Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2, 123-140
2026
Publisher: Learning Gate
DOI: 10.55214/2576-8484.v10i2.11988

Impact of the location of retail outlets on the formation of household supply flows in the autonomous district of Lome

Kodjo Djossou[1*], Iléri Dandonougbo[2], Barbara Lyonnet[3], Hicham Abbad[4]
[1]The Regional Centre of Excellence on Sustainable Cities in Africa, CERViDA-DOUNEDON, University of Lomé, Lomé1515, Togo; kodjo.djos@gmail.com (K.D.).
[2]Laboratoire de Recherche sur Espaces, Echanges et Sécurité Humaine, LaREESH/Department of Geography, University of Lomé, Lomé1515, Togo; ileridandonougbo@gmail.com (I.D.).
[3]Laboratoire d'Economie et Management de Nantes Atlantique LEMNA, Nantes Université, France; barbara.lyonnet@univ-nantes.fr (B.L.).
[4]LEMNA, FLCE, Nantes University, 44300 Nantes, France; hicham.abbad@univ-nantes.fr (H.A.).

Abstract: Household shopping trips are a key component of urban logistics. They enable households to be supplied with goods by connecting points of sale and homes. However, they are influenced by several factors, including the location of shops. This study aims to characterize the shopping trips of the population of the Autonomous District of Greater Lomé (DAGL) by examining the effect of retail outlet location on household supply flows. A mixed methodological approach, based on qualitative and quantitative surveys of 1,065 individuals, was adopted. The results reveal that 72% of households prefer local retail outlets, compared to 13% who frequent distant retail outlets. Motorcycles and walking are more commonly used for local travel, while motorcycles and city taxis dominate for longer trips. Furthermore, local retail outlets are visited an average of 6.3 times per month and account for an average monthly travel budget per household of 2,323 CFA francs, while visits to distant retail outlets are lower (3.5 times per month) with an average monthly budget per household of 5,042 CFA francs. These results provide a decision-making tool for urban logistics and urban planning stakeholders.

Keywords: *Household supply flows, Retail location, Shopping trips, Urban logistics.*

1. Introduction

The urbanization rate in Africa rose to 54% in 2024 and is expected to reach 65% in 2050 [1]. This ongoing change is leading to an increase in urban mobility needs, particularly those related to shopping, which are essential for supplying households with goods and equipment. Household shopping trips are an essential part of urban logistics. They are one of the three components of urban goods flows, as defined by the French initiative "FRETURB" [2]. Indeed, several solutions, such as deliveries to pick-up points and unmanned delivery technologies [3-5], are being considered in cities in developed countries to optimize the flow of goods in urban areas. However, the physical movement of a household member to the place of purchase remains the most common form in West Africa. Nevertheless, online shopping, which involves delivery to the customer's home, is a new trend that is slowly gaining ground in West African urban areas. Although limited to a few products offered by e-retailers, online shopping reduces the number of vehicles involved in shopping trips [6, 7] when delivery is organized in the form of a delivery route. Gardrat [8] introduces the concept of decoupling the purchase and receipt of goods by households to distinguish other purchasing practices, including e-commerce, from traditional purchasing, which is still referred to as the traditional form of household procurement [9]. The latter is often associated with other reasons for travel, such as work, leisure, visits, or studies. A trip is generally characterized by its purpose, origin, and destination, route and means of transport used, duration, and costs. However, shopping trips involve visiting a point of sale chosen based on criteria such as the

History: Received: 19 November 2025; Revised: 9 January 2026; Accepted: 14 January 2026; Published: 3 February 2026
* Correspondence: kodjo.djos@gmail.com

availability and price of the products sought, geographical proximity, accessibility, and travel time. Households often choose nearby points of sale offering a variety of goods to minimize travel distances and costs [10]. However, the logic of seeking proximity can be tempered by the tendency of households to combine shopping with other reasons for travel. Furthermore, the choice of means of transport used is also influenced by the distance between the home and the point of sale [11, 12], the quantity of goods to be purchased, and the household's income level. The location of shops, therefore, influences households' shopping trips in terms of cost, time, distance traveled, and types of transport used. Although travel related to household procurement accounts for a significant proportion of goods flows in cities, few studies in the West African context have explored this issue. The few studies available only partially address shopping trips as one of the reasons for urban mobility. Nevertheless, the importance of shopping-related travel in African cities has been mentioned by some authors. The work of Olvera et al. [13] reveals that shopping accounts for one in eight trips in Ouagadougou and Bamako, after trips related to work, visits, and studies. Similarly, in the ninth district of Ndjamena, shopping trips are the second most common reason for trips made by heads of households after work [14].

In the Lomé metropolitan area, goods distribution sites are among the most visited places by city dwellers [15]. They are varied and offer different types of goods to city dwellers, ranging from food products to imported manufactured goods. The former are found more in peripheral markets and the latter in central markets [16]. The formation of household supply flows is thus influenced by the location of shops in the DAGL. How does the location of points of sale influence the formation of household supply flows in the DAGL?

What are the characteristics of household shopping trips in Greater Lomé and the factors influencing urban dwellers' choice of retail outlets?

What strategies can be used to ensure the sustainability of shopping trips in Greater Lomé?

The answers to these questions enabled us to achieve the main objective of this study, which is to show the impact of retail location on the formation of goods flows in the urban agglomeration of Lomé.

This article begins with a review of the literature on urban logistics in general and shopping trips in particular. It continues with a presentation of the methodology adopted and the main results obtained, before offering a discussion that leads to a conclusion.

2. Literature Review

2.1. Household Shopping Trips: An Essential Component of Urban Logistics, but one that Has Been Little Explored

Beyond its involvement in urban planning, transportation facilitates socio-spatial interactions within an urban area [17]. Travel is generally motivated by one or more activities [18], among which shopping occupies a special place. In addition to the movement of people, shopping also generates the movement of goods, which sometimes requires the use of a specific means of transport depending on the nature of the goods. Shopping mobility, as one of the main components of urban logistics, enables households to be supplied with goods and equipment. However, it has been little studied [19] and is regularly included in research on the mobility of people in urban areas [14, 20, 21]. Yet shopping trips represent the last link in the urban logistics chain connecting end consumers to retailers, households to points of sale, and urban areas to suburban areas. They involve different types of transportation, both motorized and non-motorized, which are chosen based on the distance to be traveled and the quantities to be purchased. The diversity of forms that shopping trips can take complicates their quantification and definition. Indeed, they can take the form of a loop connecting the home to the point of sale, which becomes more complex when secondary reasons are added, or successive visits to several shops are necessary before returning home [22]. It can also take the form of a chain of trips when the purchase is made during a trip that originates from or ends at home, but for a different reason [14]. So, should all journeys made during a purchase be considered shopping trips, or should only the journey involving the transport of the purchased goods be taken into account? For Gonzalez-Feliu et al. [23], it is the reason for the purchase at the destination that makes a trip a shopping trip. Indeed, it is the reason for the

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

purchase that leads to a trip to the point of sale, which is what enables the purchase to be made. This is logically followed by a trip back home with the purchased goods. Shopping trips are, therefore, a major generator of flows of people and goods in cities and contribute to the increase in the number of vehicles on the road. However, it should be noted that household shopping does not necessarily require a member of the household to travel to the point of sale.

