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Analysis of Passengers' Perceptions of Minibus Transport in Addis Ababa

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Abstract

Light Rail Transit (LRT) and Road transport, including bus, midibus, minibus, and taxis, provide public transportation in Addis Ababa. There are also three-wheel Bajajs and animal carts in the peripheries of the city. The minibus is one of the dominant modes in the city, accounting for more than 70 percent of the total public transport vehicles and about 40 percent of the total trips by public transport. Hence, this study aims to analyze the perceptions of the passengers on its services. Accordingly, the primary data was gathered from 384 passengers and analyzed by SPSS version 20. The research finds that minibus taxi is relatively accessible to the passengers in terms of its stop. However, the mode is not accessible to most passengers regarding its availability, price, availability of seats, built environments like shelter, and information, among others. Hence, the primarily concerned organs such as Addis Ababa City Transport Authority and Minibus Owners; Association and other concerned stakeholders are required to improve the mode's accessibility to the users.

Key words: *Accessibility, Addis Ababa, Minibus, Paratransit, Public Transportation*

Introduction

Public transportation is one of the ways that people make mobility (trip) to access economic resources, education, health, and other vital elements (World Bank, 2011) and facilitate the peoples' participation in economic, social, and political processes (Peter &Julie, 2004). Therefore, efficient and affordable access to jobs, education and services is considered a fundamental development element (World Bank, 2009). Public transport is a transport service available to the public, unlike private vehicles. Public or private operators can provide the service with or without determined (schedules, routes, stops, fares & subsidies) (Stucki, 2015). According to the country's situation, public transport modes

include metro, rail, midibus, and minibus. Their trip can be like to and from work, schools, health facilities, and markets (Dayomi, 2000). In general, public transportation plays an essential role in creating an accessible society because it is critical for ensuring employment, completing daily living activities, engaging in citizenship, and participating in social roles and social interaction.

Therefore, cities are required to provide adequate public transport to their residents. Effective public transport, notably fast, frequent, comfortable, reliable, affordable, convenient, safe, accessible, and high quality, is essential to provide transportation services (C40 Knowledge). Accordingly, accessibility is the main element of a sustainable transport system. Therefore, public transport needs to achieve levels of comfort, quality and speed that come up to people's expectations (Gražvydas, 2008). Improving the accessibility of public transport is indispensable because it helps the cities in the following aspects (Liv, Gloria &Tone, 2011): enhances the accessibility of business; improves the perceived quality of services and leads to satisfied customers; attract passengers who would not previously have considered using public transport; enables transport services for a wider group of customers at all times of the day and week; enhance the reputation of cities among their citizens, tourists and visitors by being known as inclusive cities or locations.

However, unlike mass transportation providing fast, frequent, comfortable, reliable, affordable, convenient, safe, accessible in most developed and some developing cities, paratransit vehicles dominate the public transport system in African cities. Paratransit vehicles dominate the public transport system in African cities. These vehicles have different names in different cities. It is called 'matatus' in Kenya, 'gbakas' in Abidjan, and 'minibus' in Cape Town and Addis Ababa (Stucki, 2015). The majority (more than 90%) are private operators (most operators owning between one and four vehicles) who primarily focused on maximizing profits than providing appropriate services to the residents. They are characterized by a market-based approach, providing poor quality service, low carrying capacity, mostly unregulated operation, and their use is also not safe and secure (UN-HABITAT, 2010).

Similarly, Rubinstein and Smith (2018) have described that paratransit service is a significant economic burden for public transit agencies, significantly when budgets are not increasing, and costs are rising. More effective scheduling and routing systems can go a long way toward improving service quality and reducing the problems. They further stated that it is notoriously difficult to provide efficiently, cheaply, and predictably.

