ГЛАСНИК Српског географског друштва 105(1) 43-58
BULLETIN OF THE SERBIAN GEOGRAPHICAL SOCIETY 2025

Original scientific paper
UDC 347.763:71(662.5)
https://doi.org/10.2298/GSGD2501043B

Received: October 10, 2024
Corrected: November 17, 2024
Accepted: November 21, 2024

Mohamed Ibrahim Ballo[1]*, Ousseny Sigue, Pawendkisgou Isidore Yanogo***

** University of Norbert ZONGO, Department of Geography; Laboratory for Research in Humanities and Social Sciences (LABOSH), Koudougou, Burkina Faso*
*** Institute of Society Sciences (INSS); National Centre for Scientific and Technological Research (CNRST), Ouagadougou, Burkina Faso*

DIFFERENTIATED CHOICES OF URBAN MODES OF TRANSPORT IN OUAGADOUGOU, BURKINA FASO: CHALLENGES OF TERRITORIAL PLANNING AND LOGICS OF THE STAKEHOLDERS

Abstract: Urban transport in the metropolis of Ouagadougou (capital of Burkina Faso) is multimodal. The choice of modes of transport by users is determined by various factors. Taking these factors into account leads to better mobility planning. Thus, the objective of this study is to analyze the factors that determine the choice of urban transport modes by users in the municipality of Ouagadougou. To achieve this, data on the fleet of different types of vehicles was collected from the General Directorate of Urban Mobility of Burkina Faso. Also, traffic counting operations and household surveys have been carried out. The systems approach was used for the analysis and interpretation of the results. The results of this study reveal that the two-wheeled motorcycle remains the dominant mode of urban transport in Ouagadougou, used by 67% of users. However, 4% of these motorcycle users explain this modal choice of travel with regard to the flexibility offered by the motorcycle to avoid road congestion. Also, the motorcycle connects the different districts of the city that are not accessible by public transit because of the low level of development of the road network. Walking as a mode of transport occupies only 1% of users. This situation can be explained by the lack of pedestrian paths, the effect of high temperatures and the low income of some households. Indeed, 100% of users on foot say they walk for their trips because of a lack of financial means. Urban development and the implementation of an inclusive public transport system are essential for better mobility of the population in Ouagadougou.

Keywords: urban transport, modal choice, territorial planning, Ouagadougou, Burkina Faso

[1] amedi.ballo@gmail.com (corresponding author)
Mohamed Ibrahim Ballo (https://orcid.org/0009-0008-6013-7777)
Ousseny Sigue (https://orcid.org/0009-0007-7362-8113)
Pawendkisgou Isidore Yanogo (https://orcid.org/0000-0002-6706-8339)

Introduction

The large city produces a territory that is becoming more complex. The intra-urban space defines the city as much as the relations it maintains with the rest of the country. However, it is mobility that first and foremost creates this urban territory (Boyer & Delaunay, 2009). Faced with the high concentration of population in large African cities, the major problem that arises is that of mobility (Africa Logistics, 2020).

Moreover, although sustainable urban mobility policies strongly favor public transport, most African cities have developed around individual transport in response to deficient governance structures. As a result, governments generally struggle to control the supply of public transport and traffic management in these African cities (Stucki, 2016).

In addition, the urban transport sector has long been neglected in the countries of the South. In Africa, South America and Asia, policies to promote urban mobility are relatively recent. They are now part of the essential data of urban development. In sub-Saharan Africa, transport has become a priority for governments and international donors: it is now considered a major challenge for growth, poverty alleviation and sustainable development (Nallet, 2018). In addition, the sub-sector of urban mobility and transport, long confused with inter-urban road transport, still deserves a special look, because nowadays, the urban sector presents enormous challenges in terms of mobility, transport of city dwellers and goods in the city (Ballo et al., 2022).

This challenge of urban transport also spares the city of Ouagadougou, the largest city in Burkina Faso. Indeed, like other African cities, Ouagadougou is faced with an inefficient urban transport system, particularly with a low development of public urban transport (Nikiema et al., 2017).

However, the vision of sustainable and efficient urban mobility is intimately linked to the planning process that emerges from it. As a result, the planning of a transport system requires taking into account the spatial disparities that characterize the territories. In addition to the high urbanization and the acceleration of the rate of motorization, the failure to take into account the socio-economic realities of the populations and the poor quality of the traffic routes lead to waste time even to make a short trip (Cisse, 2016). These socio-economic realities and urban connectivity challenges generally determine the choice of mode of travel used by each user. However, most previous studies on urban transport in Burkina Faso, in general, and in Ouagadougou in particular, have not addressed the determinants of modal choices for urban transport, hence the interest of this study for better planning of mobility systems.

Materials and methods

Theoretical model of analysis

The analysis of the determinants that condition the modal choice of urban travel questions the question of governance, planning, performance and traffic flow by involving several actors and based on various factors (human, logistical, infrastructure, political, etc.), in a context of dynamic urbanization. So, in the context of this study, the systemic approach and the SWOT model (strengths, weaknesses, opportunities and threats) are used, both in the design of the collection tools, the collection of the data and their processing and analysis.