Changing consumer habits, amplified by technological advances and the Covid-19 health crisis, have encouraged the growth of online shopping [24, 25]. Also known as e-commerce, it includes, according to KOFFI et al. [26], commercial and financial transactions carried out online, including electronic payments. This type of commerce has intensified the decoupling of the act of purchasing and the collection of goods [8]. Goods can be delivered to the buyer by the store or a professional delivery service. Some consumers engage in purchasing behavior involving both distribution channels. According to Wang et al. [27], they either make a purchase in-store after viewing the product online or make an online purchase after viewing the product in-store. For Routhier et al. [2] and Olvera et al. [13] there are two types of household supply flows: trips made by households to make purchases and those made by delivery vehicles or the seller. In the context of this article, it is mainly the trips made by households to points of sale that are analyzed.

2.2. Types Of Retail Outlets and Factors Influencing Households' Choices

A retail outlet encompasses various spaces and facilities where supply and demand for purchases meet. These spaces are generally called "markets" in Africa [28] and are defined as "a point of convergence for supply and distribution networks for food and manufactured goods, as well as activities related to these networks." They are characterized by diverse activities, including wholesale and retail sales, storage, transportation, and delivery services.

Zoma [29] proposes a typology of markets in West Africa based on their functions. They distinguish between: collection markets, located in production areas and run by producers and collectors; consolidation markets, which act as an interface between collection and consumption markets, with a more significant storage function; and consumption markets, located in urban areas, offering a diversity of goods. These markets are interconnected: food products flow from collection areas to urban markets, while manufactured goods follow the reverse route.

A typology of DAGL markets has been proposed by N'kere [16]. The author distinguishes three types according to their location and the types of products offered. Peripheral markets specialize in the sale of food products from rural areas of Togo, while downtown markets offer imported manufactured goods. The market located in the port area specializes in the distribution of second-hand goods from the port. At the same time, there are commercial establishments such as supermarkets and shops, which are also sales outlets but on a smaller scale. The commercial environment in urban areas of developing countries is thus characterized by the coexistence of supermarkets with small shops, central markets, neighborhood stores, and street vendors [30].

There are several reasons behind the choice of these points of sale when shopping on the go. According to Vonthron et al. [31], this choice is guided by various factors, including budget, relationships, physical accessibility, efficiency, recreation, product-related factors, and avoidance. Tessier et al. [30] reveal that proximity is the most frequently cited reason in North Africa, particularly in the Greater Tunis urban area, as a criterion for choosing a place of sale. It should be noted that, in addition to the above factors, the distance between different types of retail outlets and the home [32] as well as the level of connectivity of the urban road network, are determining factors in the choice of a mode of transport for shopping trips [33].

The typology used in this article is based on proximity, illustrated by the use of the term "neighborhood," particularly neighborhood markets and neighborhood shops, while the Lomé Grand Market and other markets reflect the distance from the peripheral or residential neighborhoods of the households surveyed.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

3. Methodology

This study is based on a two-stage methodological approach: documentary research and field data collection.

3.1. Documentary Research

The first stage involved reviewing documents such as books, master's theses, doctoral dissertations, and scientific articles on websites and in the libraries of the University of Lomé and the African School of Architecture and Urban Planning (EAMAU). All consulted documents contributed to writing a brief literature review on the topic.

3.2. Field Data Collection

Two types of data were used in writing this article: secondary and primary data. Secondary data mainly consists of:

- A database of DAGL markets
- The cartographic background of Greater Lomé
- 2022 population and housing census data

This data was collected from institutions such as the National Institute of Statistics, Economic and Demographic Studies (INSEED), and the Autonomous District of Greater Lomé (DAGL).

On the other hand, two tools were used to collect primary data in the field:

- Semi-structured interviews using an interview guide
- Questionnaire surveys.

Qualitative data were collected through interviews with certain heads of households to understand the specific dimensions of their purchasing activities, while quantitative data on the characteristics of trips made during these activities were obtained through administering a questionnaire.

3.3. Sampling

The survey covered a sample of 1,065 households selected using a sampling technique based on the Cochran [34] formula, presented below:

$$\boldsymbol{n = \frac{Z^2 \times N \times p \times (1-p)}{e^2 \times (N-1) + Z^2 \times p(1-p)}}$$

Where:

n, Sample size, is 1,065 households

N: Population size is 547,094 households.

It is determined by dividing the number of populations in each municipality in the DAGL by four, which is the average household size defined by INSEED after the 2022 population census. This operation made it possible to calculate the number of households in the DAGL, as shown in Table 1 below.

Z: The confidence score is 1.96, determined based on the 95% confidence level considered in this study.

P: Estimated household proportion, which is 0.5. This proportion maximizes the sample.

e: Tolerated margin of error, which is 0.03. The margin of error was reduced to 3% by increasing the sample size in order to minimize discrepancies.

The investigators, working in pairs, traveled throughout the 13 municipalities of the DAGL to interview households over four working days using a survey form digitized in the Kobotoolbox tool.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

Table 1.
Sampling.

Municipalities	Population (N)	Average number of people per household	Number of households	Sample per municipalities
Golfe1	351550	4	87888	171
Golfe2	136153	4	34038	66
Golfe3	52769	4	13192	26
Golfe4	155842	4	38961	76
Golfe5	169993	4	42498	83
Golfe6	181561	4	45390	88
Golfe7	257813	4	64453	125
Agoenyive1	317255	4	79314	154
Agoenyive2	128164	4	32041	62
Agoenyive3	47554	4	11889	23
Agoenyive4	154431	4	38608	75
Agoenyive5	125097	4	31274	61
Agoenyive6	110194	4	27549	54
Total	2188376	52	547094	1065

3.4. Data Processing

The data was imported into Excel, where it was cleaned, analyzed, processed, and presented in tables and graphs.

ArcGIS software was used to create the maps.

The ease of use of Excel and the accuracy of ArcGIS in analyzing cartographic data explain why these programs were chosen for processing the data in this article.

4. Results

4.1. Lomé, Between Population Growth and Spatial Expansion

Lomé, Togo's main city, has been the capital since 1987. In 1981, the city had 390,000 inhabitants (RGPH3, 1970), compared to 2,188,376 inhabitants in 2022 (RGPH5). Rapid population growth has created spatial pressure, resulting in urban sprawl. Its surface area increased from 6,000 hectares to 425,060 hectares [35] during the same period. The spatial sprawl of the city has led to the emergence of peripheral neighborhoods, thus increasing the distances between the center and the periphery. Residents of the outlying neighborhoods are becoming increasingly dependent on vehicles to travel to the city center, where the main retail outlets are concentrated. These include the Lomé Grand Market, the Avénou Fruit Market, the Atikpodji Market, and the Dékon Shopping Center, which brings together wholesalers and semi-wholesalers.

4.2. Socio-Professional Characteristics of Respondents

Table 2.
Respondents' sectors of activity.

Industry	Frequency	Percentage
Informal	729	69%
Formal	335	31%
Total	1064	100%

The results in Table 2 indicate that in the DAGL, 69% of respondents work in the informal sector, while 31% work in the formal sector.

Table 3.
Distribution of respondents by age group.

Age Group	Frequency	Percentage
18-24	173	16%
25-34	362	34%
35-44	338	32%
45-54	127	12%
55-64	44	4%
65-74	20	2%
Total	1064	100%

16% of the heads of households surveyed are under the age of 25, while the majority, 66%, are between the ages of 25 and 44. Only 18% are between the ages of 45 and 74 (Table 3).

4.3. Types of Retail Outlets and Characteristics of Household Shopping Trips

Shopping trips involve two activities: purchasing and delivery. The act of purchasing involves choosing a supplier or point of sale, which is determined by the type of goods sought. Delivery involves choosing a means of transport to bring the purchased goods home.

4.4. Types Of Retail Outlets in The DAGL and the Factors Determining Their Choice by Households

As diverse as the products on offer, there are several types of retail outlets in the DAGL, including retail outlets, shops, supermarkets, and markets.

