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1 **IS PARATRANSIT A KEY ASSET FOR A SUSTAINABLE URBAN MOBILITY**
2 **SYSTEM? INSIGHTS FROM THREE AFRICAN CITIES**

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1 **ABSTRACT**

2 In many cities of the developing world, paratransit services –often in the form of privately-owned
3 minibuses– are a key element of the urban mobility system. Yet, charged with causing road
4 congestion and insecurity, they are sometimes considered as a default option for transportation that
5 is set to be replaced by high-quality mass transit, in particular BRT, as economic conditions
6 improve. At the same time, the development of ICT-based mobility services is reshaping
7 paratransit services all over the world.

8 Based on a field study and survey of local stakeholders conducted in the spring of 2017 in three
9 African cities –Nairobi, Kenya; Cape Town, South Africa; and Addis-Ababa, Ethiopia–, the paper
10 investigates the role of paratransit services in providing low-cost, demand-responsive
11 transportation together with service innovation and employment opportunities. The paper further
12 discusses the opportunity for including paratransit services as one element of the transition
13 towards more sustainable urban mobility systems, provided they are regulated by a competent
14 transportation authority.

15

16

17

18 *Keywords:* paratransit, urban mobility, sustainable mobility, Africa

19

1 INTRODUCTION

2 Paratransit usually refers to a flexible transportation mode that does not follow fixed schedules (1).
3 In North America or Europe, paratransit services are traditionally known as on-demand services,
4 mostly dedicated to disabled people or non-motorized households living in rural areas (2). Yet, the
5 fast-growing transportation network companies (TNCs), among which Uber and Lyft, are an
6 increasingly dynamic addition to the scope of paratransit services in urban contexts (3). In the
7 ‘developing world’, the literature may refer to paratransit as ‘intermediate public transport’,
8 ‘semi-formal transport’, or even ‘informal transport’. Paratransit services in such contexts are
9 heterogeneous, ranging from licensed minibus services operated on a prescribed route by a
10 formalized company to illegal motorbike services run by informal businesses, and they also have
11 seen the recent addition of shared mobility services proposed by a TNC. Like minibus-taxi or
12 motorbike-taxi services, these technology-enabled shared mobility services have mostly been
13 deployed by the private sector without public financial support (4).

14 Paratransit epitomizes mobility in many large cities of Sub-Saharan Africa. It started
15 developing in the 1980s and 1990s, a period when structural adjustments occurred in many
16 countries following independence, which led to the fall of some publicly-owned bus operators (5;
17 6). Nowadays, African cities are characterized by the fastest population growth in the world, urban
18 sprawl, poverty, and income disparities. This situation results in spatial mismatches between
19 housing and jobs and rapid changes in travel demand (7; 8). Motorization rates are still low, but
20 they are increasing rapidly, as the purchasing power of city dwellers has improved and motor
21 vehicles and bikes have become more affordable (8). Poorly designed road networks are highly
22 congested and dangerous for cyclists and pedestrians; the air quality is bad, and the concurrent use
23 of many different kinds of vehicles provides complementary mobility options but reduces each
24 other’s performance (7). In this context, paratransit services are often the only means for many
25 people to travel, but at the same time they are subject to vehement criticism related to reckless
26 driving, vehicle overloading, armed violence, and collusion with corrupt police (9).

27 Facing this situation, public authorities have used different strategies for rationalizing and
28 improving paratransit services, ranging from ‘acceptance’ to ‘prohibition’, and including
29 ‘recognition’ and ‘regulation’ (10). Some experts are in favor of replacing paratransit to promote
30 high-performance transit modes, such as bus rapid transit (BRT). Others advocate upgrading and
31 integrating paratransit in the public transportation network (9; 11) on the grounds that the main
32 assets of paratransit –being flexible, labor-intensive in areas with high levels of unemployment
33 and prone to innovation– could exceed its drawbacks.

34 The research presented here aims at studying the current position of paratransit services in
35 the mobility systems of large African cities and assessing whether these services could contribute
36 to sustainability transitions in said systems. We selected three cities in Eastern and Southern Africa
37 based on criteria of rapid demographic growth, and status of regional hub with relative economic
38 and political stability. The cities of Nairobi, Kenya, Cape Town, South Africa, and Addis Ababa,
39 Ethiopia, are populated by about 4 million inhabitants each, and growing fast. As this paper will
40 further elaborate, these cities present very different national and local organizational and political
41 settings, which impacted the strategies adopted locally in terms of regulating paratransit services
42 and/or organizing their modernization. While they are traditionally seen as a transient state of the
43 mobility system, could a regulated, modernized version of paratransit services in these cities be
44 compatible with their aspirations to become ‘world-class cities’? Could they even be a key asset in
45 paving the way for sustainable mobility systems in these cities?

