations.

102. Staffing. A vehicle will typically be operated by one driver, covering the full day shift which may be 15 hours. Either the driver or the operator (owner) may appoint the collector who will be responsible for collecting the fares alongside the driver. The nature of this arrangement may differ according to the model of operation (whether the daily rental or salaried crew model outlined above) with the salaried model of operation increasing the need for the vehicle owner to ensure trustworthy reporting of vehicle revenues collected. Drivers may also create partnerships with cover drivers to take their place when they are not available to drive the vehicle. In almost all cases, the arrangement between driver and operator is by means of verbal/informal agreement as opposed to any formal contractual arrangement.

Summary of commercial operating performance

103. Collected detailed information on the commercial realities of typical chapa operations is not straightforward, in part as this can vary considerably between type of operating model adopted, which in

the case of rental means that the operator may not be fully aware of the actual revenues generated by the vehicle, but also by route characteristics.

104. Based on information collected from interviews conducted with associations and chapa crew, the following typical operating characteristics and commercial parameters have been inferred.

Table 8. Commercial and Operational characteristics of Chapa

Characteristic	Value	Comments
Operating days	6 days	
Operating Hours	3:30/4am to 10-11pm COVID: 5am to 8pm	
Vehicle cost	500,000-600,000 MT	Dependent on age-condition, lower for oldest vehicles
Daily rental revenue per vehicle	1,000-1,500 MT for 15-seater 1,500-2,000 MT for 29-seater	Vehicle rental typically received by owner
Estimated daily fare revenue	3,700 MT for 15-seater 4,400 MT for a 29-seater	Estimated from surveys. Value requires validation. Value is unknown to the vehicle owner
Daily kms per vehicle	180km per day typical Range 150-250km/day	From study surveys
In-vehicle staff	200 MT for driver / day 160 MT for collector / day	There is typically no formal salary, so the amount the driver and collector can take depends on patronage
Staff salaries	6,000-8,000MT per month	Varies according to ridership. Driver makes own salary after deductions for vehicle rental, fuel and collector salary. In some cases driver will be given a day without rental to supplement wages
Fuel/day	1,200-1,300 MT for 15-seater 2,000-2,500 MT for 29-seater	Payment for fuel is responsibility of driver under daily rental model
Fees	20-30 MT	Association fee per day
Nr of pax/vehicle/day	370 pass. for a 15-seater 440 pass. for a 29-seater	From on-board surveys. Approximately 6 round trips / day during covid restrictions
Maintenance		Greatly variable – c. 80k MT if engine replacement required
Tyres	3,500-6,000 MT per tyre	Life expectancy of up to 6 months

Even prior to COVID, associations report that there is little interest for new operators to enter the market due to increasingly low returns, and some long-term industry participants have considered leaving, although for many, this industry has been all they know.

4.2. Rail based public transport operators

105. The urban passenger transport is almost entirely road-based, with just very limited provision of commuter rail services.

4.2.1. Public operators

CFM Commuter service

106. The rail system in Mozambique forms three clusters, North, Central and South, which are not connected to each other. It is constructed, maintained and managed by CFM, who also provide freight and passenger services.

107. The primary orientation of the Mozambican railway is towards freight, linking to the main ports for import, export and transit freight. The South rail network links to the twin ports of Maputo and Matola. It serves much transit traffic to/from Swaziland and South Africa. However, there are currently only about 10 freight train movements per day, and these can be scheduled to avoid the peak commuting period. This effectively leaves the rail lines free to allow commuter rail services.

a) Rolling Stock and Infrastructure

108. *Rolling stock.* CFM's passenger fleet includes 45 coaches, 24 new coaches purchased from China and 21 old coaches. All of the coaches are operational and available for use. CFM Passenger Services have 7 locomotives. Reliability of locomotives is an issue, as it is proving increasingly difficult to secure spare parts for the old rolling stock. CFM estimates that 3 additional locomotives are needed in support.

109. *Infrastructure of Urban Railways.* CFM Sul's network includes three rail lines converging on Maputo: (i) the south-west line from Swaziland and South Africa, which passes through Boane and joins the Matola Gare line near Machave; (ii) the western line from South Africa passing through Matola Gare through to Maputo; and (iii) the northern line that passes through Marracuene and join the other lines at Infulene, close to Maputo central.

110. The Maputo-Matola Gare line has 21 km. The line then continues westward and into South Africa. The line from Maputo to Matola Gare is double-tracked all the way. Thus, the infrastructure is already in place for substantial two-way flows on the line, even with little or no infrastructural investment. The line is in reasonable condition. CFM advise that the track is rated for 60 kph, and this is the speed achieved in practice with the passenger services.

111. The signaling system works on a system of 'blocks' of differing lengths. There are 7 blocks from Maputo to Matola Gare. The basic rule is that there must be at least one unoccupied block between trains, meaning that there could be maximum 4 trains on the Maputo-Matola Gare line at any given time. CFM advise that they have an ongoing satellite-based signalling project that is nearing completion, it should be fully online by mid-2020. CFM are self-financing the project. The objectives of the project are to improve safety and to increase line capacity by increasing permitted line occupancy. However, not all trains have the new onboard equipment. A similar applies to Metrobus' trains.

112. Currently, track maintenance is carried out only during daylight hours (0700-1700), Monday to Friday, with some further restrictions in adverse weather conditions. Out-of-daylight working is only done in case of emergency. If passenger rail services were to be increased substantially, it would be necessary to revise the maintenance arrangements, for example shift to weekend working and some night-time working under lights.

b) Operating arrangements

113. Currently there are 94 commuter trains per week (47 each way) serving Maputo, most/all on weekdays. There are 4 morning trains and 5 afternoon trains. This includes services on the Boane line. These trains originate from beyond the Maputo area and much of their patronage is generated outside Maputo. The passenger peak is stated to commence at 0300, but this is for people well outside Maputo. For people within Maputo Metropolitan area, including Matola, the peak starts around 06:00. The arrival peak starts at about 06:30.

114. These CFM services are quite crowded. They operate 12-carriage trains that should carry 1,320 passengers (at 110 passengers per carriage) but are actually carrying about 2,000 passengers. The services are low-, low-quality. Passenger carryings had been about 14,000 per day, they have now increased to 20,000 per day.

c) Operating performance

115. CFM Sul provides passenger services in the south of the country. Operations are provided on three routes – Ressano Garcia, Limpopo and Goba. Review of CFM Sul's operational statistics for the period 2014-2018 shows the following:

- Ressano – Garcia accounts for approximately 60% of passenger volumes.
- CFM Sul recorded a a significant increase in its passenger columes. CFM Sul transported 6.6 million passengers in 2018, an 84% increase against 2014. The available data for the first 9 months of 2019 show passenger volumes at 4.3 million[15].
- CFM Sul recorded a similar level of increase in passenger-km and passengers, against 2014 levels, 86% and 84% respectively. The average annual passenger journey across the reporting period calculates at just under 400km.[16]
- The number of operated trains increased by 4%. Overcrowding is an issue as passenger loads per train grew by 78% since 2014. CFM's estimates for train loads suggests figures of 2,100 and 1,600 for Maputo – Ressano Garcia and Maputo – Chicualacuala, respectively.

[15] The passenger volume estimated for 2019, on a pro-rata basis, suggests a total of 5.7 million.
[16] The average journey is mostly driven by services on Maputo – Chicualacuala line (522km) and high average train loads, estimated by CFM Sul at 1,600.