The systemic approach applied to the urban mobility sub-sector makes it possible to establish the interactions between urban transport policy, urban and peri-urban space, people, their travel, the means of transport and the dynamics that result from it. All of these interrelations act on the functioning and structuring of the territory under consideration, or even on those of other encompassed or encompassing territories, direct or distant neighbours. The territory thus created reacts to the constraints that contribute to its functioning (Thomas et al., 2008).

As for the type of approach, it is both quantitative and qualitative, in order to integrate all the variables of the study and to arrive at a consistent analysis.

This study was conducted in Burkina Faso, a country located in West Africa. The data collection was carried out in Ouagadougou, the country's capital, home to nearly half of the national urban population with a strong urban transport dynamic, according to the latest general population census conducted by the National Institute of Statistics and Demography of Burkina Faso (NISD, 2022).

Geographically, Ouagadougou is located in the central part of Burkina Faso. It is located between the parallels 12°20 and 12°25 north latitude and the meridians 1°27 and 1°35 west longitude (Zongo, 2005). It is bordered to the north by the rural municipalities of Pabré and Loumbila, to the east by Saaba, to the south by those of Koubri and Komsilga and finally to the west by the rural communes of Tanghuin-Dassouri and Sourgoubila (Fig. 1).

Administratively, Ouagadougou is the capital of the Centre region, of the province of Kadiogo. The municipality of Ouagadougou covers an area of 600 km2, or more than 0.2% of the national territory. It is organized into twelve arrondissements. These arrondissements are in turn organized into districts. The surveys therefore took place in the following districts: *Zagtouli* (district 7), *Bassinko* (district 8), *Bendogo* (district 10) and *Nagrin* (district 7). The different survey sites are chosen according to their demographic dynamics and the importance of user mobility observed, as population growth and urban sprawl contribute to the dynamics of the urban transport system in place (Mahamat Hemchi, 2015).

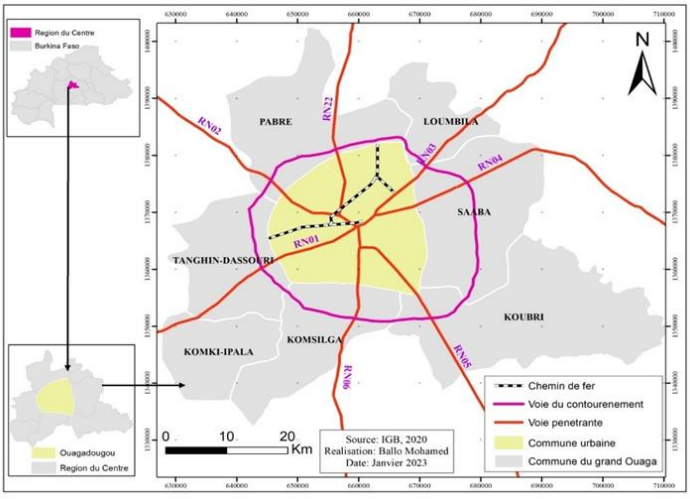

Fig. 1. Presentation of the municipality of Ouagadougou

Sampling and methods

The method of REA et *al*. cited by Pires (1997) was used to define the sample size. With a margin of error of plus or minus 5% and a 95% confidence interval, this method allows us to have a corrected sample using the following formula:

$$n = \frac{tp^2 \text{x P } (1-\text{P}) \text{ x } N}{tp^2 \text{x P } (1-\text{P}) + (N-1) \text{ x } y^2} \quad (1)$$

- n: Corrected sample size and to be used
- N: size of the target population from the 5th General Population and Housing Census (NISD, 2022)
- P: expected proportion of a population response or actual proportion. If the survey covers only one criterion and there is a given reference proportion, it is used for this purpose. In the case of a multi-criteria study like ours, P is set to 0.5 by default, which allows for the largest possible sample
- t_P: sampling confidence interval, corresponding to 95%
- y: margin of sampling error, corresponding to 5%

However, the choice of the actors of the technical and administrative services in charge of transport was made in a reasoned way.

As for the traffic counting operation, it consisted of counting the modes of transport, all types considered. This exhaustive operation takes place from the edge of the road and does not cause any inconvenience to traffic. It makes it possible to assess the dynamics of incoming and outgoing flows.

For this operation, it was a question of setting up counting posts at the level of the penetrants of national roads 1, 2, 4 and 6. Both directions of traffic are considered (centrifugal and centripetal). A tally sheet is used to fill in the information collected.

Taking into account all these methods of data production, the present study therefore involved a total of 496 people (Table 1).

Table 1. The sample of actors surveyed

Stakeholder group	Types of tools used for maintenance	Total
Households at district level	Survey sheets	251
Users on the move	Traffic count sheets	203
Technicians and administrators of structures in charge of urban mobility	Service guides	15
Urban transport service providers (city bus operators, taximen of all types, tricycle drivers, etc.)	Service guides	27
Total number of people surveyed	496	

Results and discussion

The results of this study present the modal split of urban transport in Ouagadougou. However, an analysis is carried out on the factors that determine the choice of users for each mode of transport considered.