On the contrary, Stucki (2015) mentioned that the mode could play a significant role, notably where the scheduled bus or rail services are missed. For instance, the mode is relatively providing safe and reliable transport services in Accra, Dar es Salaam, Cape Town and Johannesburg due to the authorities' proper regulation. Accordingly, minibus has a significant role in Addis Ababa's public transportation system despite its many problems. There are two types currently operating in Addis Ababa: Blue and while (code 1) minibuses (including Wuyiyit minibus), and supporting (code 3) minibus. More than 11,500 registered minibuses constitute a significant part of the public transport vehicles (more than 70%) and transport about 1.5 million passengers a day. Hence, this study examines passengers' accessibility perception of minibus services in Addis Ababa.

Characteristics of the Study Area

Addis Ababa was established in 1886 by Emperor Menilik II and his wife Empress Tayitu 1886. Hence, Addis Ababa, Ethiopia's capital city is one of Africa's oldest and largest cities (UN-HABITAT, 2008). The city has experienced tremendous growth in population and physical since its establishment. It has more than 4 million inhabitants (account for 25% of the country's urban population) living with an area of 540Km. It is located at the center of the country and 9°2' north of the equator and at 38°45' east. It also lies at an average altitude of 2500 met above sea level. Addis Ababa is the Federal Democratic Republic of Ethiopia and the country's political center. It is also the nation's economic centre where most financial and commercial institutions; hosts about 85 percent of manufacturing industries are; home to about 80 percent of the national vehicle fleet. As a result, the city has a broader role in its political, administrative, economic, social, and transportation aspects. Addis Ababa is the diplomatic centre of Africa and the third city in the world with the highest number of diplomatic missions. It is the seat of many regional and international organizations like the African Union (AU), Economic Commission for Africa (UN-ECA) and other UN agencies, including UNDP, UNESCO and the European Economic Commission (EEC) and diplomatic missions.

Overview of Minibus Transport in Addis Ababa

The public transportation system in Addis Ababa consists of both light rail transit and road transport, including Anbessa bus, Sheger bus, Alliance bus, Midibus (Higer & Kitkit Isuzu), Minibus, Taxis (non-metered Lada taxi & metered taxis), three-wheel Bajajs, and animal carts in a few peripheral areas of the city. Minibus taxi dominates the public

transport system accounting for more than 70 percent of the total public transport vehicles and about 40 percent of the full trips by public transport. The private sector operates this mode, and the most commonly known minibus in the city is white and blue. There are two types of minibus currently using in Addis Ababa: Blue and while (code 1) minibuses (including Wuyiyit minibus), and supporting (code 3) minibus.

Before the white and blue minibuses started, informal transport passed through various stages. It is believed that a cart pulled by a mule (horse) has begun as the first informal public transport service in the city in the 1900s. And later shifted to Fiat Secentos in the 1950s and then later to Wuyiyits in the 1970s. Since then, the blue and white minibus have served informal public transport (paratransit) in the city. However, since 2011, various associations organized the minibuses to provide public transport services on five routes divided into five zones.

The white and blue minibus taxis are organized by thirteen associations and operate public transport in five zones and more than 360 routes. Accordingly, the list of associations and the zone in which they are operating are described as follows. The associations under the Bole zone are Nisir, Blaine and Addis; Tsehay and Zebra under the Megenagna zone; Walta, Metebaber and Bilichta under Saris Zone; Biruh, Goh and Fikir under Tor Hayloch zone; and Selam and Tila under the Asko zone. On the other hand, Code 3 support minibuses operate without being organized into associations with the sub-city transport authority's permission.

Public transport operators (minibus and salon taxi) run their business without any direct government subsidy. Minibuses are currently providing public transport services up to 30 kilometres away. Minibus fares are designed controlled by the city government. Therefore, their transportation costs depend on the distance travelled. This means that passengers have to pay a small fee for short distances and a higher fee for long distances. The fares up to March 2020 are shown in the table below.