Figure 33. Number of trains on CFM Sul's network 2014 - 2018

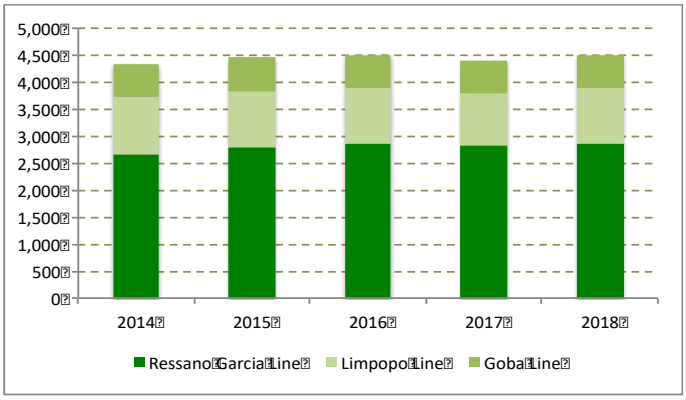


Figure 34. Number of passengers on CFM Sul's network 2014 – 2018

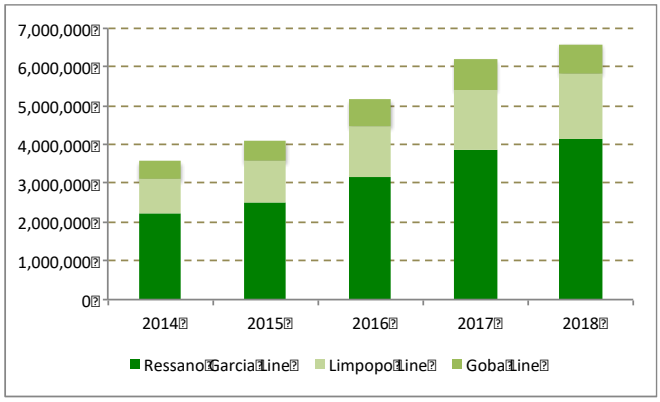
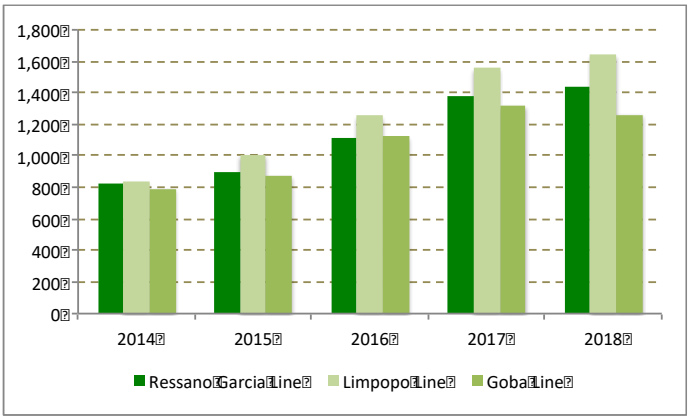


Figure 35. Average number of passengers on CFM Sul's trains 2014 - 2018



d) Financial performance of Urban Railways

116. CFM Sul's Finance department produces a suite of reports that are used to manage the business. The reports include (1) monthly reports on financial and operational performance of the company for the CFM Board of Directors, (2) annual operating budgets in line with the standard schedule that involves all technical departments developing their own resource plans and budgets for the tasks planned for the following year, and (3) 3-year plans that serves as a commitment to the MCT.

117. CFM have an existing cost allocation mechanism and cost recovery calculation that are used to assemble management reports and assess the railway's financial performance using the cost and revenue data from the ledger.

118. Funding of CFM passenger services is secured from the farebox revenue and the Budget[17]. CFM own estimates suggests a 25% level of fare evasion at present.

119. Analysis of CFM Sul's revenue and cost data shows the following:

- Revenue growth between 64% and 105%, albeit from a very low base;
- Cost growth between 39% and 121%;

[17] Allowed by the Decrete 40/94 but not implemented in practice

- In consequence, a low cost recovery of passenger operations throughout the reporting period. The maximum level of cost recovery at 37% was recorded on Ressano Garcia line in 2016 and the lowest, 12%, on Goba line in 2018.

Figure 36. CFM Sul's revenue from passenger operations 2014 – 2018 (in MT)

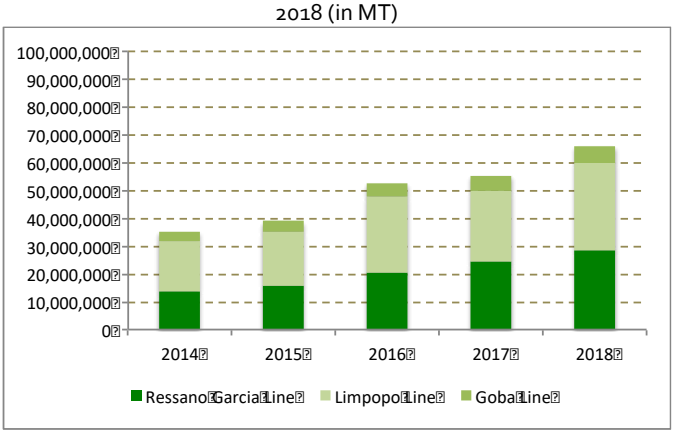


Figure 37. CFM Sul's cost of passenger operations 2014 – 2018 (in MT)

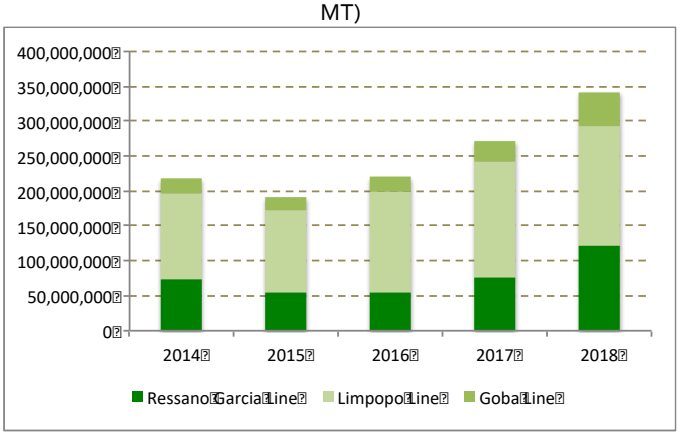
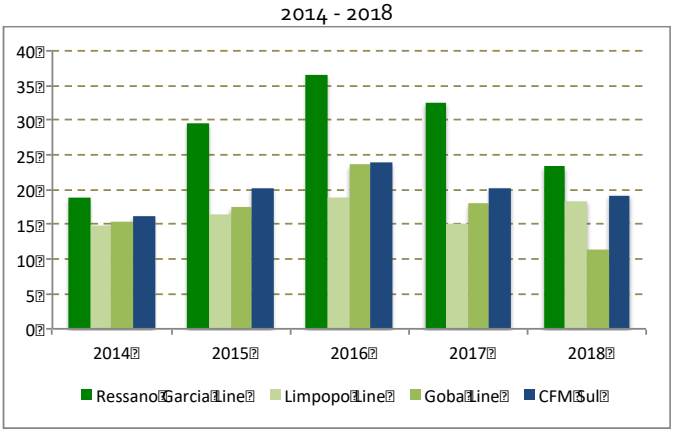


Figure 38. Cost recovery (%) of CFM Sul's passenger operations 2014 - 2018



4.2.2. Private operators

Metrobus

120. Metrobus is a private operator which operates an integrated service of bus and rail services from Matola Gare and from Boane to Maputo Central Rail station. The operation is run by Sir Motors, the company also providing the maintenance services for the co-operative buses. Originally conceived as a PPP project in partnership with CFM, operations ultimately commenced as a purely private initiative, with Metrobus given access to slots on the publicly owned rail infrastructure under a contract with CFM in order to operate with a track access charge payable. This charge is linked to the number of tickets sold on Metrobus trains. Metrobus has put in place a series of bus feeder services that integrate with commuter railway service. Metrobus services (both bus and rail) operate to a schedule, with the feeder bus routes scheduled in order to link with the rail service departure and arrival times.

a) Fleet and operations

121. Metrobus has a fleet of 16 train units (4 trains of 4 carriages) and over 100 buses which commenced operation in 2018. Originally conceived as a PPP project in partnership with CFM, operations ultimately commenced as a purely private initiative, with Metrobus given access to slots on the publicly owned rail infrastructure under a contract with CFM in order to operate with a track access charge payable. This charge is linked to the number of tickets sold on Metrobus trains.

