



Policy Brief



TRAFFIC MANAGEMENT AND CONGESTION MITIGATION: INTRODUCING PAID PARKING IN ISLAMABAD

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INTRODUCTION

In his highly influential book *The High Cost of Free Parking*, Donald Shoup argues that free parking is in fact a public subsidy that makes driving less expensive than its true cost (Shoup, 2005). The availability of free parking, he contends leads to block circling, congestion, and pollution and in that sense is a classic example of the ‘tragedy of the commons’. Public parking is considered a common good for the public as they compete over limited parking spaces commonly available to all while spending their time and resources searching for a vacant parking spot and disrupting traffic flows.

This scenario is widely witnessed in the major cities of Pakistan – including the capital city of Islamabad. Increased automobile ownership, coupled with rapid urban migration and expansion of Islamabad, has required the city administration to respond to changing dynamics. In recent years, we have witnessed a constant expansion and widening of the road network to accommodate the influx of more people in the city and greater traffic. Despite such measures, traffic congestion and disruption in traffic flows are frequent occurrences. Roads and marketplaces now face unprecedented levels of traffic on a regular basis which adds to congestion on the roads and severe parking difficulties.

Shoup (2005), like most other urban planners, advocates for a dynamic pricing policy for the use of public parking to reduce parking and traffic congestion. Considering such recommendations, this study has examined traffic data from different localities in Islamabad to identify the demand and availability of parking. Further, a survey has been conducted to identify the issues that are faced by drivers as well as the public willingness to pay for parking. Based on our findings, we recommend an operational design for the introduction of paid parking in Islamabad.

METHODOLOGY

¹ The authors respectively are Chief of Research, Assistant Professor and Research Fellow at PIDE and freelance Urban Planner. Thanks to Dr Nadeem Ul Haque, VC PIDE for suggesting the basic idea of this study and for valuable suggestions throughout the course of the study. Thanks, are also owed to the Chairman CDA and the Traffic Engineering Department at the CDA, led by Azam Lodhi for engaging in discussions on the subject and sharing maps of the parking locations. We are also thankful to the IG police and SSP (traffic), Islamabad, and the then DC, Islamabad for participating in the consultative sessions and offering valuable inputs. Finally, we appreciate the Research for Advancement and Social Transformation (RASTA) for funding this study.



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The data, for this study, were collected in 58 different locations across 17 market places in the city as well as the Pakistan Secretariat public parking (see Table 1). Where possible, parking lots were identified using maps provided by Islamabad's Capital Development Authority (CDA). In some cases, the lots were classified based on naturally occurring breaks in different localities.

Table 1: Parking Data Collection Locations

S.No	Area Name	Locations Covered
1	Blue Area	8
2	G-8 Markaz	5
3	Melody market	3
4	F-10 Markaz	10
5	Aabpara Market	2
6	Kohsar Market	1
7	F-6 Markaz	3
8	Beverly Centre	2
9	G-11 Markaz	2
10	F-7 Markaz	4
11	F-8 Markaz	3
12	F-11 Markaz	1
13	G-7 Markaz	2
14	G-9 Markaz	7
15	Peshawar Mor Bazar	2
16	G-10 Markaz	2
17	I-8 Markaz	3
18	Pak Secretariat	1

We engaged 30 students at the Pakistan Institute of Development Economics (PIDE), to gather data on vehicle demand and supply at the locations mentioned in Table 1 above. Data were collected at multiple time intervals during the day to identify peak hours. The solutions offered, including the price for parking (peak-hour pricing and marginal pricing), where to park, and how to park (parallel, angular, etc) are based on this data. A survey meant to gauge the willingness to pay for parking was also conducted at the selected locations indicated in Table 1.

Hassle-free payments are the backbone of any paid parking system. This study proposes the use of an app, not only to pay for parking but also to identify available parking spaces, within a parking lot and to send reminders before the duration is about to expire. The app also allows the drivers to pay the fines electronically for violations. Options for parking meters have also been identified. These meters may be installed in each parking lot, as an alternative to the use of mobile apps.

Paid parking is expected to curb the use of cars and thus mitigate traffic congestion – the extent will depend upon the parking price. However, the cut in the use of cars is possible only if alternate means of transport are available to commuters. Being cognizant of this need we have identified/recommend several routes on which public transport must be initiated to encourage people to shift from personal vehicles to public transport. Finally, to get input from the city administration and experts, multiple stakeholders including the CDA, the District administration, and the Traffic Police were consulted at various stages of this study.