46 This paper is organized as follows. The next section presents the methodology and an
47 overview of the mobility systems for the three case studies. A following section is dedicated to the

1 description and analysis of the strategic options adopted by the cities with regards to paratransit
2 services. Then a discussion follows on the main assets of paratransit services, as vectors for a more
3 sustainable mobility in these fast-growing cities. Some concluding remarks close the paper.

4 5 **THREE CASE STUDIES**

6 7 **Methodology**

8 The analysis mainly draws on interviews carried out during a field study and survey of local
9 stakeholders in the spring of 2017 in Nairobi, Kenya, Cape Town, South Africa, and Addis Ababa,
10 Ethiopia. A total of 32 semi-directed interviews were conducted. A wide range of stakeholders
11 were interviewed, including representatives of public authorities (5 interviews), transportation
12 operators (4 interviews), international development agencies (3 interviews), consultancies (2
13 interviews), NGOs (2 interviews), and start-ups (8 interviews), as well as researchers (8
14 interviews). The recruitment was not exhaustive but diverse enough to represent different
15 positions on the debate. The interviews were all transcribed and completed by field observations
16 and a literature review based on policy documents, newspapers and academic production.

17 The minibus taxi industry in Kenya and South Africa has been well-documented, thanks to
18 research carried out at the University of Nairobi and the University of Cape Town, with the
19 financial support of the Volvo Research and Educational Foundations (12). The paratransit sector
20 in Addis Ababa is not as extensively documented in the literature as it is for the two other cities.
21 Besides, it can be noticed that TNCs in Africa are the subject of many press releases but few
22 academic papers, unlike in Asia (13; 14).

23 24 **General Context: Overview of the Mobility Systems in the Three Cities**

25 With approximately the same population size, the three cities present very contrasted situations in
26 terms of urban organization, infrastructure development, motorization rate, and modal share. In all
27 three cities, the unbalanced urban organization is inadequately compensated by the public
28 transport system, especially for the poor. Paratransit represents an important modal share in all
29 three cities.

30 31 *Nairobi, Kenya*

32 Nairobi is the capital of Kenya. Located in the fertile central highlands, the city has been created
33 by the British as a commercial place on the Uganda-Mombasa railway line. Since independence in
34 1963, population has grown to reach 3.1 million people in the Nairobi City County (15). The racial
35 segregation of early Nairobi has evolved into the current social segregation (16). Jobs are mainly
36 located in the Central Business District (CBD). The western side of the city, which is the former
37 colonial city, remains a wealthy area. Low-income populations live in the eastern and southern
38 parts of the city. Five major arterial roads serve the CBD. As the by-pass roads have not been
39 completed, all road traffic converges towards the CBD, which causes heavy traffic congestion.

40 For public transport Nairobi mainly relies on its minibus services, called '*matatus*', as the
41 public bus services failed in the 1980s. Besides *matatu* services, *boda-boda* motorbike-taxi
42 services are expanding. So are TNC services, especially Uber and its local competitor LittleCab,
43 which respectively operate about 4,000 and 5,000 for-hire vehicles in the capital [interview with
44 an operator]. In 2013, 30% of households in Nairobi were motorized (17). The modal share of the
45 private car was 14% and 5% for two-wheelers. *Matatus* accounted for 28% of daily trips, as
46 compared with 12% for buses. Non-motorized transport modes accounted for 40% of daily trips
47 and 70% of road accidents. The use of the commuter train remained marginal (17).

1 *Cape Town, South Africa*

2 Located in a spectacular setting in the south-western part of South Africa, Cape Town is a
3 three-century old city. The construction of a railway line to the southern suburbs during the 19th
4 century shaped the urban growth of the city. Accelerated urbanization occurred in the 1940s and
5 resulted in large informal settlements populated by Black African populations in the peripheries.
6 The 1960s and 1970s were marked by low-density suburban expansion. Though somehow limited
7 by the topography, the process was facilitated by the construction of an intra-urban freeway system
8 (18). In the first decade of this century, the city proved very attractive, with a population growth of
9 30% over the decade, reaching 3.7 million inhabitants (19).

10 The current structure of the city still reflects the legacy of Apartheid and the associated
11 policies of deliberate segregation. Cape Town is approximately 30 km x 30 km (19 mi. x 19 mi.).
12 Nowadays the main townships of Mitchells Plain and Khayelitsha in the Cape Flats, about 30 km
13 (19 mi.) away from the CBD, are populated by more than one million people. There are large tidal
14 movements every day.