122. Metrobus services (both bus and rail) operate to a schedule, with the feeder bus routes scheduled in order to link with the rail service departure and arrival times. http://www.metrobus.co.mz/horarios

Figure 39: Metrobus bus routes linking with Est. Central

123. Rail capacity is limited by the slot availability. At present, the company operates only four services per day, carrying around 4,000 passengers.

124. Metrobus believes this could increase to 18,000 passengers a day if frequency of operations could be increased to more effectively make utilisation of the available rolling-stock and consider that a frequency of one train per hour arriving at Maputo would be feasible.

b) Investment and commercial offering

125. Whilst the figures for the investment made by Sir Motors to enter the sector are not publicly available, the scale is clearly significant. The rail units were purchased second hand from New Zealand and actually arrived in 2015 which represented fortunate timing as the units could be purchased whilst the prevailing exchange rate was at c. 30 meticais to the USD. By commencement of operations in 2018, the currency had

depreciated by half and now sits at around 70 to 60 meticais to the USD. Within the operator business plan there was an aspiration (pre-COVID) to turn a profit from the 5th year of operation, ie in 2023.

126. In early reported interviews with the metrobus operator, the second highest investment cost was reportedly the ticketing system. Metrobus introduced a cashless ticketing system which offers integrated ticketing between their rail and bus services, using a Mifare type smartcard which is presently not interoperable with the AMT FAMBA card. Although the same card is usable on the rail and bus services, the traveller pays for each stage of the journey individually, with no discount for transfers.

127. The fares charged by metrobus are targeted at the middle-class commuter sector, and sit higher than the fares for the public transport, chapa and private bus fares. The one-way fares are as follows:

- 21 Meticais for the feeder bus (increased from 18 Meticais in 2020, an increase of 17%)
- 43 Meticais for the train (increased from 38 Meticais in 2020, an increase of 13%)

128. Monthly passes can be purchased for 2,500 Meticais to allow unlimited travel. A typical daily commuting trip featuring a return rail + feeder bus journey would cost 128 meticais, so the monthly pass would be attractive to those using the transport for more than 20 days per month. There is however a further discount possible, with additional monthly passes for up to four family members available with a 50% discount on the price of a monthly travel pass.

5. Private sector participation in urban transport in Greater Maputo

PPP environment in Mozambique

Laws and regulations

The subject of PPPs in Mozambique is regulated by the following legislation:

- Law no 15/2011 ('PPP Law"). The Law established the guidelines for the process of contracting, implementing and monitoring the implementation of public-private partnerships, large-scale projects and business concessions and revoked some provisions of the Electricity Law no 21/97.
- decree no 31/1996 ("Toll road concessions law");
- decree no 16/2012 ("PPP regulations")
- decree no 69/2013,
- decree no 5/2016 ("PPP procurement procedure"),
- decree no 45/2009 ("Investment regulation").

Mozambique's PPP Law was passed in August 2011[18]. Prior to the passing of this Law, PPP projects were procured through individual legislation[19]. The PPP Regulations required to operationalise the PPP Law were passed by Presidential Decree16/2012 in July 2012[20]. The PPP Law applies to PPPs, Large Scale Projects and Enterprise Concessions for mining and exploration. However, in this report we only describe the section of the Law applicable to PPPs. The PPP Law establishes that each sector of government is responsible for the PPPs in their own sector, and should regulate projects in the interests of its users, ensuring the project is sustainable, and there is economic and financial equilibrium among the contracting parties. An important aspect in relation to bus services is the requirement in Article 4 of the Law, that PPPs should establish programs, projects or actions that promote social development in the local communities they serve.

Decree 16/2012 defines in greater detail the rules laid down in the PPP Law and establishes the procedures applicable to the contracting, implementation and monitoring of PPPs, in relation to[21]:

- the powers of the sectoral and financial supervisor, the regulatory authority and the implementing entity;
- the precontractual stages of the projects;
- the types of public contracting procedures;
- the financial guarantees and incentives to investment;
- the contracts and respective revisions or amendments;
- the execution of contracts, redemption, causes of termination, etc;
- the prevention and mitigation of risks in PPP; and
- the sharing of benefits.

The PPP Law established the PPP Unit within the Ministry of Finance, with responsibility for assessing the economic and financial viability of all PPP projects, coordinating with line ministries. The role of the PPP Unit includes ensuring an equitable distribution of benefits and risks related to each PPP project. The PPP

[18] https://library.pppknowledgelab.org/documents/1279/download?ref_site=kl

[19] Assessment of Public-Private Partnerships in Mozambique, International Growth Centre, 2012

[20] The Public Private Partnership Law Review Edition I - Mozambique Chapter, Werneck, B and Saadi, M, October 2015

[21] https://www.lexology.com/library/detail.aspx?g=313d20c2-01f7-4757-a613-f6f7035d5310

Unit is in place to ensure consistency of approach between PPP projects in different sectors and from different sponsoring Ministries.

According to the PPP database, there are currently 14 active PPP contracts in Mozambique[22]. The majority of these projects are in the electricity sector. The largest PPP project is the Mozambique – South Africa Gas Pipeline. Outside the energy sector, the largest PPP project is the N4 Toll Road, which opened in 1997. Other transport sector PPPs relate to railway and port concessions. It should be noted that no transport sector PPP project has reportedly been successfully let under the 2011 PPP Law. The only PPP projects let since 2011 relate to electricity. The reasons for this are unclear.

Table 9. Assessment of Preparation of PPPs in Mozambique (source: "Procuring Infrastructure PPPs" by ALSF PPIAF, 2018)

Elements of Preparation of PPPs	Commentary
Central budgetary authority's approval	Yes. Only before tendering.
Fiscal treatment of PPPs	Yes. Only specific accounting/reporting treatment.
PPP's prioritization consistent with public investment prioritization	Yes. Detailed procedure established.
Economic analysis assessment	Yes. Specific methodology developed.
Fiscal affordability assessment	No.
Risk identification	Yes. No specific methodology developed.
Comparative analysis (value for money analysis)	No.
Financial viability or bankability assessment	Yes. No specific methodology developed.
Market sounding and/or assessment	Yes. No specific methodology developed.
Environmental impact analysis	No.
Assessments included in the RFP and/or tender documents	Yes. Assessments not available online.
Draft PPP contract included in the RFP	Yes. Tender documents not available online.
Standardized PPP model contracts and/or transaction documents	Yes.

Procurement

The PPP Law established the procurement process for PPP projects. Three forms of procurement are allowed for:

- bidding by pre-qualified firms for simple projects;
- a two-stage procedure for complex projects where pre-qualified firms participate in the final design, before the bidding stage; and
- in special cases, and as a last resource in the case where there are no bidders, the government can contract a firm by direct negotiation.

[22] https://pppknowledgelab.org/countries/mozambique with the addition of the FAMBA card PPP project not included within this list

The PPP Law introduces the principle of unsolicited proposals, together with the process and criteria for such projects. If an unsolicited proposal is accepted as part of the PPP programme, the original proponent of the project is given a 15% advantage in the bidding stage, but there is no compensation for the costs incurred in preparing the proposal.

Table 10 – Assessment of Treatment of Unsolicited Proposals ("Procuring Infrastructure PPPs" by ALSF PPIAF, 2018)

Treatment of Unsolicited Proposals (USPs)	Commentary
Regulation of USPs	Expressly regulated.
Assessment to evaluate USPs	Yes.
Vetting procedure and/or prefeasibility analysis of USPs	No.
Evaluation of consistency of USPs with other government priorities	No.
Competitive PPP procurement procedure for USPs	Yes.
Minimum period of time to submit the bids	No.