Modal shares of urban travel in Ouagadougou

The modal split concerns the distribution or proportions of the movements of a population or a group of goods according to the modes of transport used. We pay particular attention to the issue of the movement of people in this part.

In the context of this study, through the counting operations carried out at the level of the various counting stations set up, combined with the results of the household surveys, we have the modal repair of travel in the municipality of Ouagadougou presented in Figure 2.

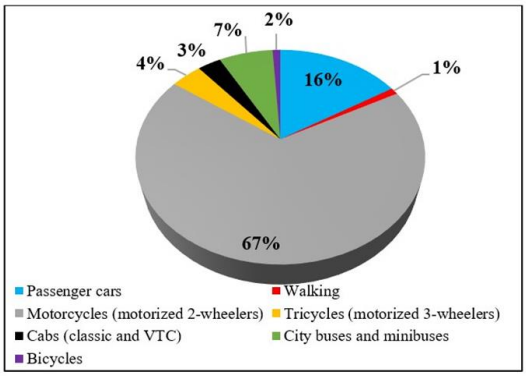

Fig. 2. The modal split of urban travel in Ouagadougou

From the analysis of the results of our field surveys, individual modes of transport occupy a predominant place in the movements of populations in the municipality of Ouagadougou. Indeed, nearly 70% of the users surveyed make their trips with motorized two-wheelers, followed by 16% who use private cars. 7% of the users surveyed travel by bus and minibus. Buses mainly concern public transport organized by the Public Transport Company named Sotraco, which is the main public operator in this area. Also, minibuses are mainly identified in the urban public transport practiced by some schools in the city of Ouagadougou, through carpooling; This is in order to reduce the risk of traffic accidents for pupils and schoolchildren in the said schools. These minibuses also concern private collective transport organised by legal entities, in particular certain hotel structures and industrial companies, for the transport of their customers and their staff respectively.

A dynamic organization operates around each mode of travel supported by factors (socio-economic, technical and physical) that determine the choice of users to be more favorable to the use of one mode of travel than to another.

Thus, the capital Ouagadougou is characterized by an influence of two-wheeled vehicles.

Ouagadougou, the "capital of two wheels" by excellence: through the prism of urban poverty and the limits of territorial development

When we talk about two-wheelers (2W), we distinguish between motorized two-wheelers (2WD) on the one hand and non-motorized two-wheelers (2WNM, usually bicycles) on the other. In the context of this study, there is a small proportion of bicycle use (2%) in contrast to motorcycle use, which accounts for 67% of trips. Thus, in general, two-wheeled vehicles occupy 69% of urban trips in Ouagadougou.

As a reminder, the history of two-wheeled vehicles is intimately linked to that of the arrival of the first European missionaries in Ouagadougou. The first bicycle was introduced in Ouagadougou in November 1908 by Father LEVAY and the first motorcycle appeared there in 1912 thanks to Father Joanny THEVENOUD (Tapsoba & Dioma, 1990); both priests of the Catholic Church who settled in Ouagadougou at the beginning of the twentieth century.

Several factors explain the choice of these modes of transport by users. By focusing on the determinants that support the choice of urban modes of transport in the municipality of Ouagadougou, the results of the surveys highlight economic, cultural, social and technical reasons (fig. 3).

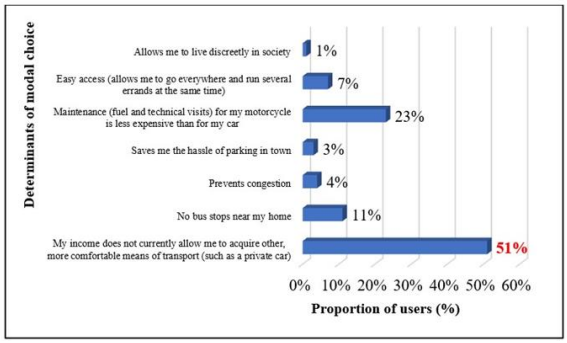

Fig. 3. The determinants of the choice of motorbike by users in Ouagadougou

The motorcycle is very popular with users in the municipality of Ouagadougou for several reasons. The socio-economic reason appears to be the main one (fig. 3). Indeed, respectively 51% and 23% of the motorcycle users surveyed justify the choice of this mode of travel by *i)* the inadequacy of their financial resources that do not allow them to afford other more comfortable modes of travel and *ii)* the cost of maintaining the motorcycle which they consider to be in line with their income.

More than 10% of motorcycle users in the municipality of Ouagadougou say they have made this modal choice in view of the lack of bus stops near their homes. Thus, they express their wish to use buses if the opportunity arises.

Another group of motorcycle users (7%) increase their choice of transport by motorcycle in view of the facilities it offers for shopping and the accessibility to various urban facilities and homes. Indeed, urban sprawl and the dynamics of land use, with the existence of many precarious neighbourhoods on the outskirts, favours the use of motorised two-wheeled vehicles which facilitate the accessibility of these places without great difficulty. In addition, during rush hour with permanent congestion on certain roads in the urban centre, motorised two-wheeled vehicles (2WD) make it easier for users to get around.

