

Assessment of Parking Spaces in Mixed-Used Buildings in Kano State

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Abstract

Man has been a wanderer right from time inception, moving about in search of food and shelter. Building as a shelter is as old as man, also different buildings perform different functions or uses to man. Some buildings have only one function, while some have multiple functions and they are known as 'Mixed-use building'. One major problem encountered with these type of structures is the issue of parking, caused as a result of either; the design, the building occupying the whole site, the residents/users of the building, or standard laws (rules and regulation) guarding the area. This paper aims at assessing the efficiency parking space in mixed-use buildings, which can be achieved through analysing the quantity and sizes of the parking spaces provided, estimating the number of car users', and ascertaining the perception of users' on the available parking space. The methodology employed involves a purposive sampling method, where the sample population to be studied were selected due to the mixed-use criteria met by the selected buildings. Data was collected through questionnaires and personal observation. Recommendations were made that various means of achieving an efficient parking space in a mixed-use building or development, such as; the provision of the right parking spaces to the functions performed ratio, during the design stage, also, the issue of shared parking in order to reduce too much usage of scarce land for parking lots should be well planned.

Keywords: *building, design, mixed-use, parking facility, shared parking*

1. Introduction

In response to the increased urban growth, many cities are now witnessing massive development due to the people's interest of a live, play and work desire in one location. Mixed-use developments or communities have been in existence as far back as the medieval period, when their villages were incorporated with different functions at the same location. Cities arising from the development of these villages exhibit some features of a mixed-use community or development.

In recent times, mixed-use buildings or developments are now the average rapid development, as they provide efficient land usage and at the same time providing comfort for its occupants. This is because it reduces over dependence on cars due to its live, play and work characteristics. The advantage of this type of building or development over the single-type cannot be under estimated, these include; efficient utilisation of scarce land resources, maximum optimisation of parking facilities, enhancing neighbourhood relationship, creating a comfortable environment for live, play and work atmosphere for its users.

According to Niemira (2007), a mixed-use building is a real estate developmental projects that is well organized and integrated with either the combination of shops, offices, residents, restaurant and other facilities. The building is pedestrian-oriented and has features of live-play-work area. This enhances maximum utilization of space, provides infrastructures, architectural manifestation and also reduces congestions on the road. Urban centres are now extremely interested in this type of development. This is because it provides maximum comfort and aesthetically pleasing environment. The different functions incorporated must be complementary of each other, and at the same time an entity on its own when it comes to marketing. Anders (2004), portrayed mixed-use communities as incorporated developments merged by distinguishable path and outlined public spaces.

Gentry (2000) on the other hand stated the advantages of this type of development as its being convenient and a comfortable provision of a live-play-work and retail/commercial environment. The community offers the retailers the chance to operate in a conducive and marketable environment, thereby resulting to increase in sale. The development is advantageous to the developers because the diversified nature of uses placed in one location reduces their investment risk (Child, Riddiough and Triantis, 1996). Mixed-use development is becoming more popular among businessmen and developers because research has it that the development has continued to overshadow sub-urban real estate, in terms of commercial and office space lease rates, retail patronage and also in

hotel accommodation demand, also this type of development allows the city planner and urban designer to create a liveable, safe and exciting community (Coupland, 1997).

One of the major problems associated with this kind of building is the issue of parking. Parking is vital in a mixed-use development. It is an important factor due to its extremely costly nature. The parking facility will always add to the investor's cost. Also, it takes away valuable scarce land resources from the site. Even with this, it is a necessity that must be provided. Although, in some places viable mass transits are provided, these developments still demand for a large committed parking facility/space. The demand for this type of building/development is on the increase every day. This paper aims at assessing the efficiency parking space in mixed-use buildings in Kano State, which can be achieved through analysing the quantity and sizes of the parking spaces provided, estimating the number of car users', and ascertaining the perception of users' on the available parking space.

It is not an easy task to design a mixed-use building and style it to operate as a singled-use building. Design or operational errors are encountered more in this type of development. The combination of the right functions is of paramount importance. Providing an efficient parking facility is not an easy task in this type of building. The parking plan should be made possible to meet-up with every applicable codes and ordinances, while bearing in mind that neither the parking requirements for the different users nor the functions are the same, due to their different time of functioning. Example; the parking space used by the office users during the daytime are available to be used at the night by other users (restaurants, residential, theatre), through shared parking theory.

