



## MULTI-LEVEL PARKING FOR SHOPPING MALLS IN PORT HARCOURT

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### **ABSTRACT**

Due to the socio-economic advantages of shopping malls and the rise of the middle class and advancement in the retail sector of Nigeria, the development of shopping malls has been on the increase in Nigeria. While locating shopping malls in city centres on the positive achieve high visibility and accessibility, on the negative it attracts heavy traffic, which congests the transportation network and also generates a high number of accidents due to the necessarily large number of turns. Addressing this challenge is to use alternative parking to surface parking in shopping malls. Owing to the topographic and climatic condition of Port Harcourt metropolis, multilevel parking is best alternative to address the traffic congestion created by shopping mall traffic.

### **INTRODUCTION**

The development of shopping malls has been on the increase due to its socio-economic advantages to the region. Investments, job creations, entertainment, leisure, recreational, cultural, and commercial services are some of the social and economic attractions of shopping malls (Heffner & Twardzik, 2015; Jäger, 2016). Also, the rise of the middle class and advancement in the retail sector of Nigeria has also contributed to the growth of shopping malls (Kiganda, 2016).

Banister (1997) suggested that shopping malls should be located at high density regions. Egresi (2017) affirmed that shopping malls should be strategically located to maintain its economic viability. This location has to be city centers because they have both a high density as well as a ready market for shopping malls to thrive (Singh et al., 2010). While this is on the positive, city centers are also known for competitive land use; on the negative, with such attraction to shopping malls traffic congestion seem to be inevitable. This is due to the fact that shopping malls located at the

city centers achieve high visibility and accessibility and also attracts heavy traffic, which congests the transportation network and also generates a high number of accidents due to the necessarily large number of turns (Ozuduru & Guldmann, 2013).

Jäger (2016) points the challenge posed by locating shopping malls in city centers to its parking facilities due to competitive land use in city centers. Popoola et al. (2013) reported that the shopping malls are one of the causes of the traffic congestion (a situation in which demand for road space exceeds supply) within cities. Traditional parking system adopted by shopping malls creates the difficulties for users of these facilities particularly during peak period (weekends and public holidays) when limited parking spaces are available (Nimble et al., 2016). This leads to traffic congestion attributed to on-street parking as a result of non-availability of space for off street parking in shopping malls (Asiyanbola & Akinpelu, 2012).

Reduction of traffic congestion in developed country like US, UK, China, Russia and others have brought about alternative parking for shopping malls. Multi-level parking garage, underground parking garage and automated parking garage are alternatives to surface parking in shopping malls (Kumar, 2019). Underground parking as an alternative to surface parking is vital for shopping malls because it ensures dedicated and comfortable parking area within the mall and eliminates traffic congestion that results from street parking (Shaikh et al., 2010; Sonar, 2017). Also, automated car park as alternative to surface parking has been proposed for shopping malls to reduce traffic congestion by Korotaev (2016). Very few literatures exist on multi-level parking for shopping malls, yet in practice there exist quite a number of multi-level parking garages in major cities in the world. Towards the reduction of traffic as well as making enough space available for parking within shopping malls in Nigeria, this study reviewed literatures of developed countries in order to integrate alternatives to surface parking is necessary in the Nigerian context. Designing a situation alternative parking to surface parking in order to address traffic congestion created by shopping malls in Port Harcourt metropolis is the focus of this study.

## **METHODOLOGY**

The need to develop multi-level parking for shopping malls to provide a solution for traffic congestions within the city centers and further increase the standards of shopping malls within Port Harcourt metropolis has this study showing a thorough review based on a literature survey in well-known journals and conferences related to multi-level parking. Although, it must be noted that very few journals on the subject multi-level parking for shopping malls exists, therefore published book and unpublished thesis were also consulted. Narrative technique is adopted by this study to show how multi-level parking for shopping malls would help reduce the challenge of locating shopping malls in city centers; traffic congestion.