Under the law, PPP contracts can take various forms, from BOT (Build, Operate and Transfer) to ROT (Rehabilitate, Own, Operate and Transfer). It is important to note that in the case of contract renegotiations, the procedures are the same as those established to approve the PPP in the first place.

The length of a PPP contract is governed by the PPP Law, with 30 years granted for greenfield projects, 20 years for rehabilitation projects and 10 years for operational contracts. It is likely that the proposed BRT in Maputo will fall into the latter category. It should be noted that the length of the contract may be extended by up to 10 years for complex projects.

Whilst the PPP Law established a framework for PPP projects, it is lacking in a number of areas. A particular constraint relates to there not being any standard terms and conditions for PPP projects, meaning that each project must negotiate its own contract. This increases the cost of entry to Mozambique's PPP sector, particularly for smaller projects. In addition to the extra strain this places on the private sector, the need to negotiate every aspect of every contract places additional strain on Government. This function falls upon the relevant line Ministry, which in almost all cases is unlikely to have the appropriate legal, financial and technical skills to carry out this function. Many countries get over this problem, by having a project development fund in place, which is used to cover the costs of appropriate consultancy support to line Ministries. Such a fund does not exist in Mozambique. These costs can run to USD2 – 3 million for even a relatively small project, which would be beyond the scope of most line Ministries.

The PPP Regulations set out clear stages in the preparation and procurement of PPP projects. There are no minimum timescales attached to these stages, but based upon experience elsewhere, it is expected that the full process from requests for expressions of interest to financial close, would take a minimum of 12 months and more likely 18 months to complete. The length of time required to develop a project sufficient to issue a call for EOIs depends greatly upon the complexity of the project, but is likely to be 9 – 12 months, including achieving the initial Government approvals.

All of the above may be reasons why there has been little success in the implementation of PPP projects, outside the energy sector, since 2011. The FAMBA project represents a step forward in this regard, and provided the scheme can address initial implementation challenges, FAMBA may be able to leverage increased interest and appetite for private sector involvement in public transport operations.

Table 11. Assessment of Procurement of PPPs in Mozambique ("Procuring Infrastructure PPPs" by ALSF PPIAF, 2018)

Elements of Procurement of PPPs	Commentary
Evaluation committee members required to meet specific qualification	Yes. Detailed membership and/or qualification regulated.
Procurement notice of the PPP issued by procuring authority	Yes. Available online.
Foreign companies permitted to participate in PPP bidding	Yes.
Minimum period of time to submit the bids	Yes. 21 calendar days.
Availability of various procurement procedures for PPPs	Open procedure (single-stage tendering). Restricted procedure (competitive procedure with prequalification stage). Competitive dialogue and/or multi-stage tendering.
Direct negotiation not discretionary	Yes
Tender documents detail the procurement procedure	Yes
Tender documents specify prequalification/shortlisting criteria (if applicable)	Yes
Clarification questions for procurement notice and/or the RFP	Yes. Answers publicly disclosed.
Pre-bidding conference	No.
Financial model submitted with the proposal	Yes.
Proposals solely evaluated in accordance with published criteria	Yes.
Treatment when only one proposal is received	No.
Publication of award notice	Yes. Available online.
Notification of the result of the PPP procurement process	Yes. Grounds for selection not included.
Standstill period	No.
Negotiations with the selected bidder restricted	No.
Publication of contract	Yes. Available online.

Public procurement laws

The Regulation on the Award of Public Contracts (RPC) sets out the requirements and procedures for the award of public works contracts, supply of goods contracts and provision of services contracts[23]. This was approved by Decree 5/2016 of March 2016. This is the key legislation regulating the award of public

[23] https://www.lexology.com/library/detail.aspx?g=313d20c2-01f7-4757-a613-f6f7035d5310

contracts, including PPP contracts. The Regulations set out the rules for the award of public works contracts, supply of goods contracts and provision of services contracts in Mozambique. The RPC is also applicable to the award of public lease contracts, consulting services contracts and granting of concessions.

All contracting authorities must abide by the RPC rules. Contracting authorities are defined in the RPC as:

- the Mozambican state and services of the direct and indirect administration, including embassies and missions abroad;
- municipalities and other public legal entities; and
- public companies and companies where the government has a shareholding.

On this basis, it is clear that AMT would be subject to the full range of procurement and PPP Laws.

Previous Mozambique PPP experience

a) PPP/PSP practice and experience to date – Rail and port concessions

The Government let the railway concessions with a view to mobilize private sector funding to and stimulate investment in the sector to rehabilitate the lines and provide services after the conflict period. However, review of available reports[24] established that infrastructure concessions did not appear integrated with state planning. In addition, prior work suggests that concessions had not always been granted for the whole of the corridor, which was counterproductive to coordination of development goals.

Overall, the experience of concessions in Mozambique is mixed:

- The initial concession for Ressano Garcia, granted to Spoornet, did not incentivize the concessionaire to use the port of Maputo as competition to its own port in Durban. The Government of Mozambique cancelled the concession in 2005 and CFM stepped in.
- CFM assumed running of the port of Nacala from January 2020, when the port element of the Northern Development Corridor (CDN) Concession ended, after a 15-year term. The rail element of the concession relates to the development and operation northern railway network. The network provides infrastructure access to (1) railway freight operation serving Tete[25] coal mine and (2) railway passenger services in the north.
- There were problems with rehabilitation of Sena line linking Beira port and Malawi, with the contract signed with an Indian concessionaire CCFB in 2005. The works were completed with considerable delay, attributed to CCFB not mobilizing funds on time.

b) PPP/PSP practice and experience to date - Urban Rail Contract in Maputo area

The national railway sector is also an example of private sector participation. Following a period of more than 12 months of discussions between Metrobus and CFM, the parties signed a contract for access and use of CFM infrastructure. It is understood that the contract[26] identified the following obligations:

- CFM provides Metrobus with access to and use of its infrastructure.
- In return, Metrobus pays an access fee to CFM.

[24] R. Bullock: Africa Infrastructure Country Diagnostic, Paper 17: Off-track: Sub-Saharan African Railways", World Bank, (2009)
[25] Tete coal mine operator, Vale, partnered with CFM and built (1) a 912-km railway line, including a 200-km section of the line through Malawi and (2) a deep port in Nacala.
[26] At the time of writing, the contract between CFM and Metrobus has yet to be made available to the World Bank.

- the access fee is linked to the number of tickets sold on Metrobus' trains.

CFM recently introduced a satellite-based signaling system in CFM Sul[27]. The system relies on onboard equipment installed in locomotives. Metrobus has yet to install any onboard equipment. CFM argues that running of Metrobus services involves a manual operation, which limits the capacity of the line.

The following elements of the CFM-Metrobus contract have yet to be clarified:

- The specific institution that licensed Metrobus as a railway transport service provider - Ministry of Transport and Communications ('MTC'), Chamber of Commerce, or any other institution?
- Formal requirements that Metrobus had to comply with, in order to be granted a license (rolling stock, financial means, competent staff, operating procedure, safety case)?
- Whether Metrobus submitted any operating details on its procedures to Metrobus prior to the start of its passenger operations, including a specific requirement to install onboard technology on its rolling stock to ensure operational compliance.

CFM sees Metrobus' operation as complementary to the services it provides. Metrobus' tariff is almost a quadruple of the CFM fare. As such, Metrobus targets the market segment that CFM is unable to serve. Despite apparent complementarity, there seems to be operational aspects where "seamless" integration of Metrobus' with the CFM network is yet to be achieved:

- Metrobus' operation commenced with 4 trains in the morning peak and is now reduced to 3 or even 2 trains;
- A 50% of train paths allocated to Metrobus are not used.
- There are operational conflicts between CFM' and Metrobus' services as Metrobus has yet to install the on-board technology required by CFM. This results in delays to both CFM' and Metrobus' services.