From interviews with these users, one of the determinants of the choice of motorcycle is the fact that it facilitates travel in all simplicity and at the same time provides this feeling of total freedom. For many daily trips, such as going to work, the market, social events, etc., a motorcycle seems to be the ideal solution, in view of the endless traffic jams. This is because motorcycles are particularly suitable for short journeys, as they allow you to reach your destination quickly without having to manage the volume of traffic as if it were a private car.

The results reveal, in addition, cultural logics relating to the use of motorized two-wheelers in Ouagadougou. Some motorcycle users, in Ouagadougou, 1% of the users surveyed justify their choice of this mode of transport (motorcycle) because it allows them to be sheltered from the eyes of society. Unlike the private car, owning a motorcycle in Ouagadougou allows you to live without attracting too many eyes to your lifestyle, these users justify. However, this is not the case when it comes to owning a luxury motorcycle whose purchase costs are sometimes exorbitant (about 2 million CFA francs, or 3,049.26 euros for the purchase cost of some luxury motorcycles).

All these reasons explain the presence and use of motorized two-wheeled vehicles (2WD) on the road in Ouagadougou (fig. 4).

Bicycle users in the municipality of Ouagadougou all (100% of respondents) say that they use bicycles for their travels, because they do not have the financial means to buy other more comfortable means of transport.

These results are reinforced by Meite (2014), who specifies that the spectacular development of two-wheeled motorized transport in some cities is a response to a chronic deficit in the supply of transport and, as such, constitutes an alternative to a situation of shortage. Rightly or wrongly, the bicycle in sub-Saharan Africa is associated with the image of poverty, with the rural environment from which city dwellers, migrants from the countryside, wish to free themselves in their search for "modernity". The bicycle suffers from an image that is too degraded (poverty, rurality) to hope that it can offer a credible alternative in the short term. Owning a private car is associated with this image of modernity. This cultural and social fact must be taken into consideration.

However, the predominance of two-wheeled vehicles, especially motorbikes, presents huge risks of traffic accidents and traffic jams in Ouagadougou. So, the prospect of implementing an effective public transport network in Ouagadougou remains an important recommendation to emerge from this study. Another recommendation is to develop a Bus Transit Rapid (BRT) and urban bus transport system serving all the districts of Ouagadougou. In addition, sustainable modes of transport such as cycling need to be developed. Cycling paths need to be taken into account in urban planning in Ouagadougou.

Fig. 4. The notorious presence of two-wheelers in Ouagadougou on Avenue 16.01 (Mogho-Naba Wobgo)

Apart from two-wheelers, taxis also occupy a prominent place in the urban transport of users in Ouagadougou.

Taxi use in Ouagadougou: a choice imposed by the failure of a public bus transport offer?

Taxis are considered semi-collective transport and the closest mode to the car. According to the results of the surveys carried out as part of this study, 3% of users in the city of Ouagadougou use the taxi (any type considered) to get around (fig. 2). Thus, after the motorcycle, the private car, the city bus, the tricycle, the taxi occupies the fifth place in the modes of transport in Ouagadougou.

Mostly green, the fleet of municipal taxis (classic) is now in a dilapidated state (fig. 5). Some of these taxis practice urban patrols in search of customers. To this end, in order to make them more profitable, they sometimes use butane gas as an energy source without any technical assistance from the Motor Vehicle Control Centre (MVCC). In addition, these taxis also informally try to organize themselves more or less in lines or at least by sectors. These lines are not consecrated and defined by a passenger information map disclosed or formalized by an administrative act. They are fragmented and are the result of an arrangement found between the different taximen. Thus, to go from one sector of the city to another, the user will have to take one or two, or even three municipal taxis in succession.

Fig. 5. Dilapidated taxi park in Ouagadougou

According to the results of our surveys, 67% of conventional taxis operate in a traditional way with an informal status. This situation poses a challenge for the professionalization of these actors. This observation is corroborated by Sigué (2008) who specifies that taxis are operated by private individuals on a traditional basis. The responsibility for the management of urban taxis lies with the municipality, but informal management makes it more difficult to operate and to count the fleet. However, the municipal taxi fleet was estimated at about 5,000 vehicles in 2021 in Ouagadougou. To date, there is no mechanism to determine exactly the number of conventional (green) taxis operating in the city of Ouagadougou, including the dynamic monitoring of the evolution of the fleet. The technical services in charge are trying to make a comparison between the number of taxis that have paid their parking tax and the number of taxis in use. However, this approach has limitations, as not all taxis in use are up to date with the tax. Thus, neither the municipality nor the ministry in charge of urban mobility has the exact number of municipal taxis in use in Ouagadougou to date. This is also due to the existence of illegal taxis that try to evade tax measures and regulations.

Despite the dilapidated state of the municipal taxi fleet, users use them for their various trips in Ouagadougou. Their attachment to this means of transport can be explained by various reasons (fig. 6).