Table 1: Minibus Fares in March 2020

Distance	Fare
Up to 2.5 km	1.50 Birr
Up to 5 km	3.00 Birr
Up to 7.5 km	4.50 Birr
Up to 10 m	6.00 Birr
Up to 12.5 km	7.50 Birr
Up to 15 km	9.00 Birr
Up to 17.5 km	10.5 Birr
Up to 20 km	12.00 Birr
Up to 22.5 km	13.50 Birr
Up to 25 km	15.00 Birr
Up to 27.5 km	16.50 Birr
Up to 30 km	18.00 Birr

Literature Review

Conesa and L'Hostis (2011) have defined accessibility only as of the possibility of accessing equipment and resources. It also refers to the conditions that allow individuals to get around and go places or the conditions in which goods can be shipped. Accessibility is in transport concept essentially refers to a spatial concept that aims to account for the effort needed to travel, to reach resources in a given place. Accessibility refers to the possibility of getting a place with the aim of carrying out activity there (Conesa and L'Hostis, 2011).

Measuring accessibility is one of several public transport quality measures (Puspas, n.d) because most transports activities' ultimate goal is to provide accessible services to the users (Litman, 2020). Improving the accessibility of public transport is essential to the sustainability, livability, and welfare of human societies (Nassir et al., 2016). Accessibility measures how easily specific locations can be reached by public transport. It means people's ability to get or arrive at destinations, opportunities or services through a transport movement (Albacete et al., 2015). Accessibility is whether the transport is universally designed to address users' needs (including people with disabilities & special needs) (Vega & Nijkamp, 2010).

Different studies show that there are no uniform and comprehensive assessment criteria. In particular, there are no developed criteria for assessing the accessibility of a

minibus public transport service. Therefore, the evaluation criteria depend on the conditions and types. Accordingly, Ltman (2020) mentioned that accessibility can be evaluated from various perspectives, including a particular group, mode, location or activity. Similarly, Tahmasbi et al. (2019) have mentioned that Different transportation modes have specific impedance functions; therefore, to measure accessibility with walking, cycling, public transport, and private car, it is needed to define a particular role for each of them. All the same, (Puspas, n.d) described different dimensions to assessing the accessibility of public transport. Despite this, the standard variables to ass public transport accessibility include availability, affordability, efficiency, convenience (payment system, travel comfort transfers), and sustainability. Hence, this research aims to evaluate the accessibility of minibus services in the city from the passengers' perspective against these criteria.

Objective and Methodology

This study's main objective is to analyze passengers' perceptions of minibus transport accessibility in Addis Ababa. Accordingly, the study used descriptive and analytical methods to achieve a goal. Data gathered from both primary and secondary sources. The primary data was collected from the 384 passengers through closed and open-ended questionnaires and filed observation. The total sample was determined using one of the best online sample size determiners called Creative Research Systems (https://www.surveysystem.com/sscalc.htm).

The total minibus trips in the city are estimated at 1.5 million passengers per day. On the other hand, the city's population is estimated at 4 million. Taking either the trips or the city's general population and using a 95% confidence level and 5% confidence interval, the sample size will be 384 according to this calculation. Thus, a total of 384 samples were selected for this study. On the other hand, the secondary data used from published documents.

Results

Characteristics of the Respondents

This section discusses the respondents' socio-economic characteristics, including gender, age, marital status, family members, employment status and monthly family income.

Table 2: Descriptive statistics of Respondents' socio-economic characteristics

Characteristics	Description of category	Distribution (%)
Gender	Male	49
	Female	50
	Prefer not to answer	1
Age	Under 18 years	5
	18-30 years	34
	31-45 years	26
	64-60 years	24
	Above 60 years	11
Marital status	Single	32
	Married	52
	Divorced	8
	Widowed	6
	Prefer not to answer	2
Number of family members	1-3 members	30
	3-6 members	39
	Above 6 members	31
Employment status	Students	16
	Self-employees	20
	Government-employees	25
	Private employees	23
	House wife	13
	Other	3
Monthly income of the household	Under 1000 Birr	8
	1001-2000 Birr	11
	2001-3000 Birr	22
	3001-4000 Birr	23
	4001-5000 Birr	19
	Above 5000 Birr	17

