International Refereed Journal of Engineering and Science (IRJES)
ISSN (Online) 2319-183X, (Print) 2319-1821
Volume 13, Issue 5 (Sep.-Oct. 2024), PP. 08-22

Public Parking Characteristics, Policies and Practices: Evidence from Kampala City

Orashida Nakanwagi, Amin .T. Kiggundu and Paul.O. Mukwaya
Department of Architecture and Physical Planning,
College of Engineering, Design, Art and Technology,
Makerere University, P.O. Box 7062 Kampala, Uganda

Abstract
Parking is an essential component of the transportation system of busy towns like Kampala. Since cars are a critical factor in urban mobility, city managers and planners must aim to meet the needs of the motorists including adequate and safe parking. This paper analysed the parking characteristics on selected on street and off-street parking lots and as well the parking policies, practices and management mechanism in Kampala City, in view of the region's urbanisation trends and development. The study employed a mixed research design that included the use of both qualitative and quantitative methods. Parking Surveys were carried out to determine the demand characteristics of parking in Kampala Central Business District in consideration of both on street and off-street parking lots that seemed to attract a relatively higher number of parkers as compared to other areas. Also, Semi-structured, in-depth interviews with various stakeholders in Kampala that constituted government officials of different levels, people actually managing public parking, drivers and the general public including the business community constituted the primary basis of the study. This was complemented by review of existing literature on public parking planning and management (legislation, books, academic articles, newsletters), as well as written materials obtained from relevant authorities specifically from Kampala Capital City Authority and Multiplex Ltd. Generally, the study results indicate underutilization of the studies parking areas especially where parkers have to pay directly for the parking spaces. Kampala Road parking slots are underutilized with a parking index of 49.88% and 57.5% on a weekday and a weekend respectively. While, Buganda Road Parking Index was 60.733% and 31.45% for a week day and a weekend respectively. For William Street, the parking index was 42.1% and 55.74% for a week day and a weekend respectively. In consideration of off-street parking lots, the Parking Index for Watoto Parking was 83.07% and 68.86% for a week day and a weekend respectively. The parking index for Mercantile storied Parking was 75.96% and 56.37% for a weekday and a weekend respectively and lastly the parking index for Mabirizi Complex underground parking was 27.5% and 35% for a weekday and a weekend respectively. The study also established that Kampala's public parking management system is inefficient with a lack of a coherent policy and management mechanism. This has highly contributed to illegal parking and cruising for parking in the city. These have escalated traffic accidents and congestion especially in the central business area. The study therefore recommends improving on the available parking facilities for optimum utilisation, an establishment of a public parking policy for the city, prioritization of non-motorized transport to manage demand for parking, gazatting and regulating of off-street parking as part of the overall parking inventory in the city and preparation of a comprehensive public parking design manual for urban areas by the Ministry of Works and Transport (MoWT) in collaboration with Kampala Capital City Authority (KCCA) and other relevant ministerial departments and agencies.

Key Words: *On street and Off-street parking, Parking Management, Parking Characteristics, Parking Policies and Practices, Public parking.*

Date of Submission: 23-08-2024 Date of acceptance: 03-09-2024

I. Introduction

Parking management is more than a necessary element for larger residential and commercial activities in cities. It is also an aspect of land use and affects travel behaviour as well as the urban environment. In addition, parking management affects the perception of mode choice and economic competitiveness of cities.

Statistics show that Uganda's motor vehicle fleet increased by 83% from 739,036 in 2012 to 1,355,090 vehicles in 2018 of which more than 50% are estimated to be in the Greater Kampala (Draft National Integrated Transport Master Plan, 2022).

Commercial motorcycles also known as 'Boda Bodas' increased by 192% from 354,000 in 2010 to 1,034,000 in 2018. Motor vehicle ownership and use among the high and middle income people in the city is also

on the rise in the Greater Kampala. Besides, most of the roads in the region were constructed in the 1960s for 100,000 vehicles. Today, over 400,000 vehicles use the same roads each day (World Bank, 2017).

According to a 2008 UN-Habitat Survey, it is estimated that 20,000 minibus taxis and 22,000 private cars operate in the CBD area of Kampala city.

The Third National Development Plan (2021-2025), Vision 2040 and as well the Greater Kampala Strategic Development Plan (2021-2025) recognise proper management of parking as one of the major strategies for improving traffic flow in Kampala city.

Also, the Smart City Strategic Plan for Kampala (2020/21-2024/25) and the National Physical Development Plan (2018-2040) emphasize the need for improved mobility and transportation networks in the greater Kampala region. A series of projects have been proposed whose ultimate goal is to achieve a congestion-free city. With such projects, it would be expected that parking issues and challenges in the region would be addressed.

The provision of parking space should take into account the critical importance of its proper management. City managers should position themselves for the changing urban parking requirements and the need for management strategies and systems in the short, medium and long run to be able to serve their increasing urban societies.

Providing sufficient parking with proper management and linking it to drivers has multiple benefits. Urban parking when sufficiently provided and managed has the potential to reduce congestion, decrease on travel time and fares, decrease traffic accidents and as well a supplementary way to reduce pollution in cities.

The absence a coherent and effective parking policy as well as a management mechanism in Kampala has meant that motorists park in undesignated areas including walkways, which has affected traffic flow due to congestion. This has further escalated road accidents due to space crunch.

Through partnerships with private companies such as Multiplex, KCCA has been regulating on street parking in the CBD of Kampala. In general, however, parking is still a major urban problem in Kampala City that requires new solutions and strategies.

1.1 Objectives of the Study

a) To analyse the parking demand characteristics for selected on street and Off-street parking facilities in Kampala Central Business District

b) To assess the public parking management policies and practices in Kampala Central Business District

II. Methodology

2.1 Research Approach

A mixed research approach that involved the use of both Qualitative and quantitative methods was used. Qualitative research collects, analyzes, and interprets data depending on what people do and say. Qualitative research is naturalistic, interpretative approach concerned with understanding the meanings which people attach to phenomena (actions, decisions, beliefs, values etc.) within their social worlds (Denzin & Lincoln, 2005).

Sugiyono (2016) states that there is no other choice in qualitative research than to make humans as definite forms,humans as subjects and objects in study or as sources and diggers of information. While Quantitative research design is the technique and measurements that produces quantifiable values (Kothari, 2007). Quantitative reserch is considered as an analytical approach towards research(Jongbo,2014). Quantitative researchers, as Rovai *et al*., (2014) elaborate, regard the world as being outside of themselves and there is an objective reality which is independent of any observations.

Semi-structured, in-depth interviews with various stakeholders in Kampala that constituted government officials of different levels, people actually managing public parking, drivers and general public including the business community constituted the primary basis of the study. This was complemented by review of existing literature on public parking planning and management (legislation, books, academic articles, newsletters), as well as written materials obtained from the interviewees specifically from Kampala Capital City Authority and Multiplex.

Information collected was transcribed and analyzed through content analysis approach using SPSS software.

2.2 Data Collection

The parking demand data was collected through In-Out field Surveys on a normal week day and weekend in April, 2024. Each of the case study areas was studied for one weekly day and a weekend from 08:00am to 06:00pm. On the survey form, the license plates, time of entry and exit of a particular vehicle were captured. Two assistants were deployed in each of the on street and off-street parking lots to capture the relevant information under the study.

Interviews were conducted following interview guides and schedules from key informants who were considered to have vast experience and knowledge as far as public parking management is concerned in Kampala City.

2.3 Study area

The study was carried out in Kampala city with a specific focus on the Central Business District (CBD). Investigations focused on private cars parking on selected streets such as: a) Kampala Road; b) Buganda Road and, c) William Street.