Main transport sector industry actors and capacities

The main actors within the public transport operating sector, both public and private, are outlined below. A summary of the features and observed activities and investment within the transport sector is presented below:

Table 12. Summary of financial and operational capacity of PT operators

Operator	Financial Capacity	Operational Capacity
Municipal Bus Enterprises	Limited, and dependent on government support. Poor debt servicing record.	Good. Fleet managed operations and scheduled service delivery.
Metrobus	Strong. Access to private financing channels.	Good. Fleet managed operations and scheduled service delivery.
Co-operatives	Limited. Some private equity. Poor debt servicing record.	Limited. Individualised operation with low level of collective activities
Chapa Operators	Limited. Some private equity	Limited. Individualised operation.

[27] A high level description of the signaling system is yet to be shared with the Word Bank.

Main financial sector actors and characteristics

129. A summary of the status quo is presented below in the form of a SWOT analysis from the financing institution perspective and also from the operator perspective:

Table 13. Opportunities and constraints analysis for Financial sector

	Strengths	Weaknesses	Opportunities	Constraints
Local financial sector	A number of large commercial banks offering corporate loans for asset purchase on flexible terms according to circumstances.	High rates of interest resulting in high cost of finance. Collateral requirements.	Express a desire to support financial inclusion and socially valuable investments. Two banks already active within the transport sector and therefore familiar with the commercial characteristics and challenges within the sector.	Little evidence of direct lending to the transport operators for fleet financing. Financial viability of commercial credit under present operations will be challenging.
Government support	Existing channels of support already established, providing mechanism to support BRT operations	Contractual arrangements with operators have been unsatisfactory, with evolving arrangements required to address shortcomings.	Introduction of BRT offers opportunity to review the way in which public support is channelled to the sector, with potential improvement and increased value in efficacy of public funds.	Intention of national government to reduce subsidy support for the public sector operators following transfer to municipalities. Shortfall in loan repayment to FTC has reduced the available resources for further investment.
International Financial Institutions	Wider range of players with capital seeking returns	Foreign currency lending presents risk to vehicle owner	Co-financing with risk sharing possibilities	Limitations on certain IFIs lending directly to operators
Vehicle manufacturers	Incentive to offer preferential finance terms for vehicle procurement	Foreign currency lending presents risk to vehicle owner	Fleet investment sufficient to generate operator interest	No local vehicle manufacturers
Private sector investors	Evidence of private sector investment from individual chapas owners and by Sir Motors for Metrobus operations	Investment typically small scale by numerous individual operators (with the exception of Sir Motors). Little investment made by the newly formed co-operatives.	Opportunity for improved collectivism made possible by the increased transparency offered by the FAMBA ticketing system. This may enable pooling of equity amongst shareholders to increase investment.	Poor track record in effective servicing of financing. Limited equity amongst the chapa operators who form the co-operatives.

Policy Options for Further Development

130. The principal motivation for the introduction of private sector into infrastructure is often to get things done where public sector was unable to do so because of various binding constraints. Experience has shown a variety of areas where private sector expertise and finance can be deployed. Experience has also shown that the need for private investment increases at times when institutional reforms are being implemented, to complement the shortfall of public funds that prompted the need for reform in the first place.

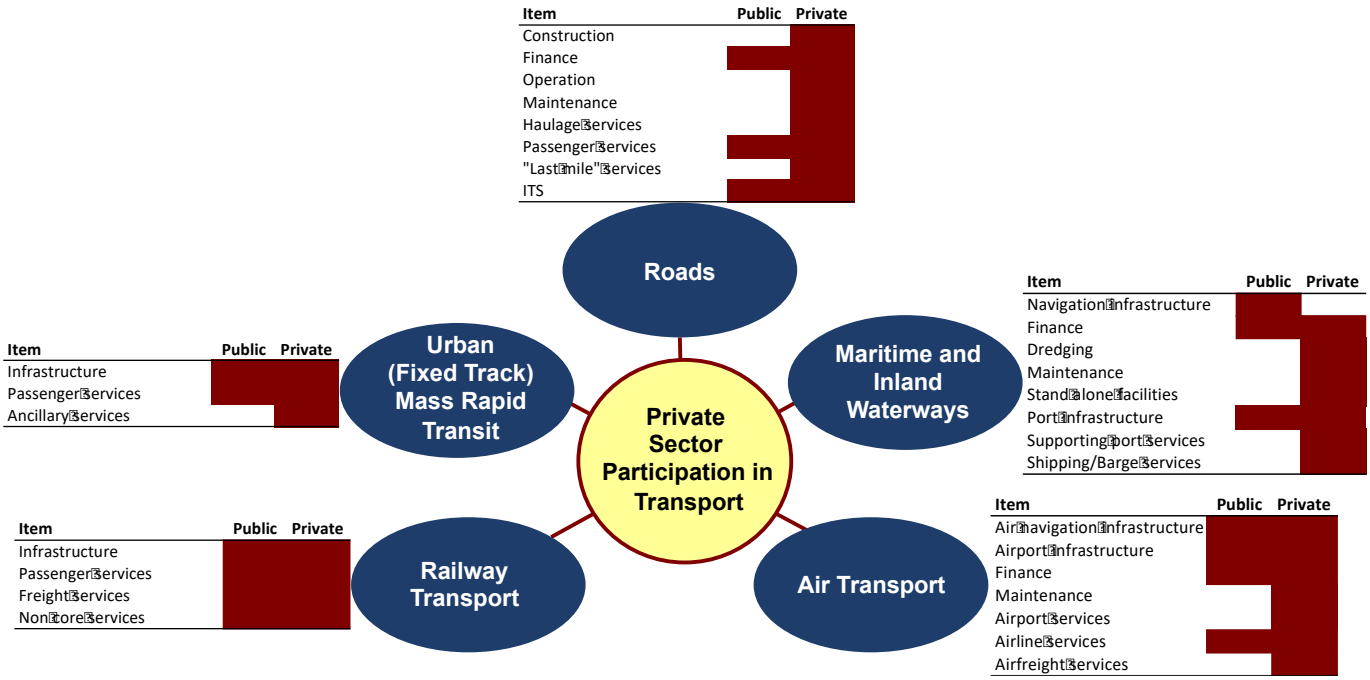


Figure 40. Opportunities for private sector participation in transport[28]

Alternative PPP delivery models for the BRT

131. Following review of the characteristics of the main stakeholders and potential investors in the public transport sector in Greater Maputo, alternative business models for implementation of the BRT project are considered below, with recommendations on the optimal model for BRT system delivery in Maputo. The optimal business model must be considered within the context of the current barriers and opportunities to private sector participation and investment in the transport sector, and the challenges and opportunities faced by those currently operating. The table below summarizes both barriers and opportunities.

Barriers	Opportunities
• Low operating profitability reported by the sector – interviews with operators, modelling of financial viability within this study and a range of associated studies including independent assessments of commercial performance highlight the challenge in achieving profitable operations under the prevailing fare structure and operating conditions. • The reported commercial performance of the municipal bus companies, and the lack of new entrants into to the sector, despite clear evidence of unmet demand and under-capacity in transport supply would appear to support the conclusion that there is presently limited profitability in operating within the sector. This of presents a significant barrier to attracting new private investment into the sector.	• The Bus Rapid Transit Scheme offers significant potential to increase operational efficiency, improving run times, reducing dwell times and round trip times, and thus reducing operating costs • Effective network planning and integration, in addition to the improved service quality, has the potential to increase traveller demand, increasing revenue through higher ridership, even before consideration of the potential for some form of premium pricing for increased service quality • The roll-out of the FAMBA card will increase transparency of vehicle and route revenues, providing greater understanding of commercial performance, and hopefully reduced revenue leakage. Improved

[28] P. Amos: Public and Private Sector Roles in the Supply of Transport Infrastructure and Services, World Bank, 2004

• Fragmented market structure, with small scale operators with limited financial resources. This is a feature even of the co-operatives at present, due to the individualised mode of operation. • A poor track record in repayment of financing extended on fleet procurement, both by private sector co-operatives and by public sector operators. This acts as a barrier to potential external financing or investment, as the risk of investment has already been demonstrated. • Operating conditions which may be likely to deteriorate over time without intervention, with increasing traffic levels further reducing operational efficiency. • A regulatory agency which has a strong political pressure to maintain fares at a socially acceptable level, irrespective of input cost of operations, presenting a significant risk to private sector investors.	monitoring of passenger and vehicle activity will enable more effective service planning • The implementation of formal mass transit presents opportunities for wider revenue raising including advertising on vehicles and on passenger-facing infrastructure, and the potential for retail opportunities at points of major passenger throughput such as the main terminal(s) • The supporting infrastructure required for BRT operations, including a terminal and depot facilities offer potential opportunity for private sector investment, with the potential for revenue streams from operation and access charging.