4.4.1. Retail outlets

These are small shops, usually located in sheds at the front of houses, along streets at certain intersections, and owned by a family member or a tenant shopkeeper who offers a variety of mainly local products. These retailers supply neighborhood households with retail products, particularly condiments, sauces, and cereals.

4.4.2. Boutiques

These come in various sizes and mainly offer imported products. Boutiques are the most important retail outlets in DAGL neighborhoods, found along the streets. House construction plans generally include the development of these local retail outlets for households in the neighborhood. Households often walk to these outlets.

4.4.3. Supermarkets

Supermarkets are retail outlets that generally sell manufactured and imported products. They are generally perceived in Africa as luxury outlets reserved for the wealthy [36].

There are a few supermarkets in the city of Lomé, and those that do exist are located in central areas rather than on the outskirts. Two major players dominate this market segment: Champion and Ramco. These stores are generally frequented by high- and middle-income households.

4.4.4. Markets

These are commercial areas covering several hundred meters (Figure 1) where a wide variety of products are sold. They also offer several types of services. In the DAGL, they are classified according to their size, the types of goods offered, and their management bodies. Some markets, such as the Lomé Grand Market and the Hédzranawoé Market, are managed by the state through the EPAM (Etablissement Public Autonome pour l'Exploitation des Marchés), while others are managed by the municipalities in which they are located: these are the municipal markets. The Lomé Grand Market is the main point of departure for goods destined for other markets and shops.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

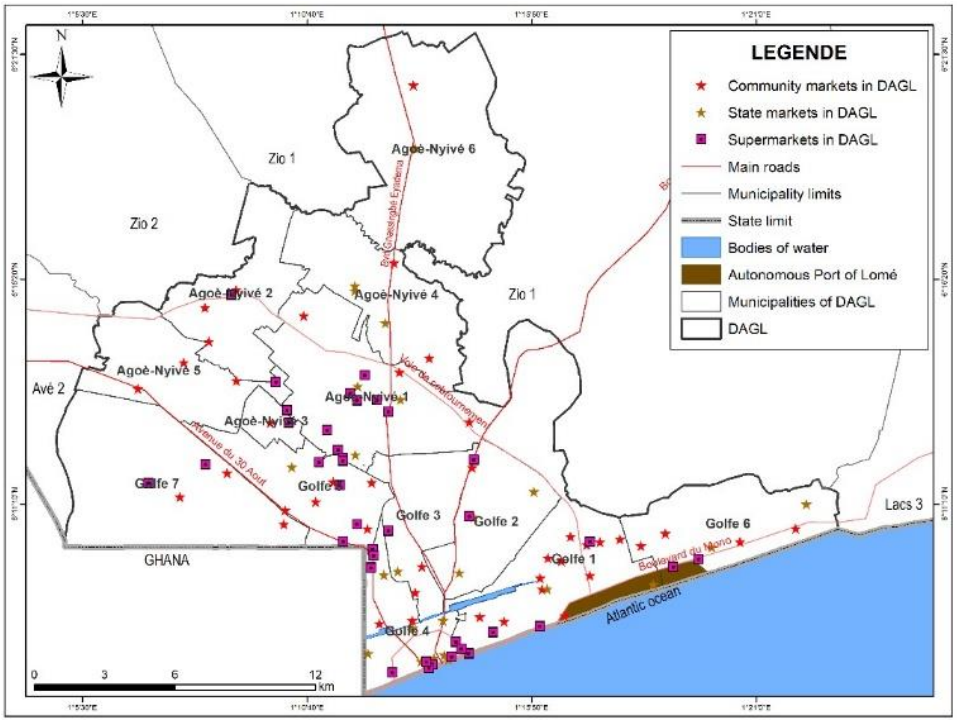

Figure 1.
Locations of different types of markets and supermarkets in the DAGL

The types of retail outlets visited by households during their shopping trips are shown in Figure 2.

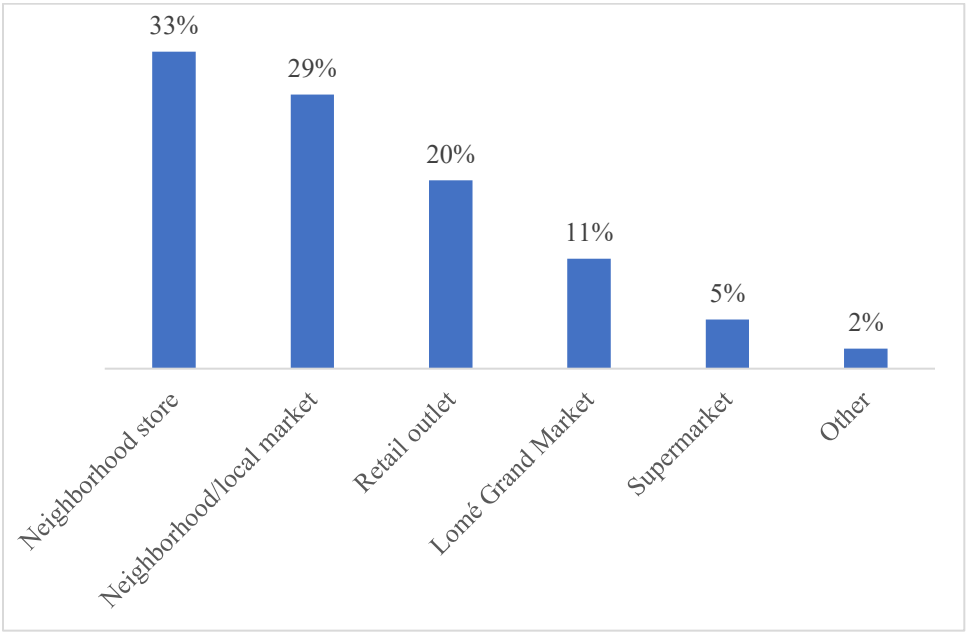

Figure 2.
Distribution of households according to the types of retail outlets frequented.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

The neighborhood shops and markets, as well as retail outlets, are the most visited points of sale by respondents. They account for 33%, 29%, and 20% of choices made during shopping activities, respectively. They are followed by the Grand Market (11%), supermarkets (5%), and other markets in the interior of the country (2%). Respondents say they only visit the Lomé Grand Market when they need to buy in bulk or in large quantities. An example of a statement is presented below (Box 1).

Box 1.
excerpt from an Interview with a woman in Adéticopé

"I only go to the big market when I need to buy a lot of products. Sometimes I take orders from friends too. This allows me to reduce transportation costs since they contribute to them as well. Often, if a neighbor wants to go to the Lomé Grand market, she asks me if I have any items to order. If so, I give her the order and contribute to the transportation costs."
Says a woman living in Adétikopé in the Agoè-nyivé 6 commune on the northern outskirts of Lomé.

Parallel to the choice of the points of sale mentioned above, 29% of households surveyed say they shop online, while the remaining 71% have never done so. Of the latter, 35% (755 households) are willing to try it in the future (Table 4).

Table 4.
Percentage of households that have made or want to try an online purchase

	Proportion of households that have made at least one online purchase		**Proportion of households that want to try online shopping in future**	
Online shopping	**Frequency**	**Percentage**	**Frequency**	**Percentage**
Yes	755	71%	493	65%
No	309	29%	262	35%
Total	1064	100%	755	100%

As one head of household in Adidogomé explains, fear of being scammed is one of the main reasons for refusing to shop online (Box 2).