Investigations on off- street parking focused on Watoto Church parking lot along Kampala Road, Mabirizi Complex basement parking which is located near the city square/constitutional square as well as Mercantile parking, Mercantile Parking, a storied parking facility which is located opposite the Crusader House in the central business district (CBD) of Kampala.

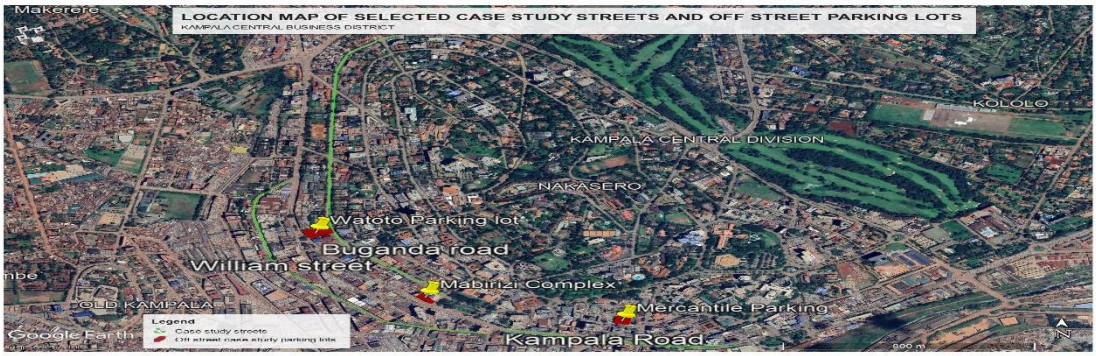
The selection of study areas was based on their varying characteristics and land uses. Selected study areas also have a higher parking turnover and are located in busy areas with several activities being carried out such as shopping (several shopping malls exists), public administration (existence of government departments and agencies such as government Ministries such as Ministry of Local Government, Uganda High Court, Kampala Central Police station and Kampala Capital City Authority offices) religious institutions such as Watoto church and Christ is the King church as well as key financial institutions such as Bank of Uganda, Bank of India, Tropical Africa Bank and Bank of Baroda, Centenary Bank.

Most importantly is that the selected study areas are close to the city square (constitution square), a key public open space as well as a landmark that attracts many people to the city centre.

Fig .1 Location Kampala Central Business District

Source: (KCCA, 2022)

Fig 2: Location of Selected On street and Off-street Parking Lots



Source:(Author, 2024)

III. Literature review

3.1 Parking Characteristics

In order to make a firm parking policy, it is desirable to study the parking behavior and characteristics properly (Parmar et al., 2018). These different parking characteristics are used to assess an existing configuration of parking areas or spaces and determine their adequacy and efficiency (Parmar et al., 2020).

As suggested by Gray et al (2008);Lautso (1981) and Tong et al., (2004),an urban car parking policy should aim to address the following parking characteristics: parking volume, parking accumulation, parking capacity, parking load, average parking duration, parking turnover rate and peak parking saturation.

Taylor et al. (1992) observes that the data regarding the accumulation, duration, occupancy and parking turnover are very much useful for making and supporting the decision making process. Apart from that, accumulation profiles can also be used for developing real-time parking information system and for the evaluation of various parking management strategies and impacts of parking restraint policies on the behaviour of travellers (Hensher and King, 2001; Hunt and Teply, 1993; Topp, 1991).

Chen et al. (2015) studied the characteristics of parking in Central Shanghai of Shanghai city in China. The authors classified the whole survey area based on the land use andanalysedparkingfacilitiesforthesame. They suggested the parking policy fordifferent areas andmoderntechniquesinparkingtobalance the parking facilities types and to provide choice to parking users.

Parking characteristics and problems may vary between developing and the developed world. Aside from the disparity between the number of vehicles and number of parking slots available in most developing counties , there are also the issues of parking locations, lack of parking signage, informal parking, and inefficient policies causing altercations and accidents related to parking (Vasallo, 2015).

3.2 Parking Management

Parking management refers to various policies and programs that result in more efficient use of parking resources (Barter, 2014). Parking management can significantly reduce the number of parking spaces required in a particular situation, providing a variety of economic, social and environmental benefits (Litman, 2021).

Control and management of parking space means managing the demand for car use and congestion. This is because every car trip ends in a parking space. Where to park, who may park, for how long and at how much are key issues to be clearly addressed in parking control and management.

Parking management holistically and strategically starts with an overall vision strategy and goals and translates these subsequently into operational action plans using a mix of measures (Auwerx et al., 2019). Auwerx et al. (2019) further explain that although parking seems most logically directed to car-policy or mode, smart Parking Management is an important leverage factor to a more and integrated development of all modes, while especiallye ncouraging a shift to sustainable modes. Some people for example may want to cycle to cities and thus a clear need to keep their bikes in good conditions with assured safety and security.

Poorly regulated parking makes government and road users pay a high cost in terms of travel time and efficiency, and cities in the country face challenge in managing parking within their CBDs and even residential areas (Yue , 2004).

Singh et al. (2009), explain that before parking is provided, there should be an analysis of a particular areas parking needs. These authors studied traditional methods of parking in comparison to innovative parking management approaches. In their work, they explained that traditional parking methods solved parking issues only by looking at parking supply, but this seemed unsustainable. They looked at various innovative approaches to parking in various cities which included; Policy based Solutions where parking is managed by institution-based policies and Technology driven solutions, where parking management issues could be solved by using technology.

However, the application of technology can be more use full and effective in countries with minimal illiteracy levels. Such technologies have been applied in countries like Australia and the results have been interesting because of their uniform highway infrastructures and high literacy levels. Other approaches included Economic based solutions which are motivated by the parking needs and other external economic and environmental factors such as laws limiting areas used by parking spaces.

The innovative parking solutions approach has a wide range of applications. This approach may be applied in many types of scenarios such as university parking lots, street parking, airport parking, commercial car parks, etc. Of course, minor alterations to the required hardware are needed but the core functionality remains the same. Many would benefit from the use of this approach, local governments, universities, medical Institutions and finally the public.

No matter how many parking infrastructures and policies are created, the city government must have the political will to follow through and implement legislation. If not, the issue of parking will have a domino effect, affecting mobility, economy, environment, and the general well-being of the city's people (Vassallo, 2015).

In Kampala, paid on street parking was introduced in 1997 through the city's Strategic Framework for Reform whose overall objective was to improve service delivery in the KCC area.

Through a process of competitive bidding, the contract to manage and control on street parking was awarded to Green Boat Entertainment. The contract was to run for four years between 1998 and 2002 and then after it was re-advertised.

Kampala City Council (KCC) awarded the contract to manage the city streets parking spaces to Multiplex (U) Ltd on September 1, 2017. Kampala Capital City Authority (KCCA) later renewed their contract until 2020. However, the contract only covers Kampala Central Division.

Currently, anyone who parks at any gazetted space in Kampala Central Division is supposed to pay Shs1,000 per hour, and this only applies to the first two hours. If one spends 30 minutes parking in the same place after the first two hours, they are expected to pay an additional Shs800. This means that if you park your car for eight hours, you will be required to pay Shs11,600; Shs2,000 for the first two hours and Shs9,600 for the extra six hours.

According to Rye (2010), the paid-on street parking is based in the Central Business area. This includes; William Street, Market Street, Burton Street, Ben Kiwanuka Street, Nasser Road and Channel Street. It also includes areas of Kampala and Jinja Road.

The paid public off street parking is privately provided and managed. Such parking spaces are way expensive compared to on street parking and a few drivers can afford it. The fares are unregulated and it's upon the owners to establish how much parkers pay depending on the time spent within such facilities.