1.1 Problems with Typical Parking Space Planning in Public Buildings

One of the reasons for parking oversupply is the lack of comprehensive research data on parking needs. The result of this lack of information has been that planners and city officials have commonly relied on publications by the Institute of Transportation Engineers (ITE) – *Parking Generation* and *Trip Generation*; to determine the number of parking spaces to provide per use. Shoup (2005) suggests that this reliance on the available guidelines may be a product of a lack of instruction in planning education on how to set parking requirements, claiming both that “most texts in regional science, transportation planning, and urban economics...ignore parking” and that “somehow, the urban land use with the biggest footprint and a profound effect on the transportation system has been invisible to scholars in every discipline.” Marshall and Garrick (2006) recognized this claim, indicating that parking and its provision is often overlooked in planning academics.

The result of these growth patterns and the uncertainty in planning for parking space has been that, for decades, the problem of suburban sprawl has been one of much discussion both in the academic literature and in practice, it is safe to say that Cervero (1988) was correct when he stated in his article on suburban mixed-use that “suburban traffic congestion has emerged as one of the most pressing problems in the transportation field today and, most probably, will hold centre stage in the transportation policy arena for years to come.” In his article also, Cervero again criticized the traditional suburban development patterns that consist of single-use centres that, in contrast to varied and well-designed urban centres, require high levels of private vehicle use to get from place to place.

1.2 Importance of Shared Parking

Litman (2012) defined shared parking as the process of using one parking facility or space by multiple users. It is a parking that serve different users, by taking advantage of their different peak parking periods that varies during the day, week or season. It is also a set of schemes used in a neighbourhood to decrease the amount of new parking areas required in a project. The problem of minimum parking requirement is that it handles each land use as an entity, that must have its own separate minimum parking requirement, example; retails, restaurants, offices. Parking spaces disrupt the urban or city's landscape of the environment, most especially when they are left unused. (Union Square Main, 2013).

The policy of shared parking is that it ensures that neighbourhood gets its rightful parking requirement, while in a mixed-use building; it reduces the total parking facilities needed. According to Metropolitan Transport Commission (2007), shared parking is estimated to reduce the demand for parking by 10-20%. The reduction depends on the functions incorporated in the buildings.

The importance of this type of parking to the community are numerous; provision of free spaces for productive usage (new businesses, recreational areas) through a decrease of the parking spaces provided, the encouragement of the use of public transport that are environmentally conducive and friendly such as mass transit or bicycles due to less parking. It also allows investors to build different kinds of buildings/developments at a less cost using a flexible tool for parking. (Marshall & Garrick, 2012).

1.3 Forms of Parking

The location of parking space provided is also a concern in mixed-use structures, since the placement of spaces can directly influence the walkability and beauty of a development. Litman (2012) suggests a hierarchy for forms of parking provided in mixed-use building/developments:

- On-street parking on main commercial streets (it is best if regulated, using either pricing or time limits, for maximum turnover);
- Off-street public parking/additional on-street parking; and
- Off-street private lots (can still be shared between two uses with opposite peak hours, i.e. a bar and a church).

2.0 Study Area

Kano municipal or Kano city which is the capital of Kano State is the study area of this research. The city is located along latitude 8°31'E and longitude 12°00'N. It is the study area because these types of structures are found only in the state capital.

Six different mixed-use buildings were observed for the purpose of this paper. They are;

1. Ummi Plaza.
2. Dogon Banki Building.
3. Gidan Ado Bayero.
4. Zainab House.
5. 7C Building.
6. Hafsatu House.

Below are Google images of the mixed-used developments studied showing the parking layouts of these building;

The plate below shows the different site locations of the buildings;



Plate 1.0: Ummi Plaza

Source: Google Images, (2013)



Plate 2.0: Gidan Ado Bayero

Source: Google Images, (2013)