Box 2.
excerpt from an Interview with a head of household in Adidogomé

"I don't really understand how it works. Even if someone shows me how it works, I'm not going to do it, because lots of people say that there are often scams involved in online shopping: either you send the money, and they don't send you the goods, or they deliver goods that don't match what you ordered. So I prefer to go myself to select what I want to buy and check the quality of the product." Statement by a master painter in Adidogomé.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

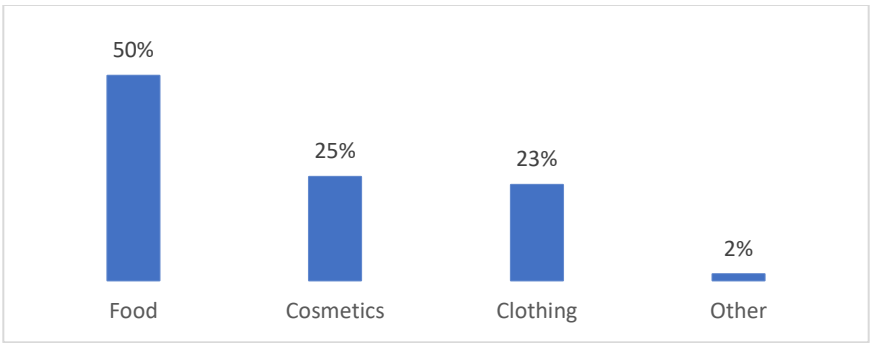

Figure 3.
Types of products often purchased by households when traveling to make purchases

Household shopping trips mainly concern three categories of products: food (50%), cosmetics (25%), and clothing (23%). These products are purchased at various DAGL outlets, the choice of which is based on the criteria shown in Figure 4.

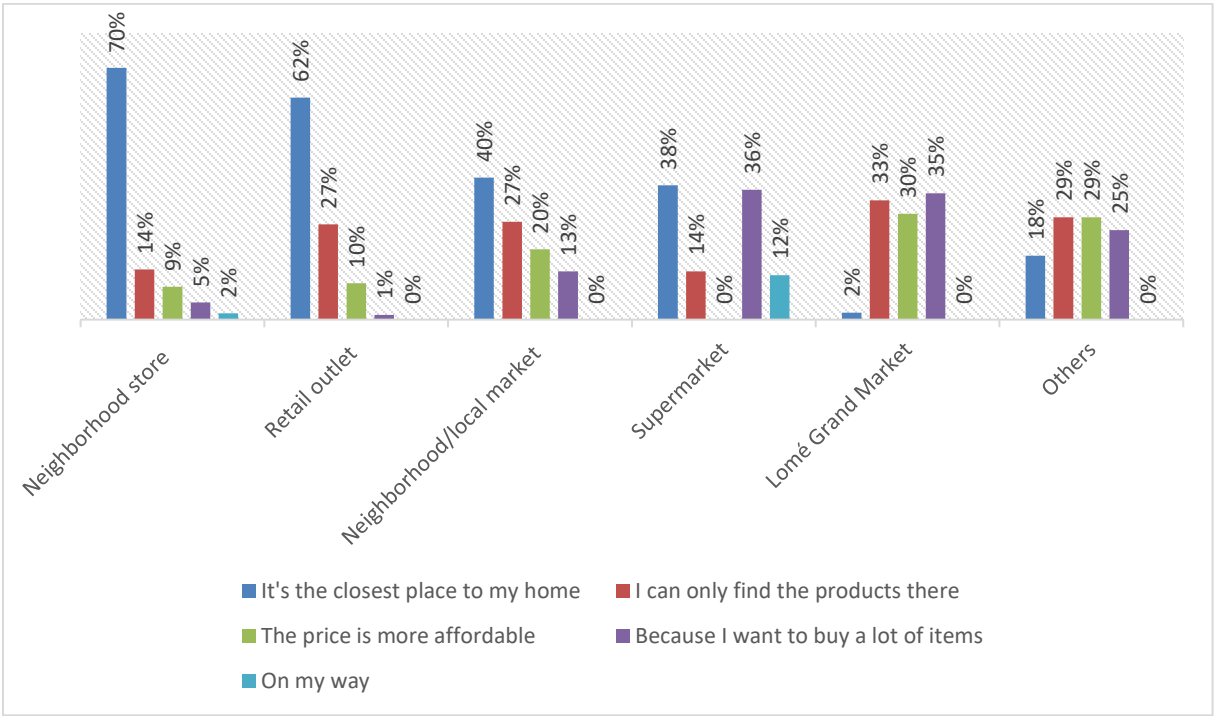

Figure 4.
Criteria for choosing retail outlets by households.

Proximity is the primary criterion for choosing retail outlets in the DAGL (38%), particularly for local outlets such as neighborhood retail outlets (62%), shops (70%), markets (40%), and supermarkets (38%).

Product availability is the second most important criterion for choosing retail outlets in the DAGL, with an average of 24%. However, this factor varies depending on the store type: it ranks third for supermarkets (15%) and first for other markets (29%).

The quantity to be purchased (19%), in terms of volume and variety of items, is the third most important criterion for choosing where to shop in the DAGL. However, it ranks first among those who

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

travel to the Grand Market in Lomé to shop (35%) and second among those who visit supermarkets (36%) and other markets (25%).

The affordability of the selling price (16%) is the fourth criterion for choosing points of sale in the DAGL. However, this criterion shares first place with the quantity to be purchased in other markets and third place in other DAGL outlets. It is not one of the selection criteria in supermarkets.

Finally, the location of outlets on the usual route (2%) is the last selection criterion. It only concerns supermarkets (12%) and neighborhood shops (2%).

4.5. Characteristics of Shopping Trips in the DAGL

Shopping trips in the DAGL are characterized by their frequency, travel costs, and means of transportation used. These characteristics vary according to the type of retail outlet frequented and its location.

The results show that several types of transportation are used in the DAGL for shopping trips (Figure 5).

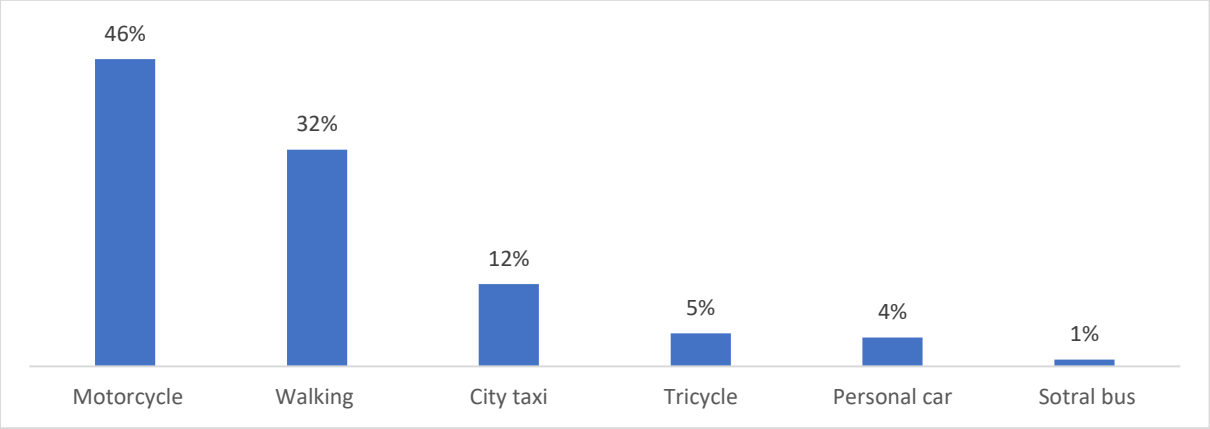

Figure 5.
Means of transportation are frequently used for shopping trips.