Restricting the amount of parking places and adjusting parking fares is an effective instrument in managing car traffic in city centres (Rye, 2010). However, in Kampala City, the capacity to manage and regulate car parking is limited by the small fees charged especially for on street parking.

3.2.1 Public parking Management in Sub-Saharan Africa (SSA) cities

Tanzania Rural and Urban Roads Agency has implemented a smart parking system which allows for effective and quick information transmission on the vehicles that are parked for easy control. The motorists pay through a government payment gateway using mobile phones and this makes their on- street parking under control. The Construction of the Dar el Salaam BRT has also shifted some private car owners to public transit which ultimately reduces the levels of parking demand.

Rwanda has established a decongestion plan through enforcement of regulatory initiatives such as the public transport policy which are premised to managing traffic. The authorities have improved and facilitated walkability to decongest the city. They have created a car free zone in CBD of Kigali to ease access with limited parking spaces.

In Lagos, a BRT solution was established and behaves like a subway, offers high-capacity rapid transit services but on dedicated lanes in city streets. In March 2008, this 22 km project connecting Lagos mainland with the island became the first dedicated bus route in Sub-Saharan Africa. The BRT runs a 16-hour operation, using 220 buses to move more than 200,000 passengers daily. In its first two years of operation, it moved more than 120 million passengers. This has helped to reduce on private car ownership and congestion in the city.

Also, Lagos state has a fully-fledged Parking Authority. Its major role is to ensure that the residents and visitors of the State have the best parking experience. As an agency, its mission is to actively represent and promote Lagos State parking policy in line with national, urban transport policies by advancing knowledge, raising standards and assessment of parking related fees.

IV. Results and Discussion

4.1 Parking Characteristics of selected on street and off street lots in Kampala City

The parking characteristics of selected case studies have been tabulated in following description. Also, the plots for parking accumulation curves and parking Demand to Capacity ratio for the same have been displayed.

4.1.1. Kampala Road

Table 1: Parking Characteristics for Kampala Road

	WEEKDAY	**WEEKEND**
Peak time	**4:00pm -4:30pm**	**12:00pm -1:00pm**
Peak parking accumulation	211	252
Peak parking saturation	0.4988	0.5957
Average Parking Accumulation	203	243.25
Peak parking ratio	1.04	1.0397
Average parking duration	146.8	103.8
Parking Index	49.88%	57.5%

Source:(Author,2024)

Fig 3 and 4: Parking accumulation and Demand to Capacity ratio curve for Kampala Road

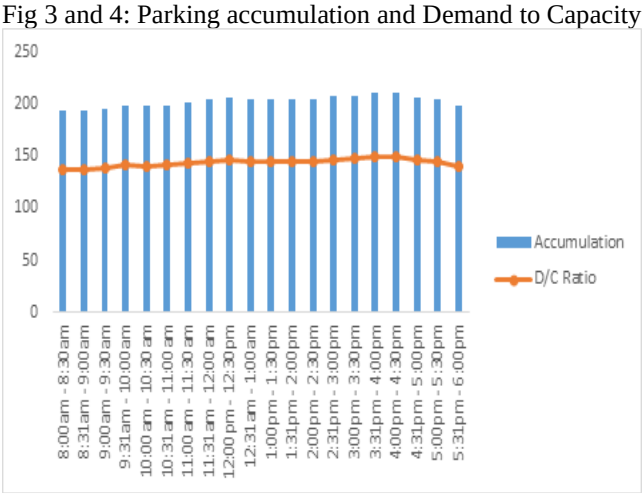


Figure 3 Parking Accumulation and D/C Ratio for Kampala Road (Weekday)

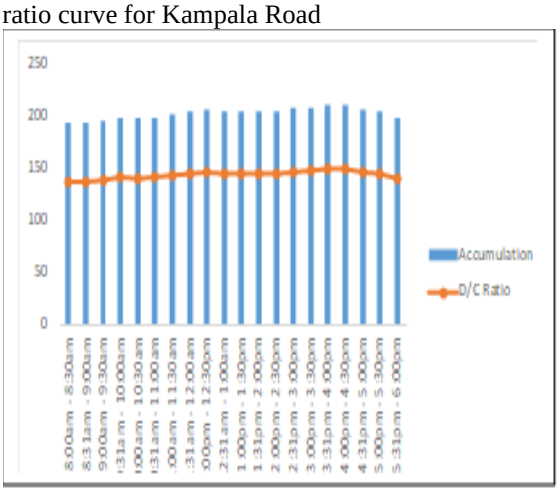


Figure 4 Parking Accumulation and D/C Ratio for Kampala Road (Weekend)

Table 1 above shows the parking characteristics for Kampala Road. It indicates that the peak parking time for Kampala Road on a weekday was between 4:00pm and 4:30pm with an accumulation of 211 vehicles with a parking load of 6330 minutes above the mean parking load of 6080 minutes while that of weekend was 252 (between 1:30pm and 2:00pm) with a parking load of 7560 minutes slightly above the mean value of 7297.5 minutes.

From the above, it is evident that whereas parking saturation was slightly different for Kampala road (with Weekends' parking saturation being greater by about 0.097), the difference in Peak parking ratios for this area for the given days was insignificant (at 0.0003). On the whole, it is evident that parking at Kampala Road is underutilized with occupancy being 49.88% during weekdays and 57.5% during weekends. The reasons could be attributed to the fact that parking is concentrated in particular areas along the road, while some spaces don't attract parkers at all because of their location. Also, the average parking duration is about 2hours, this implies that majority of the parking occupants are short stay parkers like shoppers.

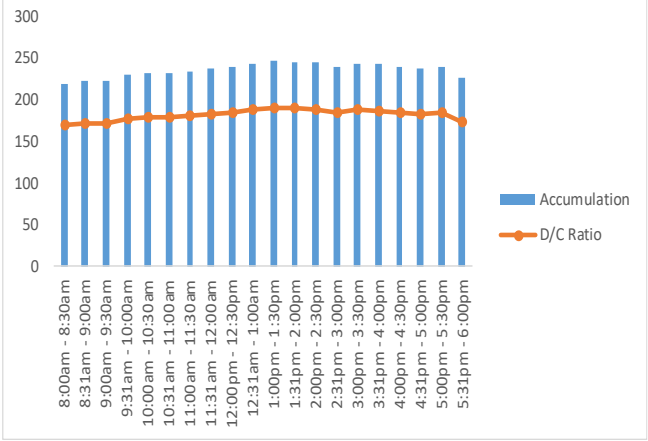
4.1.2 Buganda Road

Table 2: Parking Characteristics for Buganda Road

	WEEKDAY	**WEEKEND**
Peak time	**1:00pm – 1:30pm**	**3:00pm -3:30pm**
Peak parking accumulation	248	133
Peak parking saturation	0.6375	0.342
Average Parking Accumulation	236.25	122.35
Peak parking ratio	1.0497	1.086
Average parking duration	124.5	96.6
Parking Index	60.733%	31.45%

Source: (Author ,2024)

Fig 5 and 6 : Parking accumulation and Demand to Capacity ratio curve for Buganda Road



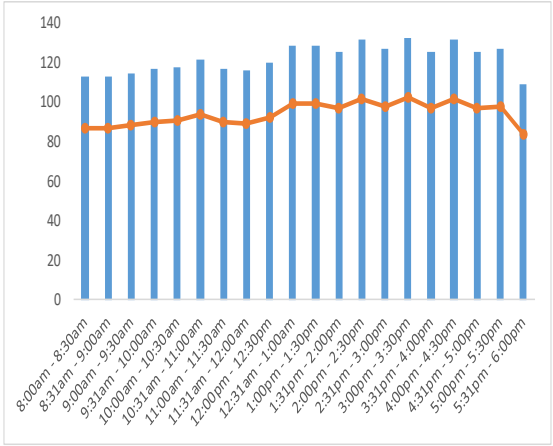


Figure 5 Parking Accumulation and D/C Ratio for Buganda Road (Weekday) Figure 6 Parking Accumulation and D/C Ratio for Buganda Road (Weekend)

From Table.2 above, it is evident that whereas parking saturation was slightly different for Buganda road (with Weekends' parking saturation being greater by about 0.2955), the difference in Peak parking ratios for this area for the given days was insignificant (at 0.0363).