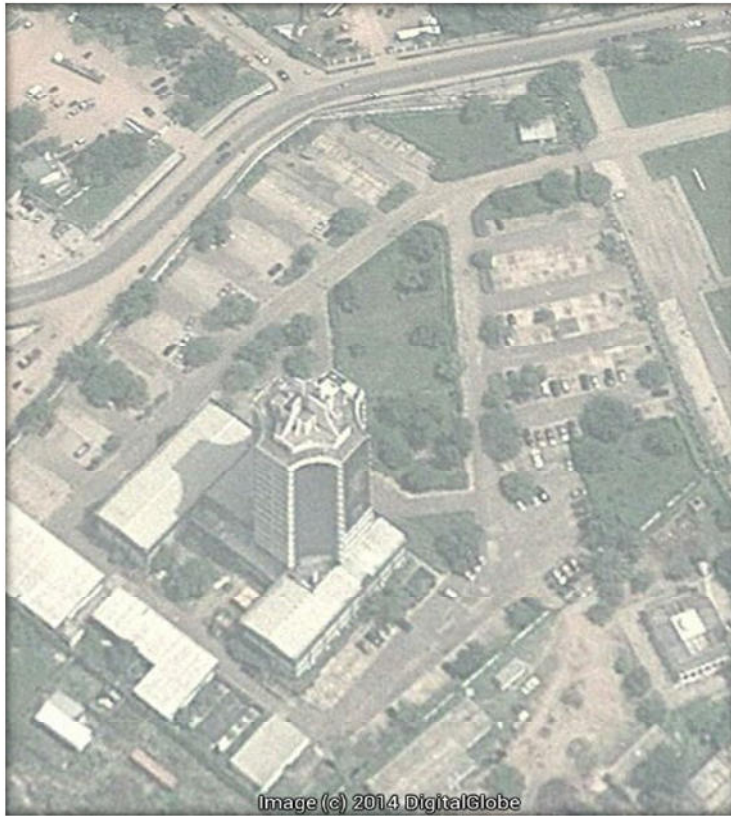


Plate 3.0: Dogon Banki Building

Source: Google Images, (2014)



Plate 4.0: Hafsatu House

Source: Google Images, (2013)

3. Methodology

The methodology employed involves a purposive sampling method, where the sample population to be studied were selected due to the mixed-use criteria met by the selected buildings. Data was collected through questionnaires and personal observation. To assess the problem of parking spaces in a mixed-used building in the state, information were gathered from primary and secondary data. The primary data were obtained through personal observation and questionnaire administration. 120 questionnaires were administered in equal ratio to all the six locations, out of which only 102 questionnaires were retrieved and valid.

4. Discussion of Result

4.1 Analysing the quantity and sizes of the parking spaces provided

From the observation taken, the parking spaces in all the studied buildings were and the result is shown on the Table 1.0 below.

Table 1.0: Parking Space Sizes and Quantities in Kano State Mixed-used Buildings

Mixed-Used Buildings	No. of Shop Spaces	Size of parking lot (m ²)	No. of Parking Spaces
Ummi Plaza	65	1050	60
Dogon Banki	34	8400	480
Gidan Ado Bayero	50	7875	450
Zainab House	14	350	20
7C Building	32	87.5	5
Hafsatu House	17	787.5	45

Source: Field work (2014)

From Table 1.0 above, it can be seen that Ummi Plaza with the highest number of shop spaces (functions), had only 60 parking spaces been provided. While, Zainab House with the least number of functions had 20 been provided and is not adequate. It can be deduced that special consideration was not given during the design stage of some of the mixed-use buildings. As a result of this, problems of parking are encountered at these locations. The sizes of the parking spaces are not in ratio with the number of functions presence in the buildings.



Plate 5.0: Ummi Plaza

Source: Field work (2014)



Plate 6.0: Zainab House

Source: Field work (2014)

Plate 5.0 and 6.0 show Ummi plaza and Zainab House mixed used development respectively, the parking facilities can be seen also, though scanty since it's an off peak period.

4.2 Estimating the number of car users'

The quantity of users of these mixed-used buildings with cars and also the guests users' with cars were estimated over a period of a week, a constant figure is shown on table 2.0 below, the number of cars during a peak period. The numbers include even such cars that are parked on the road by customers due to inadequate parking spaces on the site.

Table 2.0: Number of Car Users

Mixed-used Buildings	Staff	Guests/Customers	Total
Ummi Plaza	73	101	174
Dogon Banki	65	82	147
Gidan Ado Bayero	60	161	221
Zainab House	20	62	82
7c Building	38	44	82
Hafsatu House	24	79	103

Source: Field work (2014)

It can be seen that Gidan Ado Bayero with 221 had the highest number of car users. While the buildings with the least number of car users are Zainab House and 7C Building both having a total number of 82 car users. This implies that Gidan Ado Bayero will require more parking space than the other structures.