15 The modal share of paratransit, here minibus taxis, is relatively low in Cape Town
16 compared to other South-African cities (15% in 2013, as compared with 70% in Johannesburg)
17 (19). Minibus taxis are increasingly taking market share from the historical transport mode of the
18 poorest, namely the commuter rail (modal share of 11%) (19), owing to persistent problems of
19 under-investment in railway signaling infrastructure (reflected in unreliable schedules), decaying
20 rolling stock (reflected in reduced capacities), inadequate policing (reflected in alarming records
21 of assaults on passengers), vandalism, etc. (9). Over the last 30 years, the number of functional
22 train sets decreased by 50%, from 185 down to 85 [interview with a public authority]. Buses,
23 public or otherwise, hold a 15% market share in Cape Town. MyCiti BRT, the latest addition to
24 public transit services in Cape Town, started operations in 2011 and progressively opened new
25 routes. Though emblematic as an urban project, the BRT has had a limited impact on demand
26 (<1% modal share) so far.

27 Uber started operating in Cape Town in 2015. It has faced strong resistance from the
28 established metered-taxi industry. The number of vehicles operating for Uber in Cape Town could
29 not be obtained from the operator. There are no motorbike-taxi services in South Africa.

30 The car culture is more strongly established in Cape Town than in numerous African cities:
31 more than half of households owned a car in 2013 and the private car had a 37% modal share (19).

32

33 *Addis Ababa, Ethiopia*

34 Addis Ababa is the capital of Ethiopia (102 million inhabitants), the second most populated
35 country in Africa after Nigeria (185 million inhabitants) (20). Located in the central highlands,
36 Addis Ababa is the main commercial center of Ethiopia. It is an important regional and
37 international transportation hub as the Addis Ababa-Djibouti Railway has been influential in the
38 development of the city and Ethiopian Airlines has established itself as the largest airline in eastern
39 Africa.

40 The population of the city has almost doubled every decade since the 1980s. It has reached
41 3.3 million in 2016 (20). Addis Ababa has also experienced rapid sprawl. This trend is largely
42 based on spontaneous growth, which is reflected in the emergence and development of squatter
43 settlements. Along with demographic and spatial growth, the city has seen a rapid increase in car
44 use. Addis Ababa City Roads Authority (AACRA) initiated in 1998 the construction of a ring road
45 to alleviate congestion on the city roads. Car ownership has been growing fast (from 65 vehicles
46 per 1,000 people in 2012 to 130 in 2015 (21; 22)).

47 Almost 2.5 million persons require public transport every day in Addis Ababa. The transit

1 and paratransit fleet includes 8,500 Saloon taxis, 7,500 blue and white minibus taxis, 1,800 buses
 2 (private and public, standard and express), and 22 trains (23; 24). Minibus taxis had a 34% modal
 3 share in Addis Ababa in 2006, as compared with only 6% for buses and 6% for taxis (25).

4 The latest additions to the public transport system in Addis Ababa are two Light-Rail
 5 Transit (LRT) lines. Launched in 2015 as an emblematic project for the city, they have not yet
 6 reached their expected full capacity of 15,000 passengers per hour per direction (60,000
 7 passengers per hour four the two lines), as the purchase of all the trains originally planned has not
 8 been completed.

9
 10 **TABLE 1 Fact Sheet on the Three Cities**
 11

	Nairobi	Cape Town	Addis Ababa
Perimeter	<i>Nairobi City County</i>	<i>City of Cape Town</i>	<i>City of Addis Ababa</i>
Population (million inh.)	3.1	3.7	3.3
Area	696 km ² (269 mi. ²)	2,445 km ² (944mi. ²)	540 km ² (208 mi. ²)
Total length of roads	2,970 km (1,845 m.)	11,700 km (7,270 mi.)	5,915 km (3,675mi.)
Total length of commuter rail network	~ 18 km (10 mi.)	610 km (319 mi.)	34 km (21 mi.)
Motorization rate	100 cars/1,000 inh.	306 cars/1,000 inh.	130 cars/1,000 inh.
Mini/midi bus fleet	~10,000	7,576	~10,400
Metered Taxi/TNCs fleet	> 9,000	n.a.	> 6,500
Trips/day/person	2.34	2.37	1.02
Public transport share	40%	41%	46%
<i>Incl. Mini/midibus share</i>	<i>28%</i>	<i>15%</i>	<i>34%</i>
Private mode share	19%	37%	9%
Non-Motorized Transport share	42%	21%	44%

Sources: For Nairobi: Kenya National Bureau of Statistics - Census 2009 & Nairobi City County Statistical Abstract 2015, JICA, 2014 (2013 modal shares); for Cape Town: Transport for Cape Town, 2015 (2013 modal shares); For Addis Ababa: Addis Ababa city government 2012 (2006 modal shares), World Bank, 2016, *Addis Fortune*, 2015 and 2017.