Analysis of Figure 5 shows that motorcycles and walking are the most commonly used means of transportation for shopping trips. They account for 46% and 32%, respectively. They are followed by city taxis (12%), tricycles (5%), private cars (4%), and SOTRAL (1%). The predominance of motorcycles and walking confirms that proximity is the main factor determining the choice of the point of sale. SOTRAL buses are rarely used because the company does not accept large packages.

Furthermore, it should be noted that shopping trips are often associated with several reasons. According to the field results, 46% of respondents say they often shop while traveling for other reasons. These reasons are presented in Figure 6.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

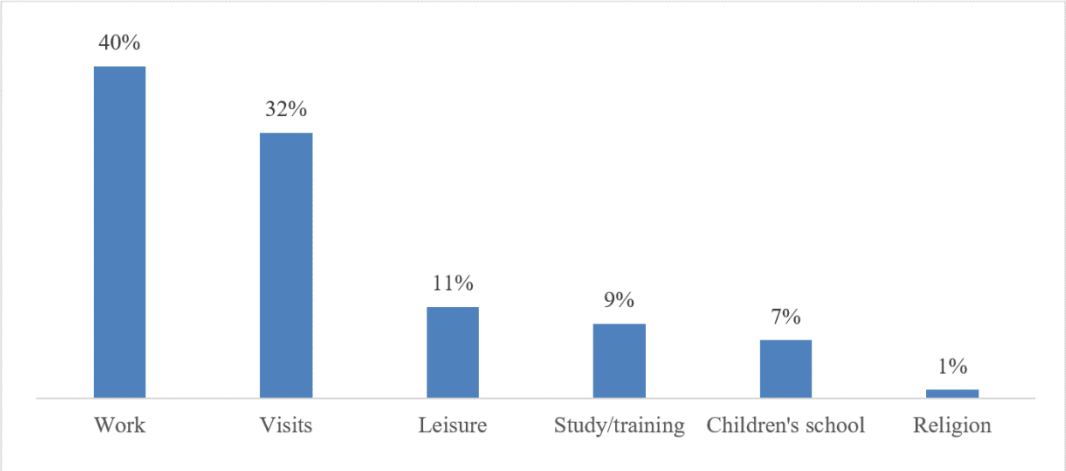

Figure 6.
Reasons for travel during which purchases are made.

Shopping trips are often associated with work (40%) and visits (32%) in the DAGL. The proportion of households making purchases during trips for leisure, studies, taking children to school, and religion is low, representing 11%, 9%, 7%, and 1%, respectively. These results show that workers are the ones who often make purchases during their main reason for travel, which is work. Additionally, shopping trips generate transportation costs that vary depending on the means of transportation and the distance between the residence and the point of sale. Thus, depending on the municipality of residence, the average cost of a shopping trip varies as shown in Table 5.

Table 5.
Distribution of the average cost of shopping trips according to the municipality of residence

Municipality	Average cost of a purchase trip (FCFA) according to the municipality of residence in the DAGL
Agoènyivé 4	1399
Golfe 6	1075
Golfe 5	940
Agoènyivé 3	917
Golfe 2	771
Golfe 7	753
Agoènyivé 6	639
Agoènyivé 1	561
Agoènyivé 2	551
Golfe 3	550
Agoènyivé 5	497
Golfe 4	463
Golfe 1	387
Total	731

Analysis of Table 5 reveals that the average cost of a shopping trip in the DAGL is 731 CFA francs. However, this average masks disparities. The outlying municipalities of Agoè-Nyivé 4 and Golfe 6 have the highest costs, while the central municipalities of Golfe 1 and Golfe 4 have the lowest average travel costs for shopping. This situation can be explained by the frequency of shopping trips to the Lomé Grand Market, which is closer to the central municipalities than to the outlying ones.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

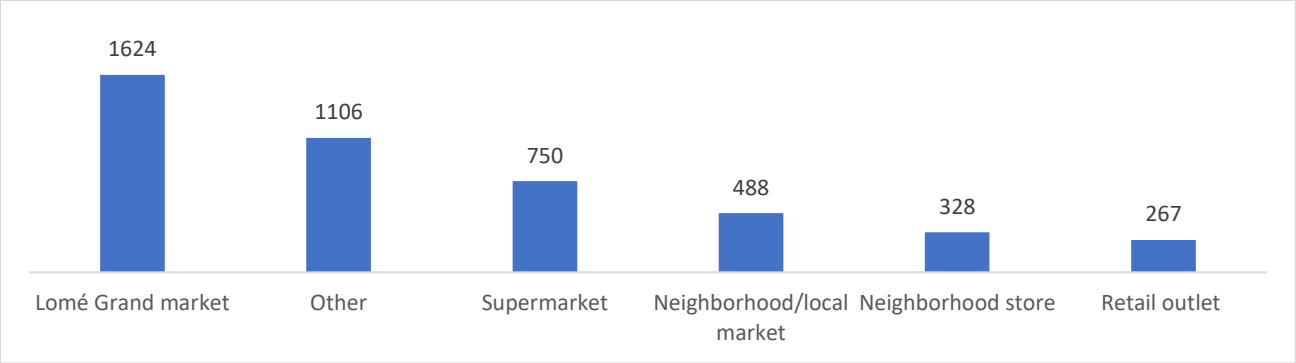

Figure 7.
Distribution of average shopping trip costs (CFA francs) by type of retail outlet

Analysis of Figure 7 reveals that the average unit cost of a shopping trip varies depending on the type of outlet visited. It is highest at the Grand Market (1,624 CFA francs) and lowest at retail outlets (267 CFA francs). This cost remains below 500 CFA francs for neighborhood markets and shops, but exceeds this threshold in the case of supermarkets and other markets.

4.6. Influence of Retail Locations on Household Shopping Trips

The location of retail outlets has a strong impact on the choice of transportation for shopping trips.

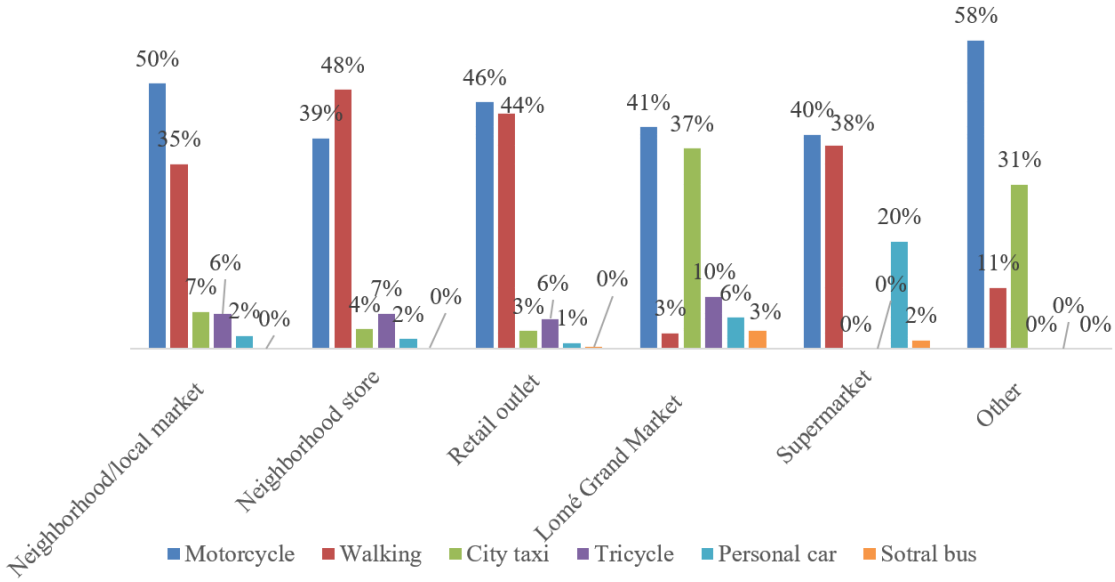

Figure 8.
Proportion of transportation modes used according to the types of retail outlets frequented

Analysis of Figure 8 shows that motorcycles are the main mode of transportation used for shopping in the DAGL, except for neighborhood stores, where walking predominates. Walking ranks second overall but declines for distant destinations, particularly the Lomé Grand Market and other retail outlets. City taxis are the second most commonly used means of transportation for these destinations, while tricycles and private cars are used on an ad hoc basis, especially for visits to supermarkets. Finally, SOTRAL buses are only used for shopping at the Lomé Grand Market and supermarkets. These results

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

confirm that walking is the dominant mode of transport for local shopping trips, while motorized modes (motorcycles and city taxis) are preferred for distant points of sale.