Alternative models of Private sector participation

132. Alternative private sector participation models have been examined, using the framework developed under the World Bank workstream on attracting finance for development. An exploration of alternative options within the Maputo context was conducted within the 'PPP Assessment' report. This identified a range of public and private sector roles, which were broadly categorized into three options: (i) Public Sector led with minimal private sector involvement; (ii) Private sector led with minimal public sector involvement; and (iii) Balanced scenario with mix of public and private involvement

133. A summary of the roles played by the different entities under each identified scenario is presented below.

Table 14. Alternative models of delivery for Maputo BRT

	Option 1 – Public Sector	Option 2 – Private Sector	Option 3 - Balanced
Fund Infrastructure	BRT Runningways - Government/ WB		
	Stops - Gvt/WB	BRT Stops – Private investor	BRT Stops – Gvt/WB
	Gvt/WB - Terminals / Depot	Terminals/Depots – Private investor	PS – Terminals/Depots - Private Investor
Fund rolling stock	Government/ sometimes private	Bus operator	Government supported procurement with lease to BRT operator(s)
Cover cost of operations	Government /sometimes private	Bus / ticket and fare operator	BRT operating company(s) with targeted subsidy from government for socially desirable services

Set tariffs and service standards	Regulator		
Operate services	Municipal Bus Company	Private bus Operator	Tender for operator based on merit (may be public or private operator)
Fares and ticketing	FAMBA Card concessionaire reverting to AMT after 10 yrs		
Monitoring	AMT as Regulator		
Maintain	Government (rollingstock)	Bus operator (rolling stock)	Bus Operator (rolling stock)
	Government (infrastructure)		

Key: Public Private Shared

Source: Consultant's representation adapted from WB Maximising Finance for Development Pitchbook

134. Following this assessment, the **Balanced Scenario** has been refined to represent the recommended PPP option for system delivery. An overview of the rationale under each sub-component is set out below.

135. Based on the three PPP options identified , the allocation of risk and responsibilities are outlined in the table below. The preferred 'Balanced Option' shares the risk effectively between the public and private sector, in the areas in which these actors are best placed to adopt this risk.

Table 15. Summary of Risk Allocation by Option

	Option 1 Public	Option 2 - Private	Option 3 Balanced Scenario
Planning Risk	G	G/I	G
Design & Construction Risk	G	G/I	G
Construction Risk	G / W	G / W / I	G / W
Fleet Purchase Risk	G	O	G / W / M
Revenue Risk	G / T	O / T	G / O
Operational Risk - Infrastructure	G	I / O	G / O
Operational Risk - Fleet	G	O	M
Macroeconomic risk	G	G / O	G / O
Political and Social risk	G	G / I /O	G / O

Key: G = Government, I= Infrastructure Company/Private Investor, T – Ticketing Concessionaire, M = Vehicle Manufacturer, O = Operator, W = World Bank

ANNEX 1. Urban Mobility's Main Actors and their Functions

136. This section presents and describes the functions of main actors involved in urban mobility in AMM; it commences at the national level and central agencies and continues toward local and decentralized agencies.

137. **Ministry of Transport and Communications.** MTC's role in urban transport relates principally to policy formulation, regulation of other entities, transport user rights and performance evaluation of transport activities. It does also have a role to promote infrastructure development based on PPPs. The MTC has various subsidiary agencies: (i) AMT, (ii) FTC, (iii) CFM, and (iv) INATRO.

138. **Agência Metropolitana de Transporte de Maputo (AMT).** The AMT was established by Decree No. 85/2017 of 29th December 2017 as a "regional institution with jurisdiction over the municipalities and districts of Maputo Metropolitan area[29]", aiming "to coordinate and implement the Maputo Metropolitan Area Transport and Mobility Master Plan". In particular, AMT is mandated (i) to carry out the metropolitan-level strategic planning and management of public transport network and assets, (ii) to define routes, (iii) to organize and monitor passenger transport services, to enter contracts or grant concessions for passenger transport services and assets, and (iv) to ensure quality in service provision and to approve metropolitan-level fares. While the functions of AMT are comprehensive and well-defined, the Decree does not provide a role for the municipalities and districts in the governance structure, nor any protocols for how the AMT would interact with them, nor clarify how the overlapping mandates of AMT and the municipalities are to be aligned in matters such as authorization, award or management of bus routes.

139. As of 2022, AMT has only a few core staff and remains understaffed for the roles it is expected to play. In reality, the overall functioning of the AMT, and its relationship with the municipalities remains unresolved. Furthermore, AMT has started performing a number of the assigned functions, in particular mapping out the routes within the network and mobilizing a new cashless fare collection system, Famba, on private and public buses. The number of functions performed are constraints by the limited human resources in the institution.

140. **The Transport and Communication Development Fund** (*Fundo de Desenvolvimento des Transportes e Communicacoes*, FTC). FTC was established as a mechanism to provide investment funds to the transport and communications sector. The intended scope was broad, covering all aspects of transportation (road, rail, maritime, air) as well as communications.

141. The FTC had a particular objective to engage with the private sector and to develop possibilities for public-private partnership and/or to leverage private sector finance and investment. The Fund would therefore provide a ring-fenced block of funds and a steady income stream which, although relatively-modest compared to the investment needs of the sector, could be used as public counterpart to leverage larger investment.

142. Up to date, FTC has procured approximately 400 buses in the Maputo Metropolitan Area to public bus companies and cooperatives. FTC has been successful in catalysing fleet modernisation though the private sector, however has had challenges in achieving repayment of loans from operators due to low revenues being received by bus managers and cooperatives, with a knock-on impact in payment for ongoing bus maintenance by the supplier. This is believed be principally due to leakage at the level of bus drivers and

[29] Specifically, Maputo, Matola, Boane, Marracuene, and neighboring districts.

conductors, driven by the cash-based fare system. 310 of these buses are now equipped with Famba card payment infrastructure, however challenges remain in driving usage of Famba and achieving full transparency around bus revenues.

143. ***Portos e Caminhos de Ferro de Moçambique* ('CFM')** is the national ports and railway company tasked with operation and management of port and railway services. As such, the company is the MCT's delivery agent in the railway sector. *Railway freight services* in Mozambique are provided by CFM are provided in the Central and Southern parts of the network[30] and by the concessionaire in the north. Railway freight operations on the network[31] totaled 23.7 million tons of cargo. *Railway passenger services* in Mozambique are provided by CFM (Central, South), by the concessionaire (North), and by Metrobus (South)[32]. CFM operates a limited number of commuter rail services within Maputo Metropolitan Area (4 morning trains and 5 afternoon trains), operates the rail station at *Praça dos Trabalhadores*, and sells network capacity to the private operator, Metrobus (central Maputo to Machava and to Boane, with 3 and 1 daily trips each way respectively). The revenue from passenger services is quite limited in CFM, in 2018 it represented 1.8% of total CFM revenue

144. **Provinces.** Provincial governments have the responsibility for the issuing of operating licenses to public transport operators where routes cross municipal boundaries. Within the context of Maputo Metropolitan Area this competency is duplicated by AMT.