Source: *Own survey, 2021*

As indicated in the above table, half of the respondents are female, while male respondents account for 49 percent. The remaining one percent of the respondents prefer

not to indicate their sex. Concerning their age, respondents between the ages of 18 and 30 account for about one-third of the respondents, while those between 31 and 45 account for above a quarter. Twenty-four percent of the respondents are between 46-60 years, and 11 percent are above 60. Respondents who are under 18 years consist of only five percent. The above table also depicts that more than half of the respondents are married, nearly a quarter of them are single. Eight percent of the respondents are divorced. Widowed respondents and those who preferred not to answer consist of four percent each.

About their family members, forty-nine percent of the respondents have more than six family members, and thirty-one percent of all four-to-six family members. Thirty percent of respondents have one to three family members. Concerning the respondents' employment status, one-fourth of them are private employees, and the other majority is a government employee. One-fifth of the respondents are self-employees. On the other hand, housewives make up 15 percent of the respondents, while students make up 16 percent. Twenty-three percent of respondents earn between 3001 and 4,000 birr, while twenty-two percent earn between 2001 and 3,000 birr. On the other hand, nineteen percent and seventeen percent of the respondents earn between 4001 and 5,000 birr and 1001 to 2,000 birr. Eleven percent of respondents' family income is less than 1,000 birr, and those who make more than 5,000 birr are only eight percent (see table 2).

Passengers' perception of minibus accessibility

This part discusses passengers' perception of minibus transport service in Addis Ababa, including spatial accessibility, time accessibility, schedule accessibility, information accessibility, vehicle design, and the built environment.

Table 3: Summary of Perceptions' of Respondents of minibus accessibility

Characteristics	Description of category	Distribution (%)
Frequency of trips per day	1-2 times	56
	3-4 times	34
	More than 4 times	10
Frequency of minibus rides	Daily	53
	Several times a week	37
	Weekly	8
	Several times a month	2
Time to reach minibus stop	Less than 10 minutes	41

	11 to 20 minutes	32
	21 to 30 minutes	16
	More than 30 minutes	11
Waiting time	Less than 10 minutes	6
	11 to 20 minutes	11
	21 to 30 minutes	32
	More than 30 minutes	48
Gets minibus from anywhere	Yes	27
	No	73
Traveling time	Very bad	14
	Bad	19
	Normal	36
	Good	25
	Very good	6
Numbers of cars ride from departure to destination	1	41
	2	46
	3	11
	More than 3	2
Find enough seat	Yes	20
	No	80
Find timetable for a stop	Yes	8
	No	92
Find timetable for a route & destination	Yes	14
	No	86
Access to shelter	Yes	19
	No	81

Source: *Own survey, 2021*

According to the above table, most respondents, fifty-six percent, travel one to two times a day, and about one-third travel three to four times a day. Only ten percent travel more than four times a day. The respondents were also asked how often they used minibus taxis, fifty-three percent used it daily, and thirty-seven percent used it several times a week. On the other hand, eight percent and two percent of respondents use it weekly and several times a month.

As depicted in the above table, most of the respondents (41 %) can reach the minibus taxi stop in less than 10 minutes. About one-third of the respondents can get the minibus taxi stop in 10 to 20 minutes. Sixteen percent and eleven percent of the respondents can get at minibus taxi stop between 20 and 30 minutes and more than 30 minutes, respectively. Concerning the time they wait for the minibus after arriving at the minibus stop, only less than 10 percent of respondents get a minibus taxi in less than 10 minutes. Still, most, or about 50 percent of respondents, can get a minibus taxi after waiting for more than 30 minutes.