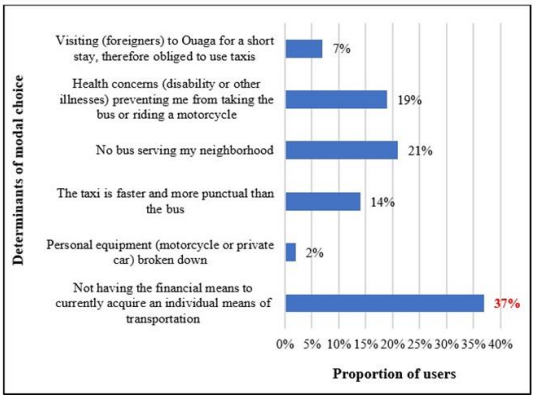

Fig. 6. The determinants of the choice of the classic taxi by users in Ouagadougou

The results of our interviews with users using the conventional taxi show a variety of reasons that explain this modal choice of travel by these actors. Indeed, only 2% of users use the conventional taxi when their personal vehicle (motorcycle or private car) breaks down. Also, the taxi is an alternative for 21% of the users surveyed who say they turn to municipal taxis (green) given the absence of urban bus lines in their neighborhood. However, nearly 40% of the users surveyed say they use conventional taxis for their daily journeys, because they do not currently have the financial means to obtain a personal vehicle, in particular a motorcycle or even a private car. Economic reasons would therefore mainly explain the use of conventional taxis by users in Ouagadougou for their urban travel. These results are confirmed by the research of Belaitouche & Nait (2017) who, investigating the subjects of transport economics, came to the conclusion that the choice of modes of transport of certain users in the city is conditioned by their level of income.

Given the enthusiasm of some users for taxis in Ouagadougou, this study recommends a renewal of the taxi fleet to ensure sustainable and safe mobility.

Urban public bus transport in Ouagadougou

According to our field surveys carried out as part of this study, the Public Transport Company named Sotraco currently holds a monopoly on the activity of bus transport in the city of Ouagadougou, with a very dilapidated fleet (fig. 7).

Fig. 7. The current state of Sotraco's bus fleet in Ouagadougou

The dilapidated urban bus fleet of the Public Transport Company named Sotraco can be explained by difficulties in the upkeep and maintenance of vehicles. The main breakdowns are due to a problem with the engine, excessive oil consumption, gearbox. In addition, the company's generic maintenance plan is not adapted due to the multiplicity of the brands of the buses it owns (Volvo, Renault, Otokar, etc.) and the non-compliance with maintenance intervals according to the manufacturers' prescriptions (Bouda, 2017).

In addition to this challenge of rolling logistics (insufficient and obsolete bus fleet), the service offers of the Public Transport Company named Sotraco is also characterized by a long waiting time for users at bus stops (fig. 8); all of which limits the commercial speed of the company. From the analysis of this graph, over the past five years, the wait time at a bus stop in Ouagadougou has almost doubled. This means that to date, in Ouagadougou, a user at an urban bus stop would have to wait nearly 70 minutes to see a bus arrive there in order to board. There are several reasons for this delay in urban buses, including the lack of dedicated bus lanes (also known as dedicated lanes or bus lanes), congestion, the insufficient number of buses operating per line, etc.

In this respect, Millet (2016) asserts that the exclusive right-of-way, unlike the ordinary right-of-way, eliminates traffic delays by its very nature. When the dedicated right-of-way is integral, exclusive right-of-way public transport is protected at all times from signal delays.

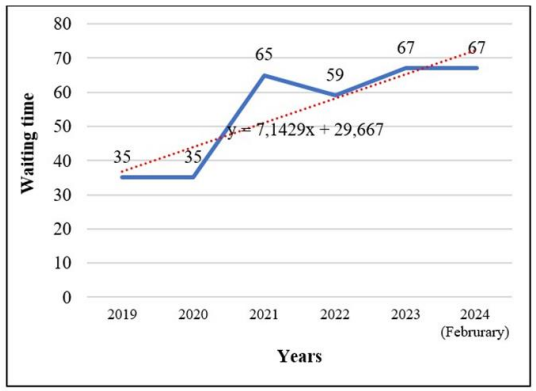

Fig. 8. The evolution of waiting time at a public transit bus stop in Ouagadougou from 2019 to 2024

In addition, according to our field observations carried out as part of this study, the average running time of a bus of the Public Transport Company named Sotraco is 7 minutes. This means that from the arrival of a bus at a stop, to its departure for its next trip, it takes an average of 7 minutes. This time allows passengers who were waiting at the said stop to board the aircraft.

The existing offer is facing an increasing demand from users who are looking for solutions for their daily travel. Despite the outdated number of buses and the rather long waiting time at the stops, many users use the urban buses of the Public Transport Company named Sotraco for their urban trips. This can be seen from the overloading of buses on the various routes and the dynamics of the evolution of the number of passengers transported per day using the company's buses over the last five years in Ouagadougou (Table 2).

Table 2. The evolution of the average number of users transported per day using urban buses in Ouagadougou from 2019 to 2024

Year	2019	2020	2021	2022	2023	2024 (February)
Average number of users transported per day using urban buses	6 118	5 394	7 259	23 210	24 907	33 328

Source: Public transport company, Sotraco, 2024.