145. **Local Government** in the AMM consists of contiguous Municipalities and Districts. These entities are administratively independent of each other, with limited mechanisms or obligations to work together at planning, implementation, and development levels. Maputo Municipality, with Provincial status, has the highest administrative level among the units that shape the AMM. Matola and Boane are both Municipalities, which is a sub-Provincial level. Matola is the largest municipality in the Country in terms of number of inhabitants, and Boane, established only in 2014, is the largest in terms of geographical area. Finally, Marracuene and Matutuine have District status. In matters of transport, the Local Government has responsibility for: (i) regulation and registration of all motor transport vehicles; (ii) regulation and supervision of public transport services, including tariffs; (iii) development, maintenance, and management of local roads (i.e., non-national); (iv) traffic management regulations, including parking control and (v) municipal police, including traffic police and enforcement. There is no "Greater Maputo" administrative structure, although recent efforts to improve coordination in urban transport among municipalities included the creation of the AMT by the MTC.

146. All Local Government Units have departments and dedicated personnel to urban transport functions. Maputo Municipality has a Department of Municipal Mobility, Transport and Transit, as well as a public Mobility and Parking Company (EMME) which aims to promote integrated urban mobility, parking, and associated services. Matola Municipality has two divisions within its Transport Department, one dealing with Mobility, the other dealing with licensing and inspection of commercial vehicles including passenger transport. Marracuene District has the same responsibilities in the transport sector, but these are delivered by the District Service for Transport and Infrastructure (SDPI).

---

[30] Operation of freight and passenger services in the northern part of the network is provided by two concessionaries - CDN and CLN - who have contracts with CFM.

[31] 2017 data

[32] Metrobus started as a bus operator in Maputo. Following the purchase of second-hand DMUs in New Zealand, the company now provides an integrated rail-bus transport service in the South. Whilst details of the Metrobus-CFM contract have yet to be shared with the World Bank team, discussions with CFM established that Metrobus has an access agreement. Under the arrangement, Metrobus purchases oil from CFM. The single ticket for Metrobus is 37 meticas, 7 times above the CFM tariff.

147. Municipal transport department are also responsible for the delivery and maintenance of most highways and mobility infrastructure in their areas, including road construction, maintenance and traffic management. These are executed through District Public Works Departments (or the SDPI in districts). This excludes roads classified as part of the national highways network (such as the N1 Av. De Mozambique) which is owned and operated by the national highway administration (Administração Nacional de Estradas) although municipalities can exert some influence over infrastructure implemented in their jurisdictions by such national agencies.

148. Public transport planning and licensing. Maputo, Matola and Boane Municipalities and Boane District are the mandated regulators of the urban road passenger transport in their areas. In practice, municipal governments' role in the public transport system is limited and the system is commercially led based on profitability to private operators There is not a network or service planning capacity at the Municipalities.

149. Public transport operations. Maputo and Matola municipalities operate their own municipal bus companies (EMTP and EMT respectively). The entities operate a small proportion of the overall public transport fleet, with around 70 vehicles of an estimated total fleet of 5,000 public transport vehicles in Metropolitan Maputo. They are constrained in their access to financing and their limited farebox recovery means that they have a reliance on public subsidy for continued operation.

150. Enforcement. Municipalities are responsible for enforcement of public transport standards and licensing. In practice, this has not been sufficient to prevent operation of paratransit. An estimated one third of chapas operate illegally, alongside unregulated MyLoves and some motorcycle taxis, particularly in peripheral areas.

151. Traffic management, traffic signals, on street (and some off street) parking are the responsibility of the Municipalities and Districts. Traffic enforcement within municipal boundaries are done by both National Traffic Police reporting to the Ministry of Interior, and Municipal Police, reporting to the municipal management structure. Although the responsibilities of each appear to be distinct, this has caused some public complaints in the past. Public transport and parking related legislation and regulation are to be enforced by municipal policy, while general traffic regulations should be enforced by national traffic police. The fact that the municipalization is a relatively new phenomenon in Mozambique, the mandate of the municipal police in many instances coincide with those from national traffic police before municipalisation, and this duplication still persists today.

ANNEX 2. Relevant legislation

CFM

The Ports and Railways Company of Mozambique initially operated under the MTC, in line with the Decree no 6/89. From January 1st 1995, CFM was transformed into a Public Company under Decree 40/94, which also acts as its statute. The document recognized CFM as the national company in charge of ports and railways and prescribed the following:

- CFM is established with a capital of MT 1.243 trillion and operates under the management of the Administrative and Fiscal Councils. The Administrative Council had seven members appointed for a period of three years while the Fiscal Council has three members appointed for a period of five years.

- Given its dominant market position, CFM tariffs are proposed by the company for the Government's approval.

- CFM's revenue includes several sources: revenue from operations, revenue arising from property rental, contributions and subsidy from public entities, revenue arising from the sale of its assets and shareholding in other companies, and donations and other sources.

- CFM management and planning tools include multi-annual and annual plans, that as a minimum in terms of operations, investment, foreign exchange and updates. Importantly, CFM planning involves a 3-year contract-program between the Ministries of Planning, Transport and Communication, and Finance and the President of the Administrative Council. This document defines the (1) strategic direction for the enterprise, (2) corporate objectives regarding the tariffs and services to be provided, (3) social, economic, and financial orientation of the company, including the corporate wage bill and investments required for the operation, (4) the subsidy to be granted to compensate for the delivery of socially necessary services, and (5) planning and monitoring principles.

- CFM is required to have funds in reserve to ensure that legal provisions, investments, and the social obligations are met.

The company is also obliged to comply with the national financial reporting requirements. This includes alignment with two major pieces of legislation:

- Law on State Owned Companies, no 3/2018:
    - The Law established corporate governance and principles and rules that apply to State Owned Companies ('SOC'). Corporate governance of the SOC is undertaken via General Assembly, and Administrative and Financial councils. The General Assembly decides on the strategic issues for the company, annual operating plan, annual accounts, annual performance and results, appointments-membership of councils.
    - The key planning and management tools envisaged under the law include the business plan, annual operating plan, annual budget for the SOC, financial and economics performance matrix for the SOC, anticorruption policy, code of ethics, administrative and financial procedure manuals.

- The financial control of the SOC business is ensured through mechanisms of financial control (clause 24), internal control (clause 25), external audit (clause 26), assessment of business risks (clause 27), and reports, and annual accounts (clause 28).

- Law on Financial Information Office, no 2/2018: The Law established the remit and responsibilities of the financial information office ('DIFIM') within the legal framework for preventing and combating money laundering and terrorist financing.

AMT

The legal basis for AMT is a Decree of the *Conselho de Ministrios* (Council of Ministers) of the Mozambican Government.

The AMT was created in 2010 by Decree No. 85/2017 of 29th December 2017. It was fortmally published in the *Boletim da Repúbica*, Series 1 – Number 203, of 29th December 2017.

The Decree defined, among other things:

- The nature of the institution (Article 2), the scope of its jurisdiction across the Maputo Metropolitan area (Article 3) and its purpose (Article 4)

- The responsibilities of AMT (Article 5) and its powers (Article 6)

- That the sectoral reporting entity would be the Minister that oversees the transport portfolio and the oversight roles of the Minister relevative to AMT (Article 7)

- The Board structure and its powers (Articles 8 through 10)

- The revenue sources for AMT, which includes provision for concession rates for Maputo Metropolitan Area routes, rates for ticketing services, fees and revenue from other services provided by FTC, plus subsidies from the National Budget (Article 11)

- Revenues collected by AMT is to be allocated 60% to AMT and 40% to the National Budget (Article 12)

It may be noted that the Decree is silent on any role for or working relationship with the Municipalities and Districts, although they have pre-existing mandates for public transport in their area, nor is there any provision for the Municipalities or Districts to be represented on the Board of AMT.