The frequency of shopping also varies according to the types of retail outlets frequented in the DAGL, as shown in Figure 9 below.

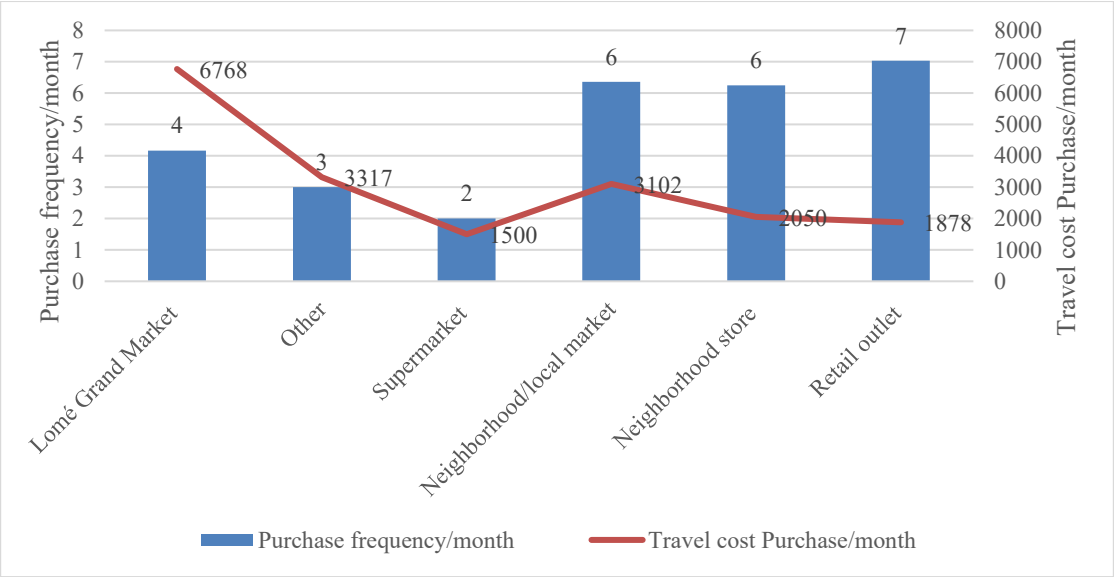

Figure 9.
Frequency of purchases with associated average monthly costs (in CFA francs).

According to Figure 9, the highest frequencies are observed at local outlets such as retail outlets (7 times/month); neighborhood shops and markets (6 times/month). However, they remain low at supermarkets (2 times/month) and moderate at other points of sale (3 times/month) and the Grand Market (4 times/month). Despite a relatively low frequency, the Grand Market and other markets account for the highest monthly shopping travel budgets (6,768 CFA francs and 3,317 CFA francs), exceeding those of local outlets. Supermarkets are characterized by low frequency (twice a month) and an average travel budget of 1,500 CFA francs.

These results show that local outlets are more frequented than those further away. However, the latter accounts for the highest monthly shopping travel budgets in the DAGL. The high frequency of visits to local outlets can be explained by the small quantities purchased compared to outlets further away.

4.7. Difficulties Experienced by The Population When Traveling to Make Purchases in the DAGL

477 of the 1,064 households surveyed, or 45%, report experiencing difficulties when traveling to make purchases. These difficulties are presented in the following figure.

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

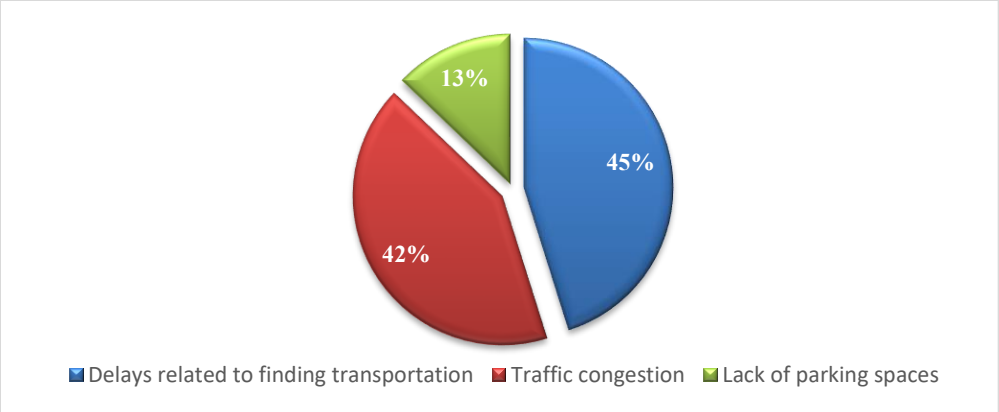

Figure 10.
Main difficulties experienced by households when traveling to make purchases.

The main difficulties associated with traveling to make purchases in the DAGL are time wasted looking for transportation (45%), traffic congestion (42%), and lack of parking spaces (13%). The scarcity of dedicated parking spaces, particularly around shops and supermarkets, often forces users to park along the roadside, thereby exacerbating traffic disruptions. Additionally, high demand for public transportation during rush hour leads to a shortage of vehicles, further increasing traffic congestion and delays.

5. Discussion

5.1. Household Purchasing Behavior According to the Location of Shops

Analysis of the effects of the location of retail outlets on the formation of household supply flows reveals that the majority of shopping trips in the DAGL (72%) are to local retail outlets.

These outlets are mainly chosen for their accessibility and product availability. They are visited on average 6.3 times a month by motorcycle or on foot, with an average monthly household travel budget of 2,323 CFA francs. The small quantity of products purchased per trip reflects the high frequency of visits to these local outlets.

Conversely, distant outlets such as the Lomé Grand Market attract households looking for wholesale goods at lower prices. Often reached by motorcycle and city taxis, these outlets are less frequented (3.5 times per month) but require a larger travel budget than the former (5,042 CFA francs per month). These results corroborate those of N'kere [16], in which the author points out that 69% of respondents say that manufactured goods sold wholesale at outlets located in the city center are cheaper than in the suburbs. He specifies that wholesale trade makes the Lomé Grand Market a specialized market.

5.2. Determinants of Modal Choice for Shopping Trips

The predominance of motorcycle use for shopping trips is simply a reflection of urban mobility in general, which is dominated by motorized two-wheelers in the DAGL. However, the widespread use of walking to nearby retail outlets and city taxis to outlets further from home demonstrates the influence of distance on mode choice. The conclusions of Jiao et al. [33] confirm the impact of distance on the choice of means of transport for shopping. In addition, this study showed that in the DAGL, other factors such as transport costs, accessibility to retail outlets, and the quantity of goods to be purchased also determine the choice of transport modes for shopping. Joewono et al. [37] specify, however, that shoppers tend to prioritize the quantity of goods to be purchased when choosing their means of transport. Furthermore, nearly 46% of households combine their shopping with other reasons for

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

traveling, and this behavior could contribute to the sustainability of urban goods flows if travel to other urban activities is controlled [38].