On the whole, it is evident that parking at Buganda Road is underutilized on a weekend with occupancy being 31.45% as compared to the weekdays where occupancy is at 60.73%. This is because mmajority of the parkers are civil servants who usually don't work on weekends . The average parking duration is also at about 2hours implying that majority of the parkers stay for shorter periods of time.

4.1.3 William Street

Table 3: Parking Characteristics for William Street

	WEEKDAY	WEEKEND
Peak time	**3:00pm -3:30pm**	**3:31pm -4:00pm**
Peak parking accumulation	167	220
Peak parking saturation	0.4418	0.582
Average Parking Accumulation	42.1	210.7
Peak parking ratio	1.0493	1.044
Average parking duration	104.02	132.64
Parking Index	42.1%	55.74%

Source: (Author ,2024)

Fig 7 and 8: Parking Accumulation and Demand Capacity Ratio for William Street on a Weekday and a Weekend

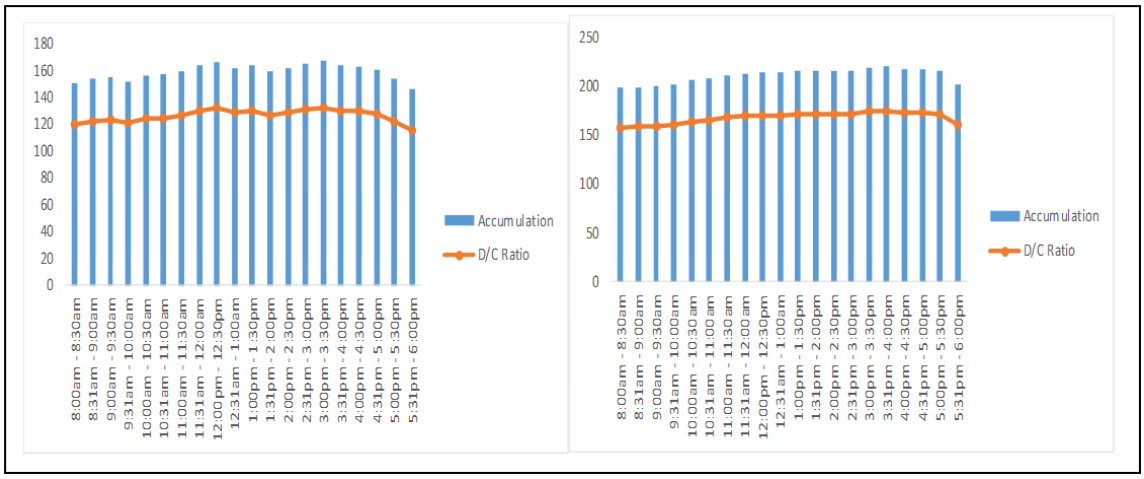


Figure 7 Parking Accumulation and D/C Ratio for William Street (Weekday) Figure 8 Parking Accumulation and D/C Ratio for William Street (Weekend)

As shown in Table 3 above, that the peak parking time for William Street on a weekday was between 3:00pm and 3:30pm with an accumulation of 167 vehicles corresponding to an accumulated parking load of 5010 minutes, implying 235.5 minutes above the average day's load while that of the weekend was 220 (between 3:00pm and 3:30pm) corresponding to an accumulated parking load of 6600 minutes, with 279 minutes above the average day's load.

Whereas parking saturation was slightly different for William Street (with weekends' parking saturation being greater by about 0.1402), the difference in Peak parking ratios for this area for the given days was insignificant (at 0.0053). On the whole, it is evident that parking at William Street is underutilized during the weekdays with occupancy being 42.1% as compared to the weekends where occupancy is at 55.74%.

4.1.4 Watoto parking (Off Street)

Table 4: Parking Characteristics for Watoto Parking Lot

	WEEKDAY	WEEKEND
Peak time	**1:00pm -1:30pm**	**3:31pm -4:00pm**
Peak parking accumulation	113	99
Peak parking saturation	0.9912	0.8684
Average Parking Accumulation	94.7	78.5
Peak parking ratio	1.193	1.261
Average parking duration	160.6	154.2

Parking Index	83.07%	68.86%

Source: (Author,2024)

Table 4 above indicates that the peak parking time for Watoto Parking on a weekday was between 1:00pm and 1:30pm with an accumulation of 113 vehicles corresponding to a parking occupancy of 99.12% (indicating tension on parking spaces) while that of the weekend was 99 (between 3:31pm and 4:00pm) with a parking load of 86.84%.

From the above, it is evident that whereas parking saturation was slightly different for Watoto Parking (with weekday's parking saturation being greater by about 0.1228), the difference in Peak parking ratios for this area for the given days was insignificant (at 0.068). On the whole, it is evident that parking at Watoto Parking is optimally utilized during the weekdays and the weekends with occupancy rates of 83.07% and 68.86% respectively.

Fig 8 and 9: Parking Accumulation and Demand Capacity Ratio for Watoto Parking Lot on a Weekday and a Weekend

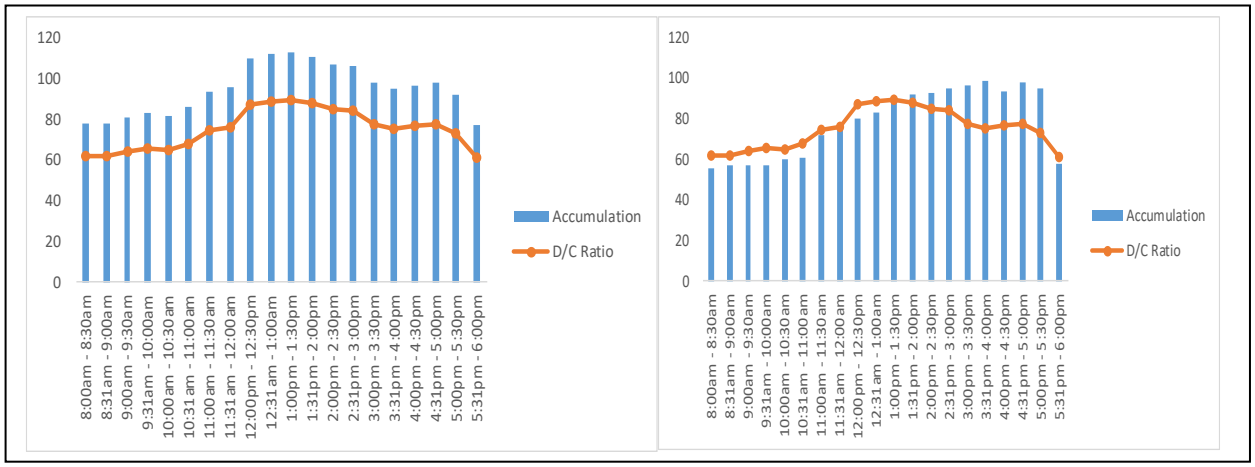


Figure 8 Parking Accumulation and D/C Ratio for Watoto (Weekday)

Figure 9 Parking Accumulation and D/C Ratio for Watoto (Weekend)

4.1.5 **Mercantile Storied Parking Lot parking**

Table 5: Parking Characteristics for Mercantile Storied Parking for a week day and a weekend.