According to the analysis of Table 2, the average number of people transported per day by urban buses in Ouagadougou has increased almost fivefold over the last five years. Thus, to date, in Ouagadougou, we have more than 30 thousand people who use the urban buses of the Public Transport Company named Sotraco for their various trips. As a reminder, the Public Transport Company Sotraco remains the only public transport operator to date in the municipality of Ouagadougou. This attachment to and use of city buses can be explained by several factors or reasons. These reasons are supported by actors' logics and socio-economic factors (Fig. 9).

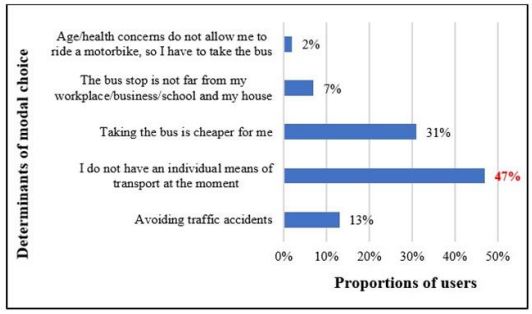

Fig. 9. The determinants of the choice of the urban bus by users in Ouagadougou

The results of this study reveal that the majority (47%) of users in Ouagadougou who use the urban buses of the Public Transport Company named Sotraco explain this choice by the fact that they do not have a personal means of transport. However, more than 30% of these bus users justify their modal choice of transport with regard to the affordable price of bus tickets. This allows them to travel at a lower cost.

In addition, the reason for road safety is not neglected. Indeed, 13% of users who use urban buses for their daily trips justify this choice by the fact that the bus is an alternative that allows them to avoid these many risks of traffic accidents.

This observation is reinforced by Duranton (2016) who specifies that, according to the National Federation of Passenger Transport (NFPT), coaches and buses remain very safe means of transport, far ahead of cars or motorcycles or rail: there are 3 times fewer fatal accidents by coach than by train, 30 times less than by car and 300 times less than by motorcycle.

Based on the results of this study, action must be taken to ensure the efficient development of the bus transport system in Ouagadougou. To this end, as part of the development of the urban road network, specific lanes (corridors) must be planned and built solely for the movement of buses. This will avoid long waiting times at bus stops. We also need to provide park-and-ride facilities at Sotraco bus terminuses. This will facilitate connections between different modes of transport (intermodality).

However, other users in Ouagadougou do not hesitate to choose the private car for their urban travel.

The private car in Ouagadougou, for comfort and safety

The private car, whose use was still reduced twenty years ago, has led to a clear change in the modes of transport of city dwellers since the early 1990s. Most often considered a luxury good, the car remains the mode of transport for more or less well-off people. Its use has increased thanks to the reduction in the import tax, the renewal of the car fleet in Europe, but also to the social enhancement that has developed strongly around it.

According to the results of this study, the private car is the second most popular mode of travel for users in Ouagadougou, after the motorcycle. Indeed, 16% of the users surveyed choose the private car to make their daily trips.

There are several reasons for this modal choice by these users (Fig. 10).

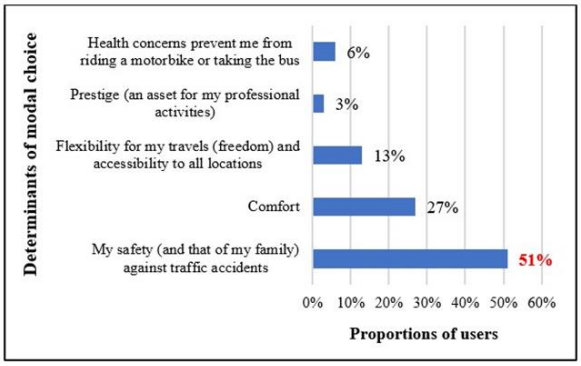

Fig. 10. The determinants of the choice of private car by users in Ouagadougou

The present study reveals that users in Ouagadougou make their daily trips by private car for several reasons. While some resort to the use of the car for health concerns (6% of users surveyed by car), others justify this modal choice by the flexibility offered by the car for the various trips, thus providing this feeling of freedom with all the possibilities of geographical accessibility generated. This last reason concerns only 13% of the users surveyed.

While 3% of these users support the social prestige offered by the use of the car and the facilities it provides to its users in the exercise of their professional activities, the majority of them explain the choice to travel by this mode of transport for safety reasons. Indeed, more than 50% of the users surveyed by car stress that they use this modal choice of travel to avoid traffic accidents and other dangers for their families, loved ones and themselves, in particular urban insecurity and its corollaries of urban incivility.

These results corroborate those of Belaitouche & Nait (2017) who note that the car, a symbol of freedom and dependence, is the individual mode of transport by excellence in the world. The car has many advantages, which give it the first place in terms of travel, even in urban areas. Indeed, its modularity (a car can carry one person as it can carry four, or a little equipment, it is used for short and long trips, etc.). Finally, these authors point out that, from a more behavioural point of view, it is safer and more comfortable to travel by car, but this leads to a loss of contact with the environment, whereas cycling and walking make this relationship with the environment and the surrounding society closer, even more convivial.

The issue of walking often seems to be marginalized in some analyses of urban travel. However, users make their daily trips far from motorcycles, cars and even bicycles, just by walking.