Plate 7.0: Gidan Ado Bayero
 Source: Field work (2014)



Plate 8.0: 7C Building
 Source: Field work (2014)

Plate 7.0 and Plate 8.0 shows Gidan Ado Bayero and 7C Building respectively, with some car parked outside both buildings.

4.3 Ascertaining the perception of users' on the available parking space

This addresses the responses from the questionnaires administered, the respondents were asked if they had problems with the parking spaces and also with the circulation around the parking spaces. These are presented on the table and figures below;

Table 3.0: Users response on parking problems encountered

Mixed-Used Buildings	Yes (%)	No (%)
Ummi Plaza	50	50
Dogon Banki	5.6	94.4
Gidan Ado Bayero	11.8	88.2
Zainab House	38.9	61.1
7C Building	52.9	47.1
Hafsatu House	42.9	57.1

Source: Field work (2014)

From the table above, it can be deduced that 7C Building with 52.9% has the highest number of parking space problem, while Dogon Banki with 5.6% encountered the least problem associated with parking space. The table above is simpler presented on the figure 1.0 below.

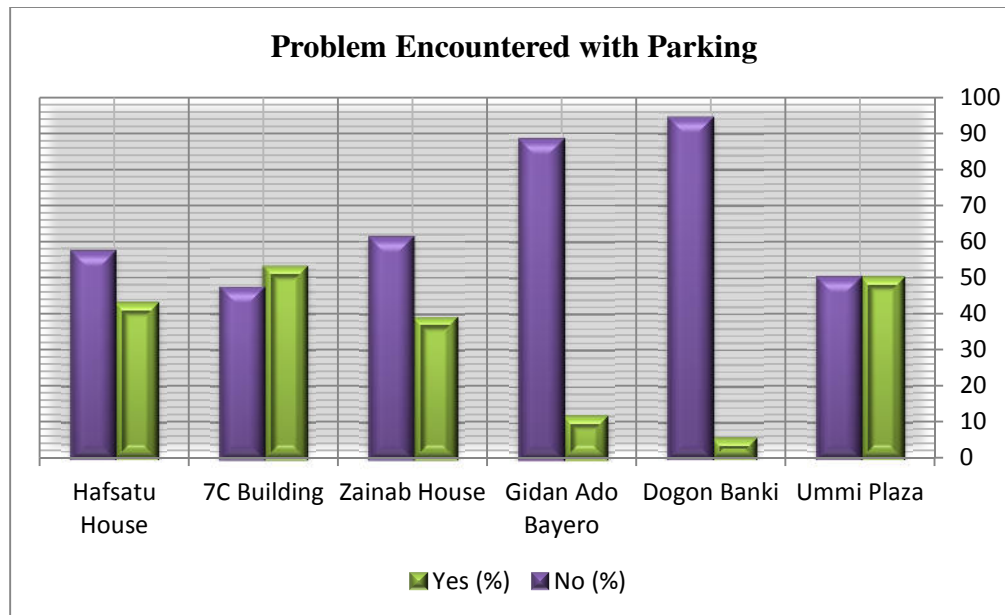


Figure 1.0: Problems encountered with Parking

Source: Field work (2014)

Table 4.0: Users' response on circulation problem within the parking space

Mixed-Used Buildings	Yes	No
Ummi Plaza	77.8	22.2
Dogon Banki	0.0	100.0
Gidan Ado Bayero	0.0	100.0
Zainab House	44.4	55.6
7C Building	64.7	35.3
Hafsatu House	57.1	42.9

Source: Field work (2014)

The table above from the users' response shows that both Dogon Banki and Gidan Ado Bayero had no problem in respect circulation in their parking spaces. While the highest problem encountered with circulation is Ummi Plaza and 7C Building with 77.8% and 64.7% complain rate respectively, Hafsatu House has 57.1% of the respondents complaining of circulation, while Zainab House has a complain rate of 44.4%, which so far is the lowest complain rate. Figure 2.0 is a cumulative of the table presented in a chart format.