12 **HOW TO BECOME A WORLD-CLASS CITY: THREE CITIES, THREE MODELS?**

13 **An Analysis in Terms of Demand, Supply and Regulation in the Mobility System**

14
 15 Using a diverse material made of stakeholder interview transcripts, scientific articles and press
 16 releases, this research investigates how paratransit is taken into consideration in Nairobi, Cape
 17 Town and Addis Ababa. For each case study, data on demand, supply and regulation are gathered
 18 and cross-analyzed. Special attention is given to market structure and system organization as they
 19 are the main differences between cities of the developing world and cities of the developed world
 20 (26).

21
 22 The hypothesis tested here is that each of the three selected cities reflects a different model
 23 in this regard. In a context where local governments, consultancies and international agencies refer
 24 to these cities as 'world-class' cities or cities that are bound to become 'world-class' cities (18; 27;
 25 28; 29; 30) (CNN would caption them as 'cities of opportunities' (31)), this analysis examines how
 26 the 'enduring presence of paratransit services' (11) is considered in relation to such issues as

1 institutional fragmentation, operational integration with a high-capacity public transport system,
2 and the influence of external (foreign) stakeholders.

3 **Model 1 (Nairobi Case Study): Dominant Paratransit**

4 *Genesis and Expansion of Paratransit*

5
6 Paratransit emerged in Kenya during the colonial period to address the unmet travel needs of the
7 indigenous populations. Indeed, colonial urban public transport was at first designed to service the
8 needs of the colonialists. After Independence (1963), the bus and commuter train services, with
9 dated technologies and management, were unable to handle increasing passenger demand. The
10 national government therefore tolerated informal ‘private taxis’ when they first started to operate.
11 In the 1980s, the government started to register *matatus* under the category of Public Service
12 Vehicles (PSVs). Institutional bus and commuter train services eventually collapsed in the 1990s,
13 in a context of structural adjustments, reduced government budgets and privatization [interview
14 with an operator] (9; 32). *Matatus* are privately run and demand-driven services; they receive no
15 subsidies from public authorities. Many of them function as cartels, operating with the primary
16 concern of protecting and expanding their territory [interview with a consultant] (10), and the
17 secondary concern of maximizing their profit. Fares vary according to the route, the condition and
18 aspect of the vehicle and even the weather [interview with a researcher]. On rainy days, fares could
19 triple. This fare structure excludes the very poor from using the minibus services and once in a
20 while encourages the shift of wealthier users towards TNC services. The industry also has to deal
21 with corrupt police and urban banditry, such as the Mungiki gang who robbed passengers and
22 minibus crews in the 2000s (33).

23
24 Besides registered *matatus*, smaller-capacity vehicles such as the Toyota Probox
25 station-wagon carrying up to 11 people when equipped with a boot, are operating in the outskirts of
26 Nairobi [interview with an operator]. They are illegal, as are the moto-taxis. Called ‘*boda-bodas*’,
27 motorbike-taxi services are often coined as a ‘militia’ [interview with an operator; interview with a
28 researcher]. Originally operated at the border of the city, the *boda-bodas* are a recent phenomenon
29 that has now literally invaded the city. Mostly operated by young men, *boda-bodas* target *matatu*
30 users who would want to escape traffic jams as well as lower-income customers (as they are
31 cheaper). As their income increases, middle-class users usually switch to private cars or TNC
32 services. The transport situation in Nairobi raises the question of the extent to which the lack of
33 public transport fosters private car ownership.

34 *A History of Uncoordinated, Time-Inconsistent Planning*

35
36 The transport system in Nairobi is mostly organized according to a ‘hub-and-spoke’ pattern
37 [interview with a researcher]. Klopp (16) underlines several key features to explain poor transport
38 planning: a large and distorting role of external actors; institutional fragmentation with top-down
39 planning processes, and a very quiet civil society. The consequence is that there is currently no
40 plan for intra-city transport. Indeed, Japan International Cooperation Agency’s (JICA) 2014
41 project for a Nairobi Integrated Urban Development Master Plan (17) was supposed to replace the
42 obsolete –and never implemented– Nairobi Metropolitan Growth and Development Strategy of
43 1973, but it has been not implemented yet. It proposes the construction of a metro system, but
44 several major stakeholders such as the Kenyan Urban Roads Authority, the national government,
45 the World Bank, along with UN-Habitat and the NGO Institute for Transportation and
46 Development Policy, call for a BRT. Yet, up to now, the BRT has not been planned in a coordinated
47 manner, as the 5 proposed lines have been designed by 5 different planners and should be funded

1 by 5 different international institutions. BRT projects in Nairobi illustrate how institutional
2 fragmentation can lead to project fragmentation.