The pedestrian in Ouagadougou, the marginal of the road?

Generally speaking, pedestrians *(the most vulnerable users)* are very little taken into account in road development in Ouagadougou. Even if some development efforts are made in this direction, such as the construction of footbridges and pedestrian strips, the observation reveals the absence of sidewalks at the level of the various road developments. The few places where they are carried out, they are unfortunately occupied by anarchic installations of shops and other economic activities. This situation forces pedestrians to walk on the bike path, or even on the road, exposing them to the risk of traffic accidents.

Of our survey results, in the context of this study, only 1% of the users surveyed walk for their daily trips.

Focusing on the determinants of such a modal choice, the results of this study reveal that 100% of these users on foot confirm that they are satisfied with this mode of travel, because they do not have the financial means to obtain another means of transport that is more comfortable in their opinion.

However, notwithstanding the recognized health and ecological benefits of walking, it is important to emphasize the "negative" connotation and image associated with this mode of transport. Indeed, walking for one's daily commute in Ouagadougou would rhyme with poverty.

In this regard, Deroux (2016) confirms that pedestrians are associated with a number of negative connotations: vulnerable, constrained in their journey, potential victims of traffic and poor (because if the user travels on foot, it is because he cannot afford a car or a public transport ticket).

However, the emergence of a new mode of transport for users in Ouagadougou is emerging and gaining ground despite the related legal provisions. This is the transport of people by motorized three-wheeled vehicles commonly known as "tricycles".

Using the tricycle to transport people in Ouagadougou, or the sign of a lack of formal public transport services.

The city of Ouagadougou is experiencing a new traffic phenomenon. These are tricycles. They are commonly referred to as "motorcycle taxis". As a reminder, these types of vehicles, at the beginning, were intended only for the transport of goods. Unfortunately, there has been a deviation from their primary use, because today they transport goods and people exclusively. Indeed, the provisions of Decree No. 2012-559/PRES/PM/MTPEN/MEF/MICA/MATDS/MID of July 5, 2012 prohibit the transport of people by tricycles in the cities of Burkina Faso, including Ouagadougou.

The difficulties of application lead to anarchic practices in the activity of transporting people by tricycles, with its corollaries of traffic accidents.

The results of this study reveal that 4% of the users surveyed in Ouagadougou make their daily urban trips using tricycles, despite the regulations in force.

Checks are carried out by the Ouagadougou Municipal Police to punish tricycle drivers who engage in this practice. These penalties often consist of impoundment of these machines and the payment of taxes by the offenders. However, the phenomenon persists. Poor development of the road network, with the problem of the *"last mile"* and the absence of a public transport system in certain neighbourhoods partly explain the use of tricycles by some actors in Ouagadougou for their daily journeys (Fig. 11).

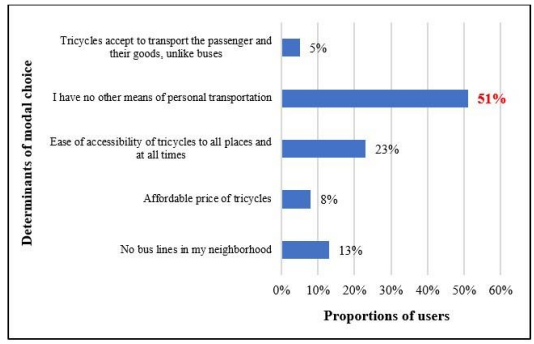

Fig. 11. The determinants of the choice of tricycles by users for their daily trips in Ouagadougou

From the analysis of Figure 11, several reasons lead some users to use tricycles for their daily trips in Ouagadougou. One of the reasons remains the flexibility that the tricycle gives by accepting the passenger to carry with his luggage. These possibilities, generally, are not offered by the urban buses of the Public Transport Company named Sotraco, specify 5% of the tricycle users surveyed as part of this study. Secondly, 23% of these users justify the choice to travel using tricycles, taking into account the "door-to-door" offered by these machines. Indeed, unlike other means of travel, such as city buses and conventional taxis, tricycles are adapted to the undeveloped roads of the tertiary network and are able to bring passengers to the door of their homes. This geographical accessibility allows the tricycles to meet the challenge of the last mile and regional development.

In addition, other reasons for the modal choice of tricycles in passenger transport in Ouagadougou are *i)* the absence of bus lines in certain districts, as evidenced by 13% of the

users surveyed and *ii)* the fact that more than half of these users (51%) say they do not have a personal means of transport that requires them to use these tricycles.

These results corroborate those of Sigué (2022), who states that the strong support of Ouagadougou residents for this tricycle transport system can be explained by its flexibility in being able to travel through hard-to-reach neighbourhoods, its affordable cost and its availability.

Conclusion

Urban transport in Ouagadougou is carried out using several modes of transport, including motorized motorcycles, private cars, taxis, city buses, tricycles, walking and bicycles.