Another issue is how many cars the passengers have to take to get to their destination. Thus, the majority (46 percent) said they would travel in two cars, while 41 percent said they would travel in one car. Eleven percent of respondents ride in three cars, and only 2 percent travel in more than three vehicles. About 6% of respondents said that the minibus travel time was very good regarding travelling. On the contrary, 14% of respondents said it was very bad. One-fourth of the respondents said it was good, and one-fifth said it was bad. The majority of respondents (36 percent) said it is normal (see table 3). Among the respondents, 80% replied that they would not get enough seats during the ride.

Respondents were also asked if there was a bulletin board indicating the stop and the minibus route. For the question 'Is there a bulletin board for information about minibus stop? about 92 percent said no, and the remaining 8 percent said yes. Respondents were asked if there was a bulletin board for information about the minibus route and destination. 86 percent of respondents said no, and only 14 percent said no. In this regard, they were asked where to get information in the absence of a bulletin board for information about the minibus' destination and route. Almost all of the respondents said that their main source of information was when the minibus assistants called for their destination and route.

Respondents were asked whether they can get minibus transportation anywhere. Accordingly, only 27 percent of the respondents said yes, while the majority (73%) would not be able to get a minibus from anywhere. Respondents who asked if they would find shelter while waiting for a minibus said 81 percent would not find shelter and only 19 percent said they would find shelter.

Discussion

One of the determinant perspectives of accessibility is spatial accessibility. It is the level of proximity-how close together the various activities (HiTrans, 2005). In line with this argument, one in ten respondents can reach the minibus taxi stop in less than 10 minutes. However, six in ten passengers must walk more than 10 minutes to access a minibus stop. This data shows that the minibus stop is not accessible to most of the passengers. Passengers' proximity to a minibus taxi stop alone is not a measure of access to a minibus taxi service. So the other criterion is whether they will get a taxi soon after they arrive at the minibus taxi stop, especially during peak hours. Accordingly, only one in ten passengers can get a minibus taxi in less than 10 minutes, while five in ten passengers get a minibus after waiting 30 minutes. Three in ten passengers can also get a minibus after 20 to 30 minutes of waiting. All the same, most passengers cannot get a minibus wherever they want. Only three in ten passengers can get wherever they want. This data shows that most passengers do not get to the minibus as soon as they arrive at the stop and wherever they want.

Passengers who do not board at a departure may have to wait a long time without a minibus taxi. The reason is that the minibus may not be able to stop if the minibus is fully loaded before it arrives, where passengers are waiting for it. This problem is exacerbated in areas where there is no alternative public transport service other than the minibus and in the off-peak period for a quieter route. Therefore, they will be forced to travel to a taxi stop where they think they will be loaded. Moreover, they may still have to wait for a minibus taxi after they travelled to the stop if the minibuses are full.

Another issue is how many cars the passengers have to take to get to their destination. Thus, nearly half of the respondents would use two cars to reach their destination. This figure shows that a significant number of passengers incur extra costs to make trips. It is becoming more common in the city to charge exorbitant fares for minibus taxis. Accordingly, when there is a shortage of public transport, especially in the morning and at night, they charge 3 birr for 1 birr and 50 cents and 5 birr for 3 birr fare. This means that one passenger pays extra money between 1 Birr and fifty cents and two birr or more for one way based on the distance he/she travels. That means a passenger travelling on more than one trip will also pay more.

In total, when a minibus earns an extra 2 birr per passenger, even if it carries 12 passengers in its seats alone, it will collect 24 birr more than the allowable tariff per trip.

However, they usually carry up to 18 passengers and collect at least 36 birr. Therefore, if a minibus transports passengers five to ten times per day, it will collect between 120 and 400 birr more than it deserves. As the cost of minibus transportation increases with the distance travelled by kilometres, they will also increase the cost of transport, which is higher than the miles mentioned above. In general, they will increase the estimated price by 50 percent or more during the above period. They also increase during the rainy season. One of the persons who studied this research also found that the minibuses, especially the supporting code 3 minibuses, often increase prices.