5.3. Difficulties Associated with Shopping Trips in the DAGL

The results showed that 45% of households in the DAGL experience difficulties when traveling to make purchases. These include wasting time looking for transportation, especially during rush hour; traffic congestion; and a lack of parking spaces, particularly around shops and supermarkets [18]. However, e-commerce is emerging as a way to reduce congestion by limiting the number of vehicles involved in shopping trips [7]. Several authors, such as Michaud-Trevinal and Cliquet [10] and Wang et al. [27], believe that online shopping sometimes contributes to an increase in travel because it makes some customers want to go to the store after viewing the product and comparing prices online. In the same vein, Zielke and Komor [25] point out that online purchases generate significant returns of non-compliant delivered products, thus requiring the implementation of a reverse logistics process [39]. It should also be noted that inequalities in access to public transport in the DAGL also constitute a mobility difficulty for the population, particularly when shopping. In fact, only 1% of respondents use SOTRAL buses when traveling to make purchases. Although this situation can be explained in part by the fact that large packages are not accepted on buses, the company's transport network remains limited to the city's main thoroughfares. Residents of outlying neighborhoods must therefore use feeder transport to bus stops during their journeys. This increases the cost of shopping trips for these residents. Not only does the level of development of peripheral roads prevent buses and city taxis from accessing certain neighborhoods, but the cost of transport also acts as a barrier to travel for low-income households. According to PMUD surveys 2024, the median monthly income in Greater Lomé is between 35,000 and 50,000 CFA francs. The results of Zielke and Komor [25] showed that some residents of the outlying neighborhoods of Accra and Koumassi cannot reach a market on foot within 30 minutes. This explains their reliance on transportation. However, the deterioration of the road network makes access to urban public transportation difficult.

6. Conclusion and Outlook

This study aimed to characterize the shopping habits of households in the Greater Lomé Autonomous District (DAGL) by analyzing the influence of retail outlet locations on their purchasing practices.

The results show that geographical proximity is the main criterion for choosing points of sale. Neighborhood shops thus appear to be the most frequented places of purchase. In terms of modes of transportation, motorcycles dominate throughout the DAGL, but they compete with walking for local purchases and city taxis for trips to distant points of sale. Furthermore, the unit cost of travel is higher for households visiting distant points of sale, despite a lower monthly purchase frequency than that observed for local shops. At the same time, households located in outlying neighborhoods have a higher monthly shopping travel budget than those living in central municipalities. In addition, some households in the DAGL experience difficulties related to wasted time, traffic congestion, and lack of parking spaces, particularly for those who travel by personal means of transport.

These various findings reveal the challenges associated with household shopping mobility in the DAGL, highlighting the need to optimize urban logistics and shopping mobility through several strategic approaches.

- Promoting online shopping with grouped deliveries in order to reduce the number of individual trips;
- Encouraging people to combine reasons for travel, particularly by integrating shopping with other daily activities such as work, studies, or training.
- Regulating and promoting local retail outlets, particularly in outlying neighborhoods;

Edelweiss Applied Science and Technology
ISSN: 2576-8484
Vol. 10, No. 2: 123-140, 2026
DOI: 10.55214/2576-8484.v10i2.11988

- Decentralizing commercial offerings by creating secondary markets and shopping centers in DAGL's suburban areas to reduce long shopping trips to the city center.

Finally, future research should further analyze shopping travel chains, particularly those involving multiple points of sale or means of transport, as well as the negative externalities of online shopping, such as the increase in trips induced by virtual browsing and direct delivery. These investigations would contribute to a better understanding of the interactions between urban logistics and shopping mobility, with a view to more sustainable planning for African cities.

The results of this study constitute a database on the shopping travel habits of households in the DAGL. They will enable decision-makers to take regulatory measures to improve the urban distribution of goods in terms of the location of points of sale. These regulatory measures must also consider the obligation to include spacious parking facilities for customers' vehicles in the construction plans for large stores, supermarkets, and shopping centers.

Furthermore, this study offers managerial advantages for urban supply chain stakeholders, as it provides them with information on the criteria used to choose retail outlets. They could use these criteria for future locations, particularly in outlying neighborhoods.

Funding:
This research was funded by the Regional Centre of Excellence on Sustainable Cities in Africa (CERViDA-DOUNEDON), the Association of African Universities (AAU), and the World Bank (Grant Number: IDA 5360 TG).

Transparency:
The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

Acknowledgements:
The authors would like to express their gratitude to the Regional Center of Excellence on Sustainable Cities in Africa (CERViDA DOUNEDON), the Association of African Universities, and the World Bank Group for their financial support, which made this research possible.

References
[1] OCDE Banque africaine de développement Cities Alliance & United Cities and Local Governments of Africa, *Dynamics of African urbanization 2025: Planning for urban expansion*. Cahiers de l'Afrique de l'Ouest. Paris, France: Éditions OCDE, 2025.

[2] J.-L. Routhier, E. Segalou, and S. Durand, *Measuring the impact of freight transport in cities: The FRETURB simulation model (Version 1)*. Lyon, France: Laboratoire Aménagement Économie Transports (LAET), Université Lyon 2 – ENTPE, 2018.

[3] R. Klar, N. Arvidsson, and D. Rudmark, "Towards a new last-mile delivery system: Cost and energy-optimized robot and van allocation," *Transportation Research Part E: Logistics and Transportation Review*, vol. 204, p. 104392, 2025. https://doi.org/10.1016/j.tre.2025.104392

[4] Y. Zhang, Z. Ding, J. Sun, D. Chen, M. Goh, and Z. Yang, "Evolving last-mile logistics: Where unmanned delivery fits," *Transportation Research Part E: Logistics and Transportation Review*, vol. 206, p. 104591, 2026. https://doi.org/10.1016/j.tre.2025.104591

[5] E. Chen, Z. Zhou, R. Li, Z. Chang, and J. Shi, "The multi-fleet delivery problem combined with trucks, tricycles, and drones for last-mile logistics efficiency requirements under multiple budget constraints,"

Transportation Research Part E: Logistics and Transportation Review, vol. 187, p. 103573, 2024. https://doi.org/10.1016/j.tre.2024.103573

[6] A. Nuzzolo, A. Comi, and L. Rosati, "City logistics long-term planning: Simulation of shopping mobility and goods restocking and related support systems," *International Journal of Urban Sciences*, vol. 18, no. 2, pp. 201-217, 2014. https://doi.org/10.1080/12265934.2014.928601

[7] J. Visser, T. Nemoto, and M. Browne, "Home delivery and the impacts on urban freight transport: A review," *Procedia-social and Behavioral Sciences*, vol. 125, pp. 15-27, 2014. https://doi.org/10.1016/j.sbspro.2014.01.1452

[8] M. Gardrat, "Research methodology: Decoupling household purchase and retrieval of goods. Research Report. Lyon, France: Laboratory for Planning, Economics and Transport (LAET); Lyon Metropolitan Area," 2019. https://shs.hal.science/halshs-03114268

[9] G. Raton, "Alternative circuits, alternative logistics? Analysis of transport services dedicated to short and local food supply chains. Research report. France: HAL Open Science," 2024. https://hal.science/hal-04627825

[10] A. Michaud-Trevinal and G. Cliquet, "Commercial location and consumer mobility," in *Proceedings of the 5th Etienne Thil Colloquium, University of La Rochelle*, 2002.