	WEEKDAY	**WEEKEND**
Peak time	**2:00pm -2:30pm**	**11:31pm -12:00pm**
Peak parking accumulation	381	264
Peak parking saturation	0.8283	0.5739
Average Parking Accumulation	349.4	259.3
Peak parking ratio	1.09	1.0183
Average parking duration	439.5	167.1
Parking Index	75.96%	56.37%

Source: (Author ,2024)

The figures 10 and 11 below present the accumulator and demand-capacity ratio for Mercantile Storied Parking Parking

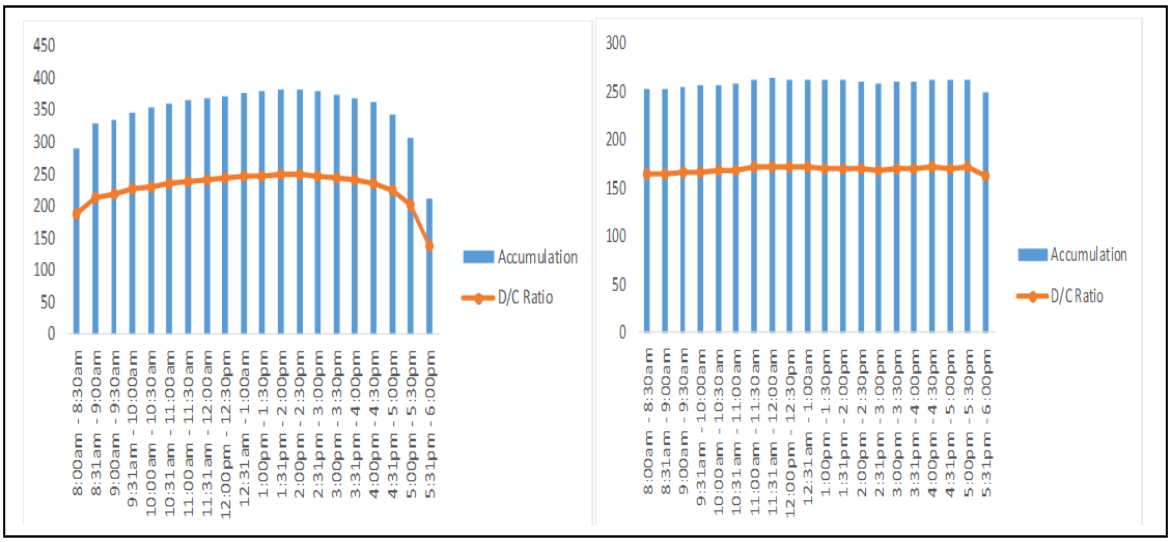


Figure 10 Parking Accumulation and D/C Ratio for Mercantile (Weekday Figure 11 Parking Accumulation and D/C Ratio for Mercantile (Weekend)

Table 5 above shows that the peak parking time for Mercantile Parking on a weekday was between 2:00pm and 2:30pm with an accumulation of 381 vehicles corresponding to a parking occupancy of 82.83% while that of of a weekend was 264 (between 11:31am and 12:00pm) corresponding to a parking occupancy of 57.39%.

From the above, it is evident that whereas parking saturation was slightly different for Mercantile Parking (with weekday's parking saturation being greater by about 0.2544), the difference in Peak parking ratios for this area for the given days was insignificant (at 0.0719). On the whole, it is evident that parking at Mercantile Parking is optimally utilized during the weekdays yet not optimally utilized on the weekends with occupancy rates of 75.96% and 56.37% respectively. While the average parking duration is over 7hours.This is because majority of the parkers don't pay directly for the parking spaces but rather their wok organizations cater for such bills. Hence, they are usually longer time parkers since parking does not affect their travel costs in any way.

4.1.6 Mabiriizi Complex Under Ground Parking

Table 6: Parking Characteristics for Mabirizi Complex Under Ground Parking on a weekend and a weekly day.

	WEEKDAY	**WEEKEND**
Peak time	**2:31pm -3:00pm**	**2:31pm -3:00pm**
Peak parking accumulation	31	47
Peak parking saturation	0.4697	0.712
Average Parking Accumulation	27.5	35
Peak parking ratio	1.27	1.343
Average parking duration	75.14	132.78
Parking Index	27.5%	35%

Source:(Author ,2024)

The figures 12 and 13 below present the accumulator and demand-capacity ratio for Mabiriizi Complex Under Ground Parking.

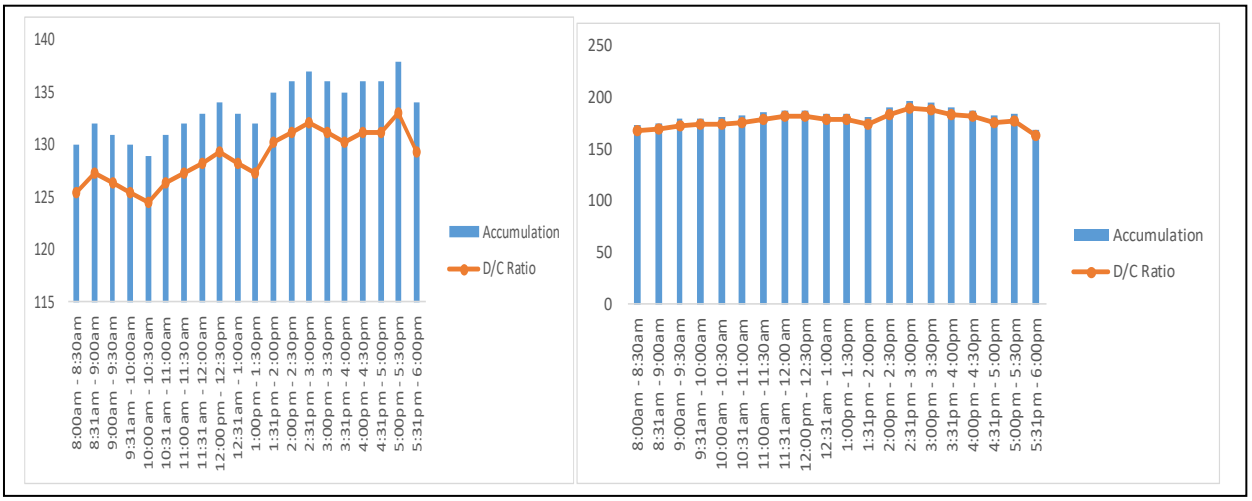


Figure 12 Parking Accumulation and D/C Ratio for Mabiriizi (Weekday) Figure 13 Parking Accumulation and D/C Ratio for Mabiriizi (Weekend)

From the 6 table above, it is shown that the peak parking time for Mabiriizi Complex on Weekday was between 2:31pm and 3:00pm with an accumulation of 31 vehicles corresponding to a parking occupancy of 46.97% and a parking load of 930 minutes while that of weekends was 47 (between 2:31pm and 3:00pm) corresponding to a parking occupancy of 71.2% and a parking load of 1410 minutes.

From the above, it is evident that whereas parking saturation was slightly different for Mabiriizi Complex (with weekends' parking saturation being greater by about 0.2423), the difference in Peak parking ratios for this area for the given days was insignificant (at 0.073). On the whole, it is evident that parking at Mabiriizi Complex is underutilized during the weekdays with occupancy being 41.67% as compared to the weekends where occupancy is at 53.03%. Though however, the parking is generally underutilized. This could be due to its location that many parkers don't have information about available parking in this lot while it could extremely difficult for drivers to maneuver their vehicles back in case, they don't find parking underground.