3 *Some Improvements on the Regulatory Side: the Generalization of SACCOs*

4 Nevertheless, some improvements can be noticed. In 2010, a directive was enacted which ruled
5 that no *matatu* should be registered as PSV unless the owner is a member of either a transport
6 Savings and Credit Cooperative (SACCO) or a private company. Said SACCO (or private
7 company) would make the application on behalf of the vehicle owner, which makes it easier for the
8 government to monitor the licensing process and punish offences [interview with a researcher].
9 The number of cartels and gangs seems to have declined since implementation of the directive in
10 2010 (34). While there is high compliance with regulations concerning registration with a
11 SACCO, adherence to routes, and payments for use of terminals, the *matatu* industry shows low
12 compliance with regulations related to labor. It is especially reluctant to abandon the ‘target
13 system’ whereby a fixed income amount (the ‘target’) has to be paid to the owner by the crew on a
14 daily basis. The government also tried to phase out the 14-seaters to promote larger buses, but this
15 operation created speculations on old 14-seaters and opened up room for *boda-bodas* to develop
16 their market further (34).

17
18 In 2012, the government created the National Transport and Safety Authority (NTSA),
19 bringing together under one roof the functions of motor vehicle registration, PSV licensing (for
20 *matatus*, but also for *boda-bodas* and TNCs), motor vehicle inspection, road safety, and driver
21 testing. The active NTSA is currently implementing electronic licensing [interview with an
22 operator], but it also plans surprise inspections to control drivers and improve road safety
23 [interview with a researcher], and offers some support for mechanical training, but no management
24 training yet [interview with a researcher].

25 *Some Improvements on the Institutional Side: the Creation of NAMATA*

26 Over the last decade, the institutional framework has evolved. The 2007 Kenya Road Act set up
27 national road agencies to build and maintain roads. Then the 2010 Constitution created the
28 counties, and in 2016 a new road classification system was established that gives more power to
29 the counties to manage local roads. In February 2017, the Kenyan President created the
30 long-awaited Nairobi Metropolitan Area Transport Authority (NAMATA), as a joint transportation
31 organization between the 5 counties of the Nairobi Metropolitan Region and the national
32 government. Its aim is to ‘provide the Metropolitan Area with a world-class public transport
33 system’ (29). Its ‘sustainable integrated public transport strategy’ should lay the groundwork for
34 the ‘Metropolitan Area mass-transit system, which incorporates both bus rapid transit and
35 commuter rail’ (29). Yet many uncertainties remain, exacerbated by the 2017 elections [interview
36 with an operator; interview with an NGO]. At the moment, the debate related to the BRT focuses
37 more on the location of the stations than on the position towards paratransit, with the prospect that
38 it could become a thorny political issue as it did in Dar es Salaam, Tanzania (6).

39 *Some Improvements on the User Side: Communities of Users*

40
41 Kenya stands out among African countries for its promotion of information and communication
42 technologies (ICTs), the dissemination of smartphones and Internet in the society, as well as the
43 widespread use of mobile payment (M-pesa) [interview with an operator x2; interview with an
44 NGO; interview with a start-up] (36). One well-known example of the transformation of the
45 transport system by ICTs is the Digital Matatu project, which used cell phones to create an
46 open-source database and maps of the *matatu* network. The creation of a community of users to
47

1 collect the data was an important result of the project (37). Other community-based initiatives that
2 rely on mobile-ICT use emerge to improve the quality of paratransit services. The Ma3Route app
3 crowdsources real-time information on traffic conditions in Nairobi. A partnership with NTSA and
4 the Nairobi City Council allows for real-time reporting on bad driving behavior from *matatus* as
5 users send the information to Ma3Route [interview with a start-up].

7 **Model 2 (Cape Town Case Study): Paratransit as a Component of a Dual, Hybrid System**

9 *Minibus Taxis, from Fighting ‘Taxi Wars’ to Embarking on the BRT Project*

10 The minibus-taxi industry developed in Cape Town during Apartheid mostly to carry poor people
11 living in the townships to workplaces in the CBD. It started operating illegally to compensate bad
12 commuter train services. In 1987, the industry was deregulated which led to overcapacity and what
13 was coined as ‘taxi wars’ (10; 38; 39). In the post-Apartheid era, the situation became less violent
14 with attempts at regulating the industry, but the quality of service decreased. As is the case with the
15 drug business, the primary objective of minibus-taxi operators is to conquer new territory, to
16 extend market share, even more so than to increase profitability [interview with a consultant].
17 Legal and illegal taxis are completely integrated, as the former help the latter to live off the system
18 until they are eventually integrated into it. The authority is always ‘on the back foot’, as
19 ‘transgression is absolutely part of the deal’ [interview with a consultant].