[11] J. Gonzalez-Feliu, C. Ambrosini, M. Gardrat, and J.-L. Routhier, "Understanding movement chains for household supplies: an empirical approach," *Revue française de gestion industrielle*, vol. 31, no. 3, pp. 105-122, 2012. https://doi.org/10.53102/2012.31.03.665

[12] G. Biba, M. Thériault, and F. Des Rosiers, "Analysis of retail market areas in Quebec City: A methodology combining a mobility survey and a geographic information system," *Cybergeo: European Journal of Geography*, 2007. https://doi.org/10.4000/cybergeo.7872

[13] L. D. Olvera, D. Plat, and P. Pochet, "Household transport expenditure in Sub-Saharan African cities: measurement and analysis," *Journal of Transport Geography*, vol. 16, no. 1, pp. 1-13, 2008. https://doi.org/10.1016/j.jtrangeo.2007.04.001

[14] V. Brahim and I. J. Laougué, "Constraints and practices of mobility in the peripheries of large cities in sub-Saharan Africa: the case of heads of households in the 9th arrondissement of N'Djamena. Cahiers Nantais," 2025. https://cahiers-nantais.fr/index.php?id=1822

[15] A. Guézéré, "Motorcycle taxi territories in Lomé: From daily practice to the reshaping of urban spaces and social ties," *Géographie, économie, société*, vol. 14, no. 1, pp. 53-72, 2012.

[16] K. N'kere, "City and commerce: A study of specialized retail outlets in the Lomé metropolitan area," 2016.

[17] M. E. Shok, Z. I. H. Al-Hussain, and A. S. Alkinani, "Sustainable traffic management strategies for congested intersections: Multi-criteria assessment of Al-Sa'a Intersection and Al-Jari Street in Hit City," *International Journal of Transport Development and Integration*, vol. 9, no. 3, pp. 527–538, 2025. https://doi.org/10.18280/ijtdi.090307

[18] C. Aholou, "Practices and challenges of mobility in Greater Lomé: An analysis of urban dynamics," *Preprints*, 2025. https://doi.org/10.20944/preprints202509.1664.v1

[19] M. Gardrat, D. Patier, and F. Toilier, "The impact of new practices for supplying households in urban goods movements: Method and first results. An application for Lyon, France. ResearchGate," 2016. https://www.researchgate.net/publication/326877550_The_impact_of_new_practices_for_supplying_households_in_urban_goods_movements_method_and_first_results_An_application_for_Lyon_France

[20] V. Zoma, D. Ilboudo, and G. Sangli, "Rural markets in West Africa: A brief literature review," 2022. https://hal.science/hal-03772636

[21] Brilé Anderson, Jorge Patiño, Jennifer Sheahan, Kwadwo Owusu, Ernest Agyemang, and et Doris Boateng, "Accessible and sustainable mobility in African cities – a spatial and gendered approach", OECD. Accessed: 9 August 2025," 2025. https://www.oecd.org/fr/publications/mobilite-accessible-et-durable-dans-les-villes-africaines-une-approche-spatiale-et-genree_a6be3b86-fr.html

[22] N. McGuckin, J. Zmud, and Y. Nakamoto, "Trip-chaining trends in the United States: Understanding travel behavior for policy making," *Transportation Research Record*, vol. 1917, no. 1, pp. 199-204, 2005.

[23] J. Gonzalez-Feliu, F. Henriot, and F. Toilier, "Commercial urban planning and household supply: Impacts on mobility of four extreme scenarios," in *Atelier de Recherche:" Transport et Logistique: Histoire (s) de durabilité*, 2009.

[24] J. Beckers, I. Cardenas, and I. Sanchez-Diaz, "Managing household freight: The impact of online shopping on residential freight trips," *Transport Policy*, vol. 125, pp. 299-311, 2022. https://doi.org/10.1016/j.tranpol.2022.06.009

[25] S. Zielke and M. Komor, "Why do customers choose online or offline channels? A framework of motives and its application in an international context," *Journal of Retailing and Consumer Services*, vol. 82, p. 104054, 2025. https://doi.org/10.1016/j.jretconser.2024.104054
[26] K. B. KOFFI, G. A. KONE, and A. P. D. N'DA, "Ivorian consumer purchasing behavior on the internet," *Revue Internationale du Chercheur*, vol. 5, no. 4, 2024.
[27] Y.-M. Wang, H.-H. Lin, W.-C. Tai, and Y.-L. Fan, "Understanding multi-channel research shoppers: An analysis of Internet and physical channels," *Information Systems and e-Business Management*, vol. 14, no. 2, pp. 389-413, 2016. https://doi.org/10.1007/s10257-015-0288-1
[28] T. Paulais and L. Wilhelm, *African markets*. Paris, France: Éditions Karthala, 2000.
[29] V. Zoma, *Villes secondaires d'Afrique de l'Ouest et défis de mobilité: Système de transport urbain à Ziniaré au Burkina Faso*. Munich, Germany: GRIN Verlag, 2024.
[30] S. Tessier *et al.*, "Food shopping transition: Socio-economic characteristics and motivations associated with use of supermarkets in a North African urban environment," *Public Health Nutrition*, vol. 13, no. 9, pp. 1410-1418, 2010. https://doi.org/10.1017/S1368980010000601
[31] S. Vonthron, C. Perrin, and C.-T. Soulard, "Des paysages alimentaires vécus diversifiés. Une analyse par les pratiques d'approvisionnement alimentaire des ménages," *Bulletin de la Société Géographique de Liège*, 2024. https://doi.org/10.25518/0770-7576.7414
[32] K. Schimohr, E. Heinen, and J. Scheiner, "The impact of relocations on distances traveled for commuting and grocery shopping: Structural equation models of panel data," *Transportation*, pp. 1-27, 2024. https://doi.org/10.1007/s11116-024-10498-1
[33] J. Jiao, A. V. Moudon, and A. Drewnowski, "Grocery shopping: How individuals and built environments influence choice of travel mode," *Transportation Research Record*, vol. 2230, no. 1, pp. 85-95, 2011.
[34] W. G. Cochran, *Sampling techniques*, 3rd ed. New York, USA: John Wiley & Sons, 1977.
[35] Institut National de la Statistique et des Études Économiques et Démographiques (INSEED), *2022 general population and housing census*. Lomé, Togo: INSEED, 2022.
[36] A. D. Bekele, J. Beuving, and R. Ruben, "How African households shop: Evidence from dairy chains in Ethiopia," *The European Journal of Development Research*, vol. 29, no. 4, pp. 806-826, 2017. https://doi.org/10.1057/s41287-016-0062-3
[37] T. B. Joewono, A. K. Tarigan, and M. Rizki, "Segmentation, classification, and determinants of in-store shopping activity and travel behaviour in the digitalisation era: The context of a developing country," *Sustainability*, vol. 11, no. 6, p. 1591, 2019. https://doi.org/10.3390/su11061591
[38] M. Hani, "Linking of family travel patterns and purchasing habits: The case of the Le Havre metropolitan area," *Géocarrefour*, vol. 84, no. 1-2, pp. 113-121, 2009. https://doi.org/10.4000/geocarrefour.7261
[39] S. Rubio, B. Jiménez-Parra, A. Chamorro-Mera, and F. J. Miranda, "Reverse logistics and urban logistics: Making a link," *Sustainability*, vol. 11, no. 20, p. 5684, 2019. https://doi.org/10.3390/su11205684