V. Public Parking Management Strategies, Policies and Practices in Kampala City

5.1 Public Parking Supply Management Strategies, Policies and Practices in Kampala

5.1.1 Public Parking Management Structure

Public Parking management in Kampala is organised hierarchically from National, regional, city to municipal level. Each local government is responsible for the proper management of their parking services.

At the National level, the Ministry of Works and Transport has the responsibility to 1) Establish legal frameworks for parking management and; 2) Planning for on street parking 3) Construction of Roads with minimum parking standards. Kampala Capital City Authority is responsible for 1) Planning and designation of parking areas 2) Determining and reviewing of parking tariffs 3) Supervising on street Parking Management and Ensuring that Monthly Subscription has been realised by the Managing entity (Multiplex). While Multiplex is responsible for Management and control of on street parking demand and collection of revenue from parkers on behalf of KCCA.

The responsibilities for each entity in regards to public parking is not very clear. Clarification of roles and responsibilities is important in ensuring accountability. When parking functions are divided between multiple agencies or city departments, it implies that there is no single entity responsible for planning, managing, operating and delivering of city parking services to the public. The most efficient way to provide parking services to the public could be through having a single government entity charged with the responsibility of planning, managing and controlling of all parking functions including both on street and off-street parking services.

KCCA has prioritised and put much emphasis on the financial benefits and meeting of monthly subscriptions by Multiplex. Parking management is beyond raising municipal finance. It's a fundamental aspect of managing urban mobility.

"Parking management is not given the desired attention by the city authorities, they only put emphasis on the monthly income that Multiplex should bring in. They don't really care about the needs and demands of the drivers especially in the CBD where the demand is overwhelming." Respondent.

Effective parking management strategies should contribute to the overall wellbeing in cities. Managing parking demand and supply means managing the car use and congestion in urban areas. Generous parking

requirements for new buildings and a focus on providing "enough" on-street parking make the city friendly to cars but not to people,drivable but not walkable (Pressl and Rye, 2020).

5.1.2 Public Parking Policies and Regulations in Kampala

It is always useful to know the existing policies and laws that are in place as it makes it easier to justify their relevancy and contribution to the levels of service provided. This section lists national, state and regional policies, regulatory and legal frameworks that are related to public parking management in the city. Most policies related to parking seem to be generalized transport policies.There is little doubt that cities in Uganda are continually growing and thus the number of vehicles which translates to a more need and demand for parking.

Though The National Physical Planning guidelines and the traffic and Road Safety Regulation 2001 provide for minimum parking requirements, there is no clear and coherent parking policy in place as far as public parking management is concerned in Kampala. This has contributed to improper organization, utilization and management of parking in the city.

There are no criteria for the supply and demand of public parking. Individuals and organizations reserve parking spaces in front of their premises and it is not clear who qualifies or does not qualify for this reservation. Likewise, there is no policy on the level of monthly stickers that should be sold and to what discount level for on street or off-street parking. Imbalanced fees create imbalanced demand on the less-expensive parking facility and encourage drivers to drive in circles, wasting gas and time to seek cheaper parking spaces (Eggleston, 2015). Parking schemes must be designed to fulfill objectives of the Parking Policy, which could include traffic restraint, accident prevention, and provision of adequate parking spaces for loading and unloading and customers of local shops.

The current public parking system in Kampala also lacks a general vision. It also has no monitoring and evaluation mechanism. Multiplex as managers of on street parking only have a vision statement as an agency. Various off-street parking lots don't have clear visions to guide their services. The lack of a clear city public parking vision and a monitoring mechanism has negatively affected the performance of the current parking management in the city. Where institutional responsibilities in regards to public parking management are fragmented, cities cannot ripe the benefits of effective parking management and control. Cities such as Lagos has a fully-fledged Parking Authority. Its major role is to ensure that the residents and visitors of the State have the best parking experience. As an agency, its mission is to actively represent and promote Lagos State parking policy in line with national, urban transport policies by advancing knowledge, raising standards and assessment of parking related fees.

Off street parking is not gazatted by the authorities in the Kampala. Private organizations or institutions just pay the required Revenue without being regulated. Additionally, parking rates in buildings, shopping malls and open grounds are usually much more expensive. It is not clear how they arrive at such fares. Unfortunately, this is a foundation for future parking problems. Congested parking charges encourage on street parking blocking areas for short term stay parkers.

5.1.3 Parking Supply

5.1.3.1 On street Parking Supply

Parking for private motor vehicles within the KCCA central area is dominated by use of on-street space. Information from KCCA and Multiplex Ltd indicates that the existing on-street parking supply in the city is approximately 5,082 parking spaces. Out of these, 554 spaces are not available to the public (309 are designated as 'No Parking' by Police, 192 are occupied by Boda Bodas and 53 have been made unavailable by property developers). The remaining **4,528** are available for public use at a fee.

Table 1: below summarises the current parking inventory in KCCA.

Table 7:On street parking supply

Table 7 below summarises the current parking inventory in KCCA.

Usage of space	**Number**	**Remarks**
Spaces for public Use	4,528	Includes reserved spaces and taxi stages
Spaces occupied by Boda Boda	192	
Spaces made unavailable by Developers	53	Unavailable as a result of construction works, etc.
Spaces where parking has been abolished by Police	309	Parking has been abolished for "security reasons"
Total	**5,082**	

(Source: KCCA,2023)

An unspecified number of spaces are reserved parking for various firms for their own use while some

are occupied by taxis. There are no spaces reserved for loading and unloading, residents and the disabled. A study undertaken by Saad Yahya et al in 2007 indicated that there were about 5500 parking spaces in the city. The current inventory indicates a reduction in number of parking spaces, which is attributed to abolition of parking on some roads, such as Entebbe Road, Hannington road and others. Further reductions in street parking spaces are due to construction of the Kampala fly over.

5.1.3.2 Off-street parking Supply

There are some private off-street parking areas in the city. Some of these are basement parking while others are open parking yards. Generally, very limited amounts of these off-street parking facilities are available for public use. The premises that provide off-street parking are largely office or commercial sites and their parking spaces are reserved for tenant and customer use, with tenants having priority.

However, there is no comprehensive inventory of available off-street vehicle parking spaces, space utilization and tariff structure in the CBD yet exists.

KCCA does not regulate their operations. Unlike on-street parking, which is often characterized by its curbside accessibility, off-street parking provides a more secluded and secure environment for vehicles. Off street car parking facilities offer a range of options for drivers seeking a safe haven for their vehicles.

Off street parking lots are also cleaner and aesthetically pleasant than on street parking. The lack of proper parking signage on streets has contributed to illegal parking and violation of parking rules in the city. Many on street parking lots lack clear parking lines and other necessary information that could enhance their proper utilization.

5.2 Location, Distribution and Design of parking spaces

Distribution and nature of parking play an important role in the city form (March, 2007). There is no technical standard or guide on the location, distribution and design of public parking facilities for Kampala city. Generally, it is assumed that short stay parking facilities (for shopping, medical visits, drop off someone, etc.) have to be located close to the final destination and that long stay parking facilities (for work, recreation, travel etc) can be located at some distance (Van et al., 2017).

Consequently, in Kampala, on-street parking is allowed in many places, even on major roads where it constrains traffic flow. The Parking of Motor Vehicles Regulations of 2001, applying to Kampala District empowered Kampala City Council to identify roads and streets on which parking places may be designated, and charge a fee for their use. Currently Multiplex ltd uses parking bay sizes of 6.6m long x 3m wide. Angle parking spaces are 2.5m wide but the angles are not defined.