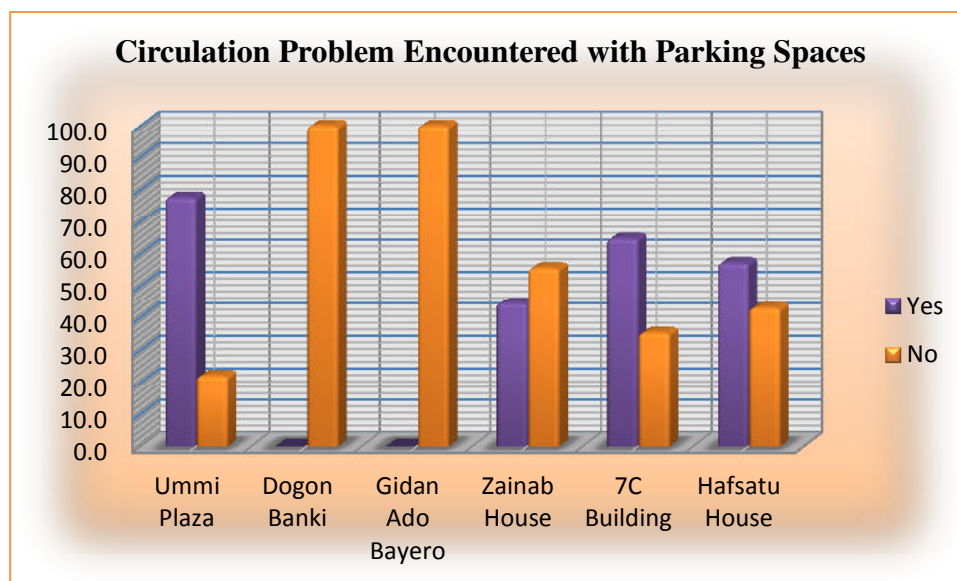


Figure 2.0: Circulation Problems with Parking

Source: Field work (2014)



Plate 9.0: Gidan Ado Bayero
 Source: Field work (2014)



Plate 10.0: Hafsatu House
 Source: Field work (2014)

Above are some plates showing the parking spaces of some of the mixed-used developments, it can be deduced that plates 9.0 has enough well defined parking spaces, and enough circulation space around it, while in plate 10.0 the parking space is not defined, this is why there is high rate of parking space inadequacy is experienced because most users just park haphazardly also causing high circulation problem.

5. Conclusion and Recommendation

The study had successfully shown that, most mixed-use buildings have parking space problems. The problem may arise either due to the investors quest for profit (building up the whole site without provision for parking space), as is the case of 7C Building. While some of the buildings have insufficient parking spaces (Umami Plaza, 7C Building), some have sufficient and well defined parking spaces (Dogon Banki, Gidan Ado Bayero). The paper in conclusion, recommends various means of achieving an efficient parking space in a mixed-use building or development, such as;

- Provision of the right ratio of parking spaces to the functions that are performed in the building be determined during the design stage.

- Also, the issue of shared parking in order to reduce too much usage of scarce land for parking lots should be well planned.
- Functions that have the same peak periods should be avoided as much as possible when planning a mixed-use building.

REFERENCES

- Anders, M., (2004). Understanding and balancing mixed-use schemes: The key to creating successful communities. *Journal of Retail and Leisure Property*, 3, 353-364.
- Cervero, R. (1988). Land-Use Mixing and Suburban Mobility. *Transportation Quarterly*, 42(3), 429-446.
- Childs, P., Riddiough, T., & Triantis, A., (1996). Mixed-uses and the redevelopment option. *Real Estate Economics*, 24, 317-339.
- Coupland, A., (1997). *Reclaiming the city: Mixed-use development*. London, E & FN SPON.
- Gentry, C. (2000). *Mixed-use projects serve diverse lifestyles*. *Chain Store Age*, 76, 144-148.
- Union Square Main, (2013). Shared Parking Report. Retrieved from: <http://www.unionsquaremain.org/wp-content/uploads> on 30th March, 2013, 12:15pm
- Litman, T. (2012). Shared Parking: Sharing Parking Facilities among Multiple Users *TDM Encyclopaedia*. Victoria, B.C.: Victoria Transport Policy Institute.
- Marshall, W., & Garrick, N.W. (2006). Parking at Mixed-Use Centres in Small Cities. *Transportation Research Record*(1977), 164-171.
- Metropolitan Transportation Commission (2007). “*Reforming Parking Policies to Support Smart Growth*.” Oakland, California.
- Niemira, M. P. (2007), “*The Concept and Drivers of Mixed-Use Development: Insights From a Cross-Organizational Membership Survey*,” *Research Review*, 4(1)
- Shoup, D. (2005). *The High Cost of Free Parking*. Chicago, IL: American Planning Association.

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