20 Faced with the great difficulty of improving commuter rail services (partly due to lack of
21 appropriate capability in the national rail authority) [interview with a local authority], and with the
22 prospect of upcoming Soccer World Cup in 2010, the planning of BRT services, branded as
23 MyCiti, began in 2006 (40). The model of ‘best practice’ BRT inspired by South-American cities
24 and promoted by international development agencies was one of total –though possibly gradual–
25 replacement of paratransit services by a trunk-and-feeder network in which all remaining operators
26 are formal bus companies (11). Eviction of paratransit services from the BRT project was then a
27 sort of evidence, as ‘*it is the inverse relationship between wealth and informal transport that*
28 *prompts public authorities to attempt to ban them in hopes of conveying a modern, first-class*
29 *image*’ (40). Therefore, when the first trunk-and-feeder services of the first-phase BRT were
30 launched in 2011, they were operated by 3 contracted bus companies, two of which had been
31 formed out of the incumbent minibus-taxi operators that used to operate within the corridor (40).

32 A major debate then started about the size of the vehicles that would be appropriate to serve
33 as contracted public transport on feeder routes. To avoid giving credit to the minibus-taxi industry
34 operations (usually based on 15-seaters), the decision was made that the smaller vehicles
35 contracted as public transport should have 25 seats [interview with a local authority].

37 *Why Minibus Taxis Will Not Just Go Away*

38 Although some would argue that the current BRT system is a success story –as it is considered the
39 first reliable bus system, with a cost recovery close to 50%, and much appreciated too by some
40 portions of the population [interview with a consultant]–, others criticize it as both over-expensive
41 for users and more costly than anticipated for public authorities (maintenance costs were initially
42 underestimated), as well as inadequate to actual travel needs of the target population (inflexible
43 with regards to stops for pick-up and drop-off, not serving some of the poorest, most populated
44 areas, and using very rigid, high-tech ticketing based on Europay-Mastercard-Visa cards)
45 [interview with a researcher x2]. For these reasons, and because public authorities had
46 underestimated the tensions that would arise with the implementation of BRT around the inclusion
47 of the previous transport investors and workforce in the new system (as was the case in other

1 contexts too (6)), the minibus-taxi services are still operating on feeder lines for the BRT. The
2 potential costs of the compensation program originally envisaged for minibus-taxi operators
3 would only be another cloud on the horizon [interview with a researcher].
4

5 *Towards a 'hybrid model': the 'regulatory innovativeness' of the Municipality of Cape Town*

6 Yet, unlike Johannesburg, the City of Cape Town has recently been operating a shift in perspective,
7 and is now considering the integration of paratransit services into the BRT project [interview with
8 a consultant]. The city even officially acknowledged in 2015 the benefits of a 'hybrid model' that
9 would '*combine MyCiTi buses and minibus-taxis to provide scheduled and unscheduled services*
10 *alongside each other without competing for passengers*' (41). The very concept of the 'hybrid
11 model' was developed at the University of Cape Town around 2008/2010 and was only much later
12 exported to the municipality [interview with a researcher]. Such 'hybrid models' have long been a
13 '*common feature of developing world cities*' but may have been overlooked for some time as
14 possible fertile ground for '*the best possible urban transport system for a city*' (42; 11). No
15 agreement has been reached so far in Cape Town as to what forms the hybrid model shall take,
16 whether the remaining minibus-taxi services would be scheduled or not, how individual licenses
17 could be transferred to the newly-created Taxi Operating Companies, etc. [interview with a
18 researcher].

19 One of the upsides of the hybrid system, from the demand management perspective, lies in
20 the concept of 'peak lopping', whereby investment in infrastructure and rolling stock to handle
21 peak hours can be reduced by relying on the minibus-taxi industry and its flexible fare system to
22 spread the demand peak [interview with a researcher].