It should be noted that design of parking spaces differs between agencies and purpose. According to British practice, the minimum size for a bay, parallel to the kerb, should be 1.8 m in width and 4.5 m in length but variations up to 2.5 m and 6.0 m respectively are common, to allow for different site conditions and sizes of vehicles. A bay size of 2.5m wide x 6m would increase the number of bays available. However, the Ugandan fleet contains a significant number of 4WDs and long vehicles for example Land Cruisers, Toyota Noah station wagons among others, which may require an extra 0.5m for ease of maneuvering.

5.3 Provisions for Bicycle parking

Both on street and off-street parking facilities in Kampala lack provisions for bicycle parking. Without secure and accessible parking, potential cyclists could be forced to opt for motorized means of travel. Though non-motorised transport cannot serve every purpose, it has a potential for saving resources and finances. Non-motorised transport is more affordable and resource efficient as compared to alternative forms of transportation and recreation (Litman, 2022). The high value placed on driving and low value placed on walking in conventional planning reflects how transport is measured (Litman, 2003). This tendency to undervalue non-motorized travel can be particularly harmful because transportation decisions often involve trade-offs between different travel modes (Litman, 2003b).

5.4 Use of Technology in parking management

The use of technology especially in parking demand management is a responsibility of KCCA and Multiplex in the city. Currently Multiplex has an automated onstreet parking fee collection technology known as pay and display meters. The automation technology (using park and display devices) meets most of the requirements for parking control devices and it is used widely in many countries.

The system is also operational in Kenya and Tanzania, which suggests that it is adaptable to Ugandan environment. Park and display meters enable better control of the parking revenue using internet capabilities.

Multiplex also introduced the Plex Application which avails information on available parking to the users. The application also enables users of street parking to pay their current and historical bills instantly. However, the application is accessible to only android phone users. While, many parkers are not aware of such an innovation. Without such awareness, new customers may not be attracted and this could compromise royalty. Real

time information on available parking spaces allows drivers to find suitable parking without delays. This subsequently improves the overall parking experience, accelerates traffic flow and reduces emissions.

Majority of off-street parking facilities have not adopted technology. Their activities are mainly hands on which makes their operational costs higher. Also, this leads to a lot of errors in their parking and payment records. Smart parking systems can contribute to the overall car park efficiency and security. Such systems provide real time information about parking availability and consist of various components that could include sensors, cameras and communication devices which work together to collect and transmit data to a central system timely hence fostering easy and effective control and management of parking facilities.

5.5 Stakeholder involvement in the planning and provision of parking

There is no involvement of stakeholders in parking planning and provision in Kampala. Citizens and various relevant stakeholders should be involved in parking decisions. Parking attracts the interest of different road users. Consultation is all-important in terms of parking policy,not least in order to obtain public acceptance. Consultation can be undertaken at a number of levels whether it be at a national or local level.Implementation of parking policies becomes difficult if the general public and relevant stakeholders are not involved in the initial stages of planning.

VI. Public Parking Demand Management Strategies, Policies and practices in Kampala

6.1 Staffing and Enforcement

There is enough staff to guide parkers for both on street and off-street parking in the city. Where there is violation of parking rules and regulations, vehicles are usually clamped and the owners are fined accordingly. Defaulting of on street parking fares after 48hours leads to a surcharge and when it accumulates to UGX.14,000, the vehicles are usually clumped and if the owner does not pay after 6:00pm, the vehicle is towed to Multiplex premises for more charges. While for off street facilities, the use of security guards is common in ensuring law and order. Fines vary depending on a given facility in case of violation. There are no general guidelines for handling infringement of parking rules and regulations in the city.

The traffic police also take care of parking violations in the city especially for on street parking. However, often lack time and have more important tasks to do than controlling parking infringements. Thus, private entities and multiplex monitor any parking violation and handle such cases by themselves. This has led to decriminalization of parking violation where by non-police staff do the enforcement. This is in one way of an advantage because the fines levied now from on street parking is an income to the city instead of the state.

6.2 Time Limits and Time period Regulations

For both on street and off-street parking, there are no time limits and time period regulations. Drivers can park as long as they meet their payments. Essential on street parking users like shoppers are mostly affected by inadequate parking as a result of long -time parkers such as employees to monopolize the available parking facilities. Time limits can be used to improve turnover and hence allowing for more cars to use the same spot over the course of the day. Short stay shoppers should have priority over long-stay parking for commuters, and reservation for specific users should only be allowed in very special circumstances. The current practice of space reservation and over-discounted monthly stickers appears to encourage long stay on street parking. Time limits could lead to compelling environmental, well-being and economic advantages. Time limits may also be imposed on different categories of parkers, especially in dense areas to increase turnover.

Regulations prohibiting certain hours for parking are used to discourage a particular user group from storing vehicles on street for longer periods of time. In some cities such as Bogota, parking overnight on the streets is prohibited to allow for street cleaning and snow clearing.

6.3 Event Parking Management in the city

There is no mechanism for managing event parking demand in the city. City events whether sports galas, cultural events or music concerts attract people to enjoy shared experiences. However, one of the most common challenges associated with such events is managing parking with the influx of attendees. To ensure that city event parking is as smooth as possible, it is important to plan through estimating the number of potential drivers and identify available parking that is accessible to them. This should include both on street and off-street parking facilities. It also requires working with local authorities and private parking owners to secure enough spaces. Also, encouraging attendees to opt for public transport use could help to reduce on parking related concerns. There could be collaboration with transportation agencies also to make arrangements for special event transportation services often with discounts to make it more attractive.

VII. Conclusion

Parking is an essential component of the transportation system. Vehicles must park at every destination. Parking convenience affects the ease of reaching destinations and therefore affects overall accessibility. Parking convenience is among the major factors that affect shoppers' destination choices. Availability of parking space therefore influences the viability and competitive posture of commercial areas such as the Central Business District of Kampala.

The results of the study indicated an underutilization of the available parking facilities. Thus, it is important that the available spaces and facilities can be well managed and improved to accommodate the current vehicle numbers rather than providing more parking areas which would otherwise require more land and investment.

Parking for private motor vehicles within the KCCA central area is dominated by use of on-street space, with very limited amounts of off-street space provided for general public use. Taxis and Boda Bodas also greatly reduce the supply of parking by standing on-street for long periods while waiting for customers. On the other hand, the number of private automobiles in the city has increased, leading to a shortage of parking space in some parts of the CBD. Not only does this result in regular illegal parking, but also drivers circulating the city centre looking for parking spaces exacerbate congestion and pollution problems.

Currently there is no clear parking policy in place. There are no criteria for allocating parking spaces. Individuals and organizations reserve parking spaces in front of their premises and it is not clear who qualifies or does not qualify for this reservation. Likewise, there is no policy on the level of monthly stickers that should be sold and to what discount level. Parking schemes must be designed to fulfill objectives of the Parking Policy, which could include traffic restraint, accident prevention, and provision of adequate parking spaces for loading or unloading and customers of local shops.

VIII. Recommendations:

Development of a public parking policy by the city. Parking policy measures are relatively more important than many Transport Demand Management measures. Clearly, effective parking policies could complement other transport initiatives in achieving objectives relating to accessibility and environmental management. The importance of parking policy becomes more important as car ownership continues to rise. It is therefore important that ffective parking policies are formulated and implemented by the government and city authorities. If there is an excess of city centre parking over demand for it, improvements in public transport alone cannot be expected to result in a change in modal split. Many of the most significant initiatives and policies towards city centre transport depend for their success on restricting road traffic, and parking policy is one of the most potent yet also publicly acceptable means of restriction.