However, for socio-economic reasons, mainly due to the lack of financial means, the majority of users in Ouagadougou use two-wheeled motorcycles for their commuting. In addition, the motorcycle makes it easier to get around, especially with the presence of traffic jams. In addition, the road network is not sufficiently developed, making some districts of the city of Ouagadougou difficult to access by urban bus. This situation also encourages the use of two-wheeled motorcycles and tricycles. As for public transport, factors partly explain its low modal share, in particular the inadequacy and obsolescence of the bus fleet, the delay in buses in circulation due to the absence of *"bus lanes"*. Walkability, for its part, suffers today from marginalization in the design and implementation of urban projects. This situation can easily be observed through the glaring absence of pedestrian paths in Ouagadougou and the lack of landscaping along the roads to facilitate walking for users.

To this end, the planning of an efficient mobility system in African cities in full urbanization, such as Ouagadougou, requires the consideration of these determinants of the modal choices of urban transport. This requires detailed pricing engineering of modes of transport and consistent urban development.

Conflicts of Interest: The authors declare no conflict of interest.

Publisher's Note: Serbian Geographical Society stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.

References

Africa Logistics (2020). *Mobility and accessibility of urban transport in Africa: the challenges?* Magazine, the Logistic Journal of African Decision-Makers. https://www.africalogisticsmagazine.com/?q=fr/content/mobilite-et-accessibilite-des-transports-urbains-en-afrique

Ballo, M., I., Bamas S., & Yanogo P., I. (2022). Parking issues in Ouagadougou, Burkina Faso. *Science and Technology, Letters, Human and Social Sciences, 38*(2), 57-81. https://revuesciences-techniquesburkina.org/index.php/lettres_sciences_sociales_et_hum/article/view/1365

Belaitouche, A., & Nait, O. (2017). *Analysis of demand through the economic behavior of public transport users in the city of Bejaia (Algeria)* [Master's thesis in economics, option: transport economics, Abderrahmane Mira University of Bejaia].

Bouda, P. (2017). *Public transport and urban mobility in the city of Ouagadougou: the case of Sotraco* [Graduation thesis, National School of Financial Authorities].

Boyer, F., & Delaunay, D. (2009). *Settlement of Ouagadougou and urban development*. Cooperation and Cultural Action Service of the Embassy of France.

Cisse, C. (2016). *Transport and mobility in African cities: Issues and challenges*. Economic Analysis, Editions L'Afrique des idées.

Deroux, C. (2016). *Developing the practice of walking in metropolises: challenges and implementation of an action programme*. Grenoble Institute of Urban Planning.

Duranton, I. (2016). *Buses and coaches: what are the safety rules?* Notre Temps. https://www.notretemps.com/droit-argent/droit-du-consommateur/bus-et-autocars-quelles-sont-les-regles-de-securite-16056#:~:text=Selon%20la%20F%C3%A9d%C3%A9ration%20nationale%20des-fois%20moins%20qu'en%20moto

Mahamat, H. H. (2015). *Urban Mobilities and Planning, The Case of N'Djamena* [Doctoral thesis, University of Bordeaux Montaigne]. https://theses.hal.science/tel-01222332

Meite, Y. (2014). *Urban transport governance and sustainable mobility in the district of Abidjan (Ivory Coast)* [Doctoral thesis in Sociology, University of Strasbourg]. https://theses.hal.science/tel-01140115

Millet, T. (2016). *The optimization of a Public Transit project in a dedicated lane: a proposed method for the case of the Montreal tramway* [Master's thesis in urban studies, Université de Québec à Montréal].

Nallet, C. (2018). *The challenge of urban mobility in Africa. The case of the Addis Ababa Light Rail*. IFRI ratings.

National Institute of Statistics and Demography (2022). *Fifth General Population and Housing Census of Burkina Faso. Synthesis of the final results*. National Institute of Statistics and Demography.

Nikiema, A., Bonnet, E., Sidbega, S., & Ridde, V. (2017). Road accidents in Ouagadougou, an indicator of urban management. *Health and Urban Policies, 78*, 89–111. https://doi.org/10.7202/1039340ar

Pires, A. (1997). *Sampling & qualitative research: theoretical and methodological essay*. School of Criminology, University of Ottawa.

Sigue, O. (2008). Public transport in Ouagadougou: the case of taxis [Master's thesis, University of Ouagadougou].

Sigue, O. (2022). Success of the "Taxi-moto" tricycle in Ouagadougou. *Science and Technology, Letters, Human and Social Sciences, 38*(1), 9-30.

Stucki, M. (2016). *Sustainable mobility and accessibility policies in African cities*. Africa Transport Policy Programme.

Tapsoba, C., & Dioma, J.C. (1990). *Two-wheeled exhibition at the National Culture Week, Bobo-Dioulasso*. Directorate of Cultural Heritage.

Thomas, H., Laurence, H., M., Samuel, C., & Jean-Pierre, M. (2008). Systemic approach to the functioning of a hedgerowed agricultural territory. *Revue L'espace géographique, 37*, 270-286. https://www.cairn.info/revue-espace-geographique-2008-3-page-270.htm

Zongo, S., A. (2005). *Environmental impact study of the development project for the second phase of the Zone of Various Activities (ZAD II) of Ouagadougou in Burkina Faso*. Inter-School of Rural Equipment Engineers.