The primary factor for the problem is drivers' greed and their assistants and failure of passengers to refuse to pay more than the standard fare. Some passengers refuse to pay more than the allotted fare. However, the minibus assistants will force the take them, passengers, off those who are not willing to pay the amount they required. There are also many instances in which drivers are often harassed or forced to drop off by assisting their assistants. Moreover, as the dispute escalates between the minibus operators and those who do not pay more than the estimated cost of transportation, other passengers will join the operators and use various words to pressure them to pay the required amount. The words that passengers often use to pressure them are: Do you want the car to stop? Is your intention to distract us from our journey? What good is arguing? What if we helped them by paying the price for the increasing spare parts? and so on. Additional factors include failure of minibus controllers to monitor the service; minibus queue keepers encrypt with the operators; when complainants call the Transportation Authority, their phone does not work or pick up the phones; and lack of effective supervision system are key among others. Therefore, this unreasonable increase in the fare of minibus transportation is seriously affecting access to the service.

Concerning the availability of seats during travel, only two in ten passengers could find enough seats. On the contrary, eight in ten passengers cannot find enough seats during a minibus ride. The reason is that the minibus, which has a capacity of 12 people, is often crowded with 18 to 20 passengers. Similarly, a 15-seat dolphin minibus and similar minibuses carry at least 20 passengers. Therefore, passengers are usually crowded; three people sit on two seats, four people on three seats, and five people are sitting on four seats. In addition to the minibus seats, passengers are seated on benches and jerry cans. This situation makes it difficult for passengers to get on and off the minibus. Another measure of access to public transport is a shelter. In this regard, there is no such thing as a shelter

for minibus taxis in the city. However, the passengers can use bus shelters nearby to their waiting areas. Although they can use the nearest bus shelter, According to respondents, eight out of ten passengers would not get the shelter. Therefore, minibus taxi users are often exposed to sun, wind and rain while waiting for the taxi. Nevertheless, passengers sheltered at the nearest bus shelter, shoeshine shelter, shops, bars and restaurants along the road.

Another critical factor determining accessibility would be a person's ability to get information about the schedule, stop and the public transport route. Hence, the fundamental and necessary question is whether the passengers can find information billboard about minibus schedule, stop and route. With this regard, nine in ten passengers cannot find information billboard about minibus schedule, stop and routes in the city. There is no information on the service's timing at the minibus taxi, except for passengers waiting for the next minibus to arrive. There is also no information on taxi stops or destinations. Passengers get information about this, mainly from the minibus taxi assistants who call the destination and drivers and queue keepers. They also obtain information from the passengers in the lineup, from the people standing around, from street vendors, from those who sell gum and soft, from local beggars, and shoe shiners where the taxi stop is by telling their destination. As a result, there is a massive gap in access to information, as passengers do not have access to minibus taxi service points, destinations, and routes. Especially newcomers, persons with disabilities, pregnant women, and elders face difficulty.

Conclusion

Minibus taxi is playing a significant role in Addis Ababa's public transportation system. This research also finds that it is relatively accessible to the users in terms of geographic accessibility in the particular stop. However, it is not accessible to passengers in price, information, seats, availability, and shelter. Hence, Addis Ababa City Transport Authority must take concrete actions to improve Minibus accessibility in the city. The measures shall include: (1) Strictly monitor the minibus operators whether they fully comply with the designed routes, schedule and fare regularly. The sub-city branch offices must closely monitor code three minibus since they are not part of Minibus Owners Associations. Hence, they need to make sure as they are serving the commutes as per the

service standards; (2) The Road and Transport Authority and its branch offices should take against servers that do not comply with set deadlines and set prices. Traffic police must be determined; and (3) The Authority and its branches must promote dialogue and cooperation among community representatives, Minibus operators (drives & assistants), Minibus Taxi Owners' Associations, and queue keepers and other parties.

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