23 Yet two measures actually hint at the 'regulatory innovativeness' of the City of Cape Town
24 [interview with a consultant]: first, the creation of the Transport and urban Development Agency
25 (TDA) in 2016 (aggregating human settlement, urban design, transport, and environment); second,
26 the organization, with support from the University of Cape Town, of capacity building sessions for
27 the management of minibus-taxi operators (helping them create a reliable service for
28 non-scheduled operations).
29

30 **Model 3 (Addis Ababa Case Study): Paratransit as an Integral Part of a Hierarchized Public** 31 **Transport System**

32 *A Diversity of Public Transport Services Owing to the Preservation of Historic Operator*

33 Addis Ababa claims to be an exception among Sub-Saharan African cities in a number of respects,
34 and especially in respect to its urban and transport setting [interview with an international
35 institution]. Because the Italian occupation of Ethiopia was short-lived (1936-1941), Addis-Ababa
36 was not molded by colonial segregation considerations to the same extent as other cities of the
37 continent (43), and until very recently it would commonly display highly-mixed settlements and
38 activities in its very center [interview with a researcher x2] and could be said to have an '*organic*
39 *structure*' [interview with a researcher].
40

41 From a transport perspective, Addis Ababa has managed to preserve its public large-bus
42 company, Anbessa, owing to strong public support. The company dates back to 1952, was
43 nationalized in 1974, and was transferred to the City Administration in 2010 (44). Besides
44 Anbessa's bus fleet of 600, large buses are operated by other public and private (Alliance)
45 companies on some designated routes or demand segments (e.g. civil servant commuting); and
46 Sheger Express bus services (42 seats) were launched in 2016 on 4 designated routes (e.g. to the
47 airport).

1 Yet paratransit services in the form of minibus taxis, locally known as ‘*wuyeyet*’ (45), have
2 developed alongside public transport to absorb the fast demographic growth of the city. Until
3 2009, minibus taxis could freely choose the routes or areas in which they would operate (46). Due
4 to lack of restrictions on market entry, the number of minibuses (and midibuses) grew fast,
5 reaching 10,400 in 2014 (21). Minibus taxi fares are controlled by the city government (46), and so
6 is now the route allocation process. Besides minibus taxis, Higer midibuses (27 seats) have
7 operated on 24 designated main routes since 2007. They qualify as paratransit as they can flexibly
8 choose their stops along the way (45).

9 10 *A Highly-Hierarchized Transport System Backed by Strong Political Will for Planning*

11 The federal and local governments in Addis Ababa have strong political will for planning
12 [interview with an international institution]. The City Administration released the Addis Ababa
13 Transport Plan in 2007 and the Transport Policy of Addis Ababa in 2011. The latter makes
14 provisions for the rejuvenation of Anbessa City Bus Enterprise, and the introduction of BRT (7
15 lines) and LRT systems (2 lines) along major corridors. The LRT and BRT systems are to form the
16 backbone of the city’s transport system.

17 The feasibility study for the BRT system funded by the French Development Agency AFD
18 in 2010 identified seven potential routes, including an initial demonstration route (B2) travelling
19 through the city from North to South. A different, temporary corridor has however been used for
20 demonstration since 2012 –on a route that should become an LRT corridor–, allowing both
21 Anbessa buses and private midibuses to operate along the corridor in the absence of exclusive BRT
22 services (45).

23 Yet Addis Ababa’s BRT projects have been delayed, partly because of the opportunity to
24 build the LRT system with significant assistance and funding from Chinese stakeholders. Two
25 LRT lines totaling 32 km have been constructed under a design-build contract signed in 2011 and
26 started operating in 2015. Some experts consider Addis Ababa’s LRT project as emblematic of the
27 ‘panda model’, whereby a Chinese company, the China Railway Engineering Corporation
28 (CERC), designs and builds a system funded with Chinese funds, secured from the Export-Import
29 Bank of China, and operated (at least in the initial stages) by a Chinese operator, the Shenzhen
30 Metro Group [interview with an NGO].

31 32 *(Minibus) Taxis as Cog in its Due Position in the Wheel of the Mobility System*

33 With the delays in BRT implementation so far (one BRT line was in the planning phase in 2014
34 (21)), and the rapid expansion of the city (including major settlement projects far beyond the reach
35 of the LRT system) (46), minibus taxis and other forms of paratransit will have a major part to play
36 in the supply of transport services in many areas of the city [interview with a researcher].

37 Besides, congestion on the LRT is already very high (for the record, the two lines have not
38 reached their expected full capacity as not all 41 trains could be funded as originally planned), and
39 safety (theft) and health (lice) issues have arisen on board the trains, which are reflected in the
40 preference of many passenger for paratransit over LRT [interview with an international institution;
41 interview with a researcher].