FTC

The legal basis for the FTC is a Decree of the *Conselho de Ministrios* (Council of Ministers) of the Mozambican Government. The legislation to establish was brought forward by Ministry of Transport and Communications to the Council, who approved it.

The FTC was created in 2010 by Decree 38/2010 of September 15th. It was formally published in the Boletim da Repúbica, Series 1 – Number 37, of 15th September 2010.

The Decree defined, among other things:

- The creation of the Fund as a public institution, with oversight by Ministry of Transport and Communications (Article 2)
- The high-level objective of the Fund, expressed in one sentence (Article 3)
- The income sources for the Fund, including a detailed list of public entities whose passive assets could be considered (Article 4)
- Add here further articles when we get the full version*
- Financial management and administration of the fund (Articles 20 through 26)

**The available version of the Boletim of 15th September is missing one or more pages containing articles 5 through 19; the complete version has been requested from FTC.*

ANNEX 3. List of Priority Projects included in the Strategic plans

Table 1. List of Priority Projects included in the Comprehensive Urban Transport Master Plan for the Greater Maputo

Project	Sub-sector	Description	Approx. Cost (USD million)
East-West Axis			
New Construction of Exclusive Bus Road of Maputo–Matola	Road	To construct an exclusive busway to link Infulene (in Matola) and Maputo using the ROW of the railway	20.8
New Construction and Improvement of Infulene– Maputo Connection Road	Road	To construct (and partially improve) a major district road to link Infulene (in Matola) and Maputo	8.0
Western Matola Industrial Road Improvement	Road	To pave a major arterial road in the Western Matola industrial area	17.6
Preparation for Maputo– Matola Gare Rail Line Project	Rail	To conduct project preparation for Maputo–Matola Gare Rail Line to be developed by medium-term period (using the existing railway ROW)	650
North-South Axis			
BRT City Center – North (Baixa – Maguanine)	Road	To improve related Av. Eduardo Mondlane	5.9
	Road	To improve other related roads	25.7
	BRT	To develop BRT from the city center toward north (Baixa–Maguanine)	136
BRT along EN1 (Zimpeto–Benfica–Brigada)	Road BRT	To improve the related section of EN1 and develop BRT from Zimpeto to Brigada via Benfica along EN1	93
EN1 Bypass Construction	Road	To construct a bypass for EN1 along the Greenbelt, and link EN1 with EN4	154
Maputo–Marracuene Connection Road Improvement (A)	Road	To pave Av. Cardeal Alexandre dos Santos linking Marracuene and Maputo, and absorb traffic from the BRT Line (city center–north)	28.6
Traffic Management			
Intersection Improvements	Traffic Manag.	To improve configurations of bottleneck intersections for smooth traffic flow	10.5
Short-Term Traffic Management Measures	Traffic Manag.	To remove bottlenecks impeding smooth traffic flow	10
Traffic Signal Measures	Traffic Manag.	To increase traffic signal installations, and introduce traffic signal control system	50

Traffic Signal Measures	Traffic Manag.	To implement short-term measures for traffic safety improvements	7
Capacity/Institutional Development			
Capacity Building of the Bus Sector	Bus	To strengthen operational capability of TPM, and help improve bus and chapa services	5
Improvement of Bus Sector	Bus	To restructure the bus network (including feeder services) and renew bus fleet	80
Road Maintenance Capacity Strengthening Project	Road	To strengthen the capacity for road maintenance in Greater Maputo	3
Development of Greater Maputo Metropolitan Transport Agency (GMMTA)	Urban Transp	To establish an organization to strengthen coordination and decision making for the transport development in Greater Maputo	3
TOTAL			1,318.7

Table 2. List of Projects included in the DPM

PILLAR 5 : INFRASTRUCTURES AND PROVISION OF SERVICES - TRANSPORT, MOBILITY AND ACCESSIBILITY		
STRATEGIC OBJECTIVE 1 : ENSURE THE IMPLEMENTATION OF THE TRANSPORT AND TRANSIT MOBILITY DIRECTOR'S PLAN WITH A VIEW TO IMPROVING THE STRATEGIC AND OPERATIONAL MANAGEMENT OF PUBLIC AND PRIVATE URBAN TRANSPORT IN THE MAPUTO METROPOLITAN AREA		
Activities	**Goal**	**Term**
Increasing and improving the quality of the road fleet of public and private services in the Municipality of Maputo	Increased d to the bus fleet of at least 150 units	by 2023
Reinforcement of the route shortening mechanism (monitoring system, control and inspection center)	Reduced route shortening	by 2023
Promote the organization of transporters in associations	Cooperatives and / or companies of semi-collective transport operators created in all transport corridors	by 2021
Introduce exclusive corridors for public transport and retrace transport routes to cover all neighborhoods	Route concession system introduced in the BRT (*Fast Bus Transport*) corridor	by 20 19
Discipline and establish rules for the circulation and distribution of goods for cargo vehicles	Establish guidelines and regulations for cargo transportation	by 2020
Promote and expand the intermodal system in the Metropolitan area of Maputo	Implementation of an electronic ticketing system and a single pass valid for all modes of transport	by 2021
Built go terminals and road transport stops	Built the transfer terminal with parking in Magoanine	2022/23
Build road transport terminals and stops	Built from the Museum bus terminal	2022/23
Build road transport terminals and stops	Construction of the Intermodal Terminal in Baixa started	2022/23
Build road transport terminals and stops	Built second phase terminal of the square of the Warring	2022/23
Build road transport terminals and stops	Bus terminal built in the Malanga area	2022/23

Build road transport terminals and stops	KaTembe bus terminal built	2022/23
Creation of a database of different types and means of transport including operating rules establishments	Database created and functioning	By 2020
STRATEGIC OBJECTIVE 2: PROMOTE THE USE OF COLLECTIVE MASS TRANSPORT MEANS		
Activities	**Goal**	**Term**
Introduction of the mass transport system with a high level of service - *BRT*	Works on exclusive corridors for public transport started including related and access infrastructures	by 2022
Consolidation of the existing transport system: Metro Bus in the Metropolitan Area of Maputo	construction of transport stops and terminals started along the Metro Bus lines	Start 2022
Introduction of the mass transport system with a high level of service - *Metro*	implementation of the AGT system has begun over an extension of twenty-three (23) km	start 2022
Ensure continuity of the Maputo / KaTembe crossing	Acquisition of new passenger vessel	by 2023
Ensure the allocation of new ships for Maputo/ Kanyaka crossing	Ensure conditioning and commissioning of new vessel to T ravessia Maputo / Kanyaka	by 2023
Ensure the allocation of public road passenger transport to the KaNyaka Municipal District	Ensure that at least two means of public passenger transport are put into service	by 2023
STRATEGIC OBJECTIVE 3: PROMOTE IMPROVEMENTS IN THE FUNCTIONING OF THE PUBLIC AND PRIVATE TRANSPORT SYSTEM		
Activities	**Goal**	**Term**
Construction of municipal car parks and car silos and strengthening the organization and management of parking services	increase in the number of public and private parking spaces	By 2023
Creation of a municipal urban mobility system for traffic management (traffic lights, video monitoring)	Traffic control and management center created	by 2021
Maintenance and Massification of the road signaling system in the Municipality	Periodic and routine maintenance of graphic and light signs	2019 to 2023
Approval and implementation of the strategic parking plan	Implementation of priority actions in the strategic parking plan	2019
Review of municipal transport postures (passengers, cargo, taxis, velocipedes)	Postures revised and approved by the Municipal Assembly	2020 to 2021
Create and implement a civic education project focused on mobility and parking	Dissemination of content through audiovisual media and in the school teaching process	2023