### **Parking in Shopping Malls**

A parking lot is an area that is designated for parking vehicles in the mall premises. Shopping malls have designated lots, with space to carry between 500 – 10,000 two- and four- wheelers depending on its size and popularity. These parking facilities can be indoor or outdoor, publicly or privately operated.

### **Types of Parking in Shopping Malls**

**Single Level Parking Garage:** This is a parking garage that has only one floor and are found mostly in Tier II & III cities shopping malls.

**Multi-Level Parking Garage:** These are parking garages that have multiple floors to park at. The design of a multilevel parking garage can be very different and huge with the most common design is that of ramps to move from one level to another. Proper flooring of multi-level parking is very important to avoid traffic congestion on the ramps. This type of parking is usually found basically in Tier I cities shopping malls.

**Underground Parking Garage:** An underground parking garage can consist of several levels below the ground level, but above ground. Most often, underground parking garages are located in city centres where much space is not available to build a parking facility, but there is need to build one.

**Automated Parking Garage:** Automated parking garages are the most advanced type of parking. These parking garages are automated with robotic systems that move cars from one level to another. The floors of the parking garage can either go up, down or both. Uniquely is that this automated to be applied to both underground and multi-level parking garages. A major benefit of an automated multi-level parking garage is that more cars can be stacked in a compact space because they are parked by robots.

### **Design Consideration for Multi-Level Parking Garage for Shopping Malls**

Multi-level parking would be favoured above underground parking for the South-South region of Nigeria. This is because of its tropical climate; Port Harcourt lies on 9m above sea level and a precipitation of about 2708mm|106.6inch per year. Rainfall is significantly most months of the year and the short dry season has little effect (CLIMATE-DATA.ORG, 2020). With such level of rainfall and inefficient drainage system, multilevel parking would be preferable to underground parking in Port Harcourt metropolis. The study and analysis of some existing multi-level car park in Nigeria, U.S.A and England reveal that they possess facilities that satisfy the multi-level requirements (Nyamse, 2008). The design of their physical structures also meets the same standard. An assessment of the existing facilities will serve as a guide to the attainment of the following standards:

- Using a ramp system that is most effective to choose from.
- Free flow of traffic: The pedestrian movement should be separate from the vehicular movement.
- Aesthetics of the structure should not be neglected.
- Provision of adequate parking for the disabled.
- Achievement of natural lighting.
- Achievement of adequate natural ventilation.
- Zoning of the ancillary facilities without interrupting vehicular movement.
- Central positioning of elevators and stair cases in relation to the parking bay, in such a way that they can be accessed directly from the lounge or lobby.

- Creating a natural environment by using element peculiar to the environment.
- Maximum attention to fire protection and security.
- Achievement of proper signage at strategic locations.
- Zoning of long and short stay lots.

Having highlighted these design considerations, it is important to noted that in the context of locating a shopping mall in Port Harcourt metropolis, having the multilevel parking lot as a separate structure from the shopping mall would require much land that is not be readily available, in the sense that it would require the demolition of existing building which increases construction cost. Hence, having a multilevel building that has some of the levels for parking and some for the mall would be a better solution for the metropolis.

### **Benefits of Multi-Level Parking for Shopping Malls**

The benefits for multi-level parking for shopping malls in the Nigeria context would be enjoyed by the management, the consumers, the environment and as well the general public. The challenges of strategic location in the city center hinted by (Asiyanbola & Akinpelu, 2012; Jäger, 2016; Nimble et al., 2016; Popoola et al., 2013) would be resolved since lots of parking space would be made available which eliminates on street parking, and ultimately eliminates traffic congestion caused by parking.

### **CONCLUSION**

The development of shopping malls has been crucial to every developing economic and society because of its capabilities of meeting various socio-economic needs of the region which ranges from investments, jobs creation, leisure, entertainment, Commercial Avenue and many others. Despite the advantages of shopping malls, yet its strategic location in city centers significantly poses a challenge that if not properly managed would give a dent to the sustainable health of the city center. Hence, for a tropical region like Port Harcourt, multi-level parking garage should be considered in the development of shopping malls.

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