42
43
44

1 DISCUSSION

2
3 Paratransit services, albeit in heterogeneous forms, are a common feature of the transport systems
4 of all three cities examined here. Inadequacy of public transport services might have been the
5 initial trigger for their development. Yet, the fact that paratransit services have maintained or even
6 developed their presence in all three cities, which present contrasted situations in terms of political
7 management style, urban organization, infrastructure development, and motorization rate, points
8 to some of their intrinsic qualities, namely: labor-intensiveness, flexibility, and
9 innovation-readiness. Acknowledging such qualities is key to sketch some ideas about the role that
10 paratransit services could play in the transition towards more sustainable mobility systems.
11

12 **Providing Jobs in Cities that Need Them**

13 As local socio-political conditions usually have an influence on the development of transport
14 services (6), paratransit's labor-intensiveness makes this industry a valuable source of outcome to
15 tens of thousands of people in the type of cities considered here. Depending on the context, it
16 provides jobs to 'drop-outs' as well as 'graduates' (cf. the minibus-taxi industry in Nairobi)
17 [interview with an operator], to township residents as well as immigrants (cf. respectively the
18 minibus-taxi industry and the TNC industry in Cape Town) [interview with a researcher], and
19 thereby contributes to alleviating poverty and empowering low-income populations. The
20 opportunity to '*run their own business*' is even the main argument made by Uber in Cape Town
21 and Nairobi to recruit '*driver partners*' [interview with an operator]. By comparison, decisions to
22 implement BRT systems can in some instances be associated with job losses for the local poor and
23 profit-making for large, sometimes foreign, companies (6).
24

25 **Flexibility as Paratransit's Main Asset**

26 The fundamental asset of paratransit, which might well be what makes it an integral part of most
27 transport systems in developing world cities, is its essential flexibility. Notwithstanding
28 regulation, paratransit services are first of all, to a greater or lesser extent, flexible in time (no
29 schedule, adaptability to peak and off-peak hours) and in space (no fixed routes, or no fixed stops
30 along routes, adaptable routing in peak/off-peak hours, capacity to reach city outskirts and
31 informal settlements). Besides, depending on the context, the choice of vehicle, the fare structure,
32 etc., paratransit is also adaptable to different categories of users, from very poor to middle classes.
33 As Cervero and Golub would coin it, paratransit is a '*gap-filler*' (40), providing accessibility to
34 demand segments that are not addressed otherwise.
35

36 **ICT-Based Modernization**

37 It can be argued that innovation-readiness is another main asset of paratransit's (47). ICTs play a
38 major role in the numerous initiatives which are under way to modernize the paratransit industry in
39 the three cities examined here, be it in the form of cashless payment, digital mapping of paratransit
40 route networks, crowdsourcing of traffic information, app- or SMS-based passenger information,
41 smartphone-enabled traffic and revenue surveys, computerized fleet management, etc. Surely
42 enough, ICT-based modernization in such contexts has its challenges, as illustrated by the
43 postponed implementation of the cashless fare collection requirement for minibus-taxi licenses in
44 Cape Town (5), the decision by Uber to introduce cash payment in Nairobi (despite the widespread
45 use of M-pesa mobile payment) [interview with an operator], or yet the decision by ride-hailing
46 start-ups ZayRide and ETTA in Addis-Ababa to set up conventional call centers after the Internet
47 access was shut down pursuant to the state of emergency [interview with an operator x2].
48

1 **CONCLUDING REMARKS**

2 This research has highlighted several features that are commonly found in paratransit services,
3 regardless of context, and can become assets in the (far from secure yet) sustainability transition of
4 mobility systems in developing-world cities, namely: their labor-intensiveness, their flexibility,
5 and their innovation-readiness. In a context of rapid growth in private car ownership and use, a
6 regulated, modernized version of paratransit services may have what it takes to provide large
7 portions of the population with an efficient mobility alternative to the private car. If so, paratransit
8 services could play a key role in supporting more sustainable mobility systems in the
9 developing-world cities of tomorrow.

10 This is not to deny, however, that many other, less positive features of paratransit services
11 in the three cities examined here, are yet to be dealt with for paratransit operators to even become
12 credible actors in this transformation process. Such features include, but are not limited to, reckless
13 driver behavior, poor vehicle maintenance practices, poor management capabilities (*I; IO*).

14 Further research would be needed to grasp the full extent of opportunities and risks in the
15 inclusion of paratransit services on the way towards more sustainable mobility systems in
16 developing-world cities. More research could be needed also to investigate the transferability to
17 developed-world cities of the paratransit experience of developing-world cities, as the former are
18 currently experiencing the fast rise of TNCs in a context where urban mobility systems mostly
19 relied on the established duo of private automobiles on the one hand, and (mass) public transit on
20 the other hand.

21

22

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29

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