Prioritising sustainable transport modes. Public transport, cycling and walking should be an integral part of the overall transportation planning in the city. The growth of motor vehicle ownership in the city implies an increase in parking demand. Proper Parking provision requires land, finances and other operational resources. Provision of a condusive environment for walking and cycling could actually supplement on the socio economic and as well the environmental wellbeing in the city. Cities such as HongKong, Singapore, Bogota and others have heavily relied on public transport and non-Motorisation as a means of travel. This has helped to curb their vehicle numbers and thus the demand for parking in the cities. In order to enhance the transition to less car dependency and more active modes, cities should reconsider standards for traditional car parking and for bicycle parking. Existing buildings without bicycle parking should be retrofitted either by converting some of their car parking spaces to bicycle parking or by providing facilities near to such buildings. This should be coupled with minimum standards depending on the land use in that particular area. These standards should be monitored, evaluated and modified regularly depending on the changing travel patterns and modal split in the city.

Both on street and off-street parking supply, including private parking, should be considered together, as complementary parts of the total parking stock available in the city. Off street parking lots should be gazatted and regulated by the city council. The need for new off street car parks should be considered within overall transport policy and the adequacy of the local highway network. Maximum allowable parking provision for a new office block in the city center with good public transport access can be restricted as opposed to the current practice of requiring a minimum provision. Thus a larger number of spaces would be required per unit of floor area of new commercial building to be located at some distance from public transport services than would be required or permitted near a major public transport service route. This probably offers a direct impact on levels of car use and can be used to control city center congestion, while promoting more sustainable modes of transport.

Considering the increasing parking demand in the city, the Ministry of Works and Transport should prepare a comprehensive public parking design manual to guide urban areas. This should stipulate on-street parking should be restricted whenever practical along major roadways. The identification of what should constitute a major urban roadway necessitates the establishment of a functional hierarchy for the urban roadway network. On the higher-level road classes, no on-street parking would be allowed except at lay-bys specially designed and provided for the purpose. There should be allowance of a minimum of 6m wide for two traffic lanes

or 3.6m wide for single traffic lane. There should be no parking 10m from pedestrian crossings and junctions. There should also be no street parking on roads where volume or capacity ratio is more than 0.8. There should be dimensions of parking bays for different uses: cars, loading and unloading, motor cycles, bicycles should be defined and the loading and unloading bay should be considered to be equivalent to 2 car parking bays.

References

[1]. Auwerx ,P. Pressl,R. Cré,I. Kocak,N& Rye,T.(2019). Parking and sustainable urban mobility
[2]. Barter, P. A. (2012). Off street parking policy surprises in Asian Cities, J. Cities, 29 (1), 23
[3]. Chen ,Q. Wang, Y & Pan ,S.(2015).Characteristics of Parking in Central Shanghai, China. Journal of Urban Planning and Development, 142(3),1943-1954.
[4]. Chen,Q, Wang Y,&Kefei, Y.(1999). Forecasting Research of Urban Parking FacilitiesDemand,Journal OfSoutheast Univwrsity(Natural Science Edition, 12(9) ,121-126.
[5]. Denzin, N. K., & Lincoln, Y. S. (Eds.). (2005). The Sage handbook of qualitative research (3th ed.). Thousand Oaks, CA: Sage.
[6]. Eggleston. P (2015). Parking as a Public Policy Priority. International Parking and Mobility Institute.
[7]. Hensher, D. A. & King, J.,(2001). Parking demand and responsiveness to supply, pricing and location in the Sydney central business district. Transportation Research Part A, 35, 177-196.
[8]. Hunt, J.D &Teply, S. (1993). A nested logit model of parking location choiceTransportation Research Part B: Methodological, 27 (4), pp. 253-265
[9]. Jongbo, O. C. (2014). The role of research design in a purpose driven enquiry. Review of Public Administration and Management, 3(6), 87 - 94.
[10]. Kothari, C. R. (2007). Research Methodology: Methods and Techniques. New Delhi: New Age international (P) limited, publishers.
[11]. Lautso, K. (1981). Mathematical relationships among parking characteristics and revising and reduction methods of parking field survey information.Transportation Research Part B: Methodological, 15 (2) , pp. 73-83
[12]. Litman, T. (2003). Equity - Clarity" Economic Value of Walkability,Victoria Transport Policy Institute
[13]. Litman, T. (2022). Economic Value of Walkability,Victoria Transport Policy Institute
[14]. Litman, T.(2002b), Evaluating Transportation Land Use Impacts, VTPI (www.vtpi.org); at www.vtpi.org/landuse.pdf.
[15]. Litman.T.(2021). ParkingManagementComprehensive Implementation Guide.Victoria Transport Policy Institute.
[16]. March, A. (2007). 'Towards strategic planning for car parking'. Working paper, urban planningprogram, University of Melbourne.
[17]. Ministry of Works and Transport (2009) National Transport Master Plan (2008-2023),Kampala: Ministry of Works and Transport
[18]. Msigwa. R. E & M.K. Bwana. (2013). Parking Challenges Facing Urban Cities in Tanzania: Evidence from Dar el salaam. Journal of Economics and Sustainable Development. 4(15), 94-105
[19]. National Planning Authority .(2015). The Second National Development Plan (2015-2020), Kampala: National Planning Authority.
[20]. National Planning Authority .(2021). The Third National Development Plan (2021-2025), Kampala:National Planning Authority.
[21]. National Planning Authority. (2013). Vision 2040, Kampala: National Planning Authority.
[22]. Nile Post. (2022, 12th September). Kampala City running out of parking space. Retrieved fromhttps://nilepost.co.ug/2022/09/12/kampala-city-running-out-of-parking-space. Accessed on 12th September 2022.
[23]. Parmar, J.,P.D & Dave,M. (2019). Evaluation of Parking Characteristics: A case study of Delhi: TransportationResearch Procedia 48 (2020) 2744–2756
[24]. planning. European platform for urban mobility plans.
[25]. Pressl.R and and Rye,T.(2020). Good reasons and Principles for parking management.
[26]. Rovai, A. P., Baker, J. D., & Ponton, M. K. (2014). Social Science Research Design and Statistics. Chesapeake, VA: Watertree Press LLC.
[27]. Rye,T. (2010). Parking Management: A Contribution towards Liveable Cities. SustainableTransport: A Sourcebook for Policy-makers in Developing Cities, Germany
[28]. Saad Yahya (20027). Feasibility Study on the Modernization of Street Parking in Kampala.
[29]. Singh,P.K.Singh,R. Nandi, S.K. & Nandi,S. (2009). Smart Contract Based DecentralizedParking Management in ITS.Innovations for Community Services. Springer International Publishing.
[30]. Sugiono. (2016). Metode Penelitian Kuantitatif, Kualitatif, dan R&D. Bandung: Alfabeta.

[31]. Taylor, M.A.P. Young, W. &Wigan, M.R. (1992).Travel data: theircollection and use.The 3rd International Conference on Survey Methods in Transportation, Washington DC, p. 1990.
[32]. Tong.C.Wong S. C. & Leung, B. S. Y.,. (2004). Estimation of parking accumulation Profiles from survey data. Transportation, 31(2), 183-202. Travel characteristics survey, Territory Transport Planning Division, MVA Asia, Transport Department, Hong Kong.
[33]. Topp, H.H.(1991).Parking policies in large cities in Germany.Transportation, 18 (1) , pp. 3-21
[34]. Vasallo, A. (2015). Parking woes in developing cities. International parking and mobility institute.
[35]. Vassallo, A. (2015). Parking woes in developing cities. International parking and mobility institute.
[36]. World Bank (2017) .From Regulators to Enablers: The Role of City Governments inEconomic Development of Greater Kampala,Washington DC: World Bank
[37]. Yue, W.L. (2004). Parking Management in Saudi Arabia: Is there any Solution? 27th Australasian Transport Research Forum, Adelaide. Australia: Transport System Centre , University of South Australia.