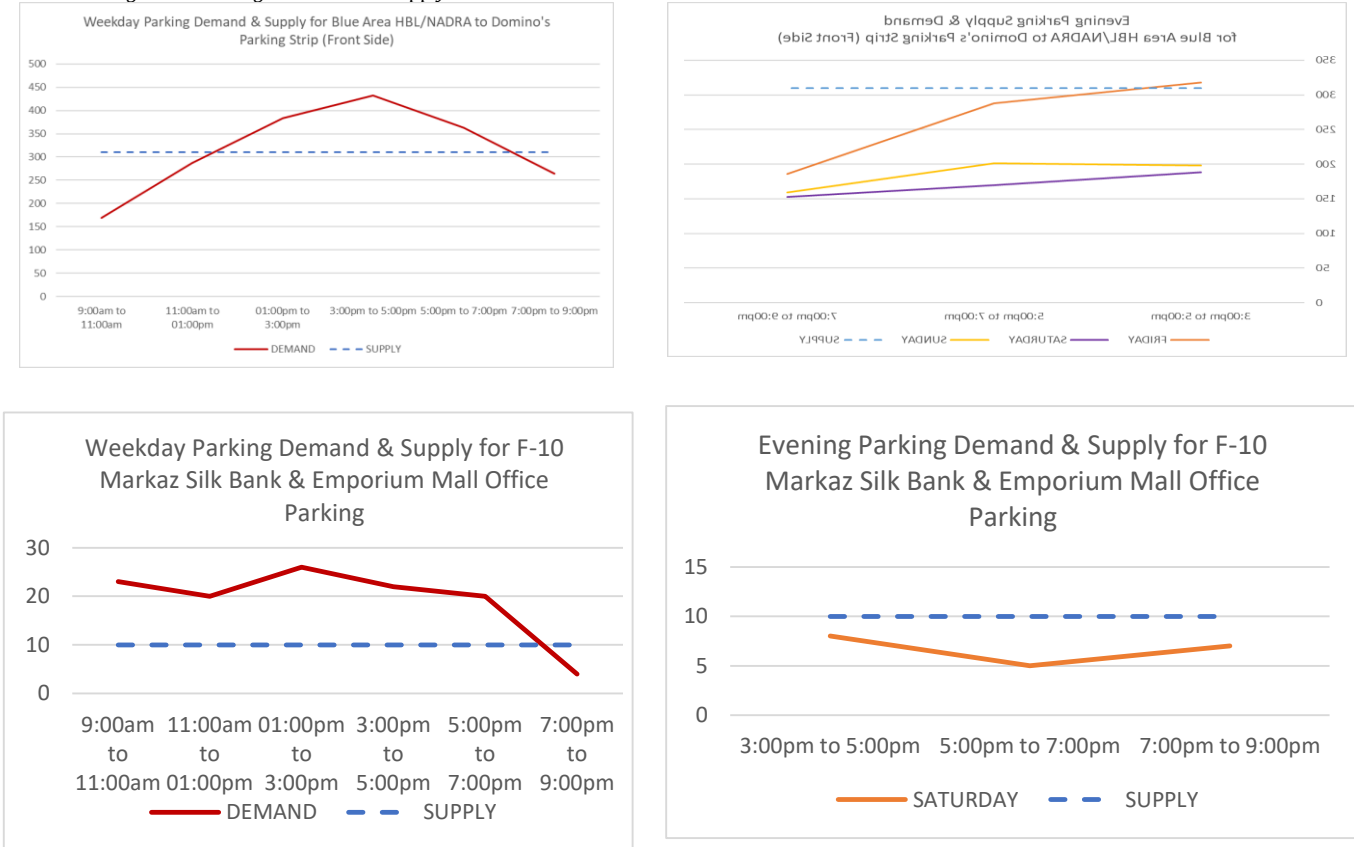
FINDINGS

Demand and Supply Survey Findings

The demand and supply survey helped us analyze the parking demand variations during; weekdays (daytime and evenings separately) and at weekends. For weekdays, which we term as Monday to

Thursday, in the context of this study, the survey was conducted from 9 am to 9 pm (in six-hour shifts) while for the weekend- evenings, which includes Friday, Saturday, and Sunday, the survey was conducted from 3 pm to 9 pm. Data from selected locations is plotted below (Figure 1).

Figure 1: Parking Demand and Supply

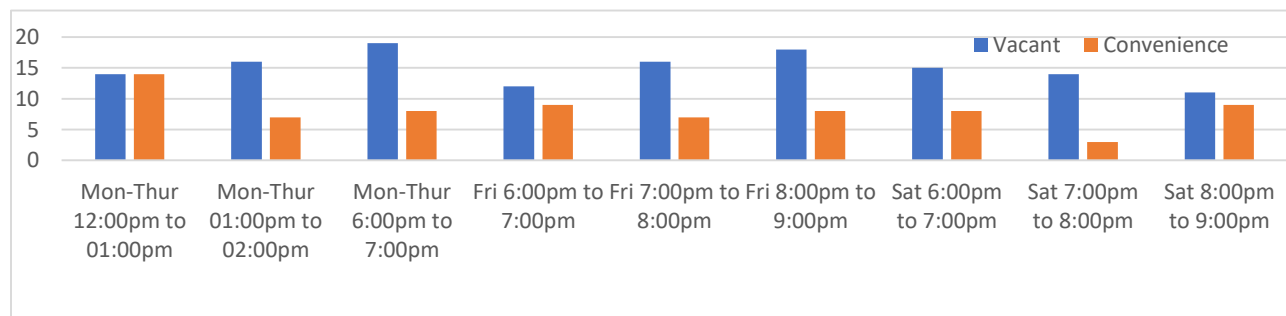


Visual inspection of the data clearly tells that there is;

1. Considerable excess demand for parking at several locations
2. Considerable variation in demand at locations and times of the day/week

An interesting finding from the survey is that there is considerable use of 'convenience parking' – parking outside the parking lots while sufficient space is still available within the lot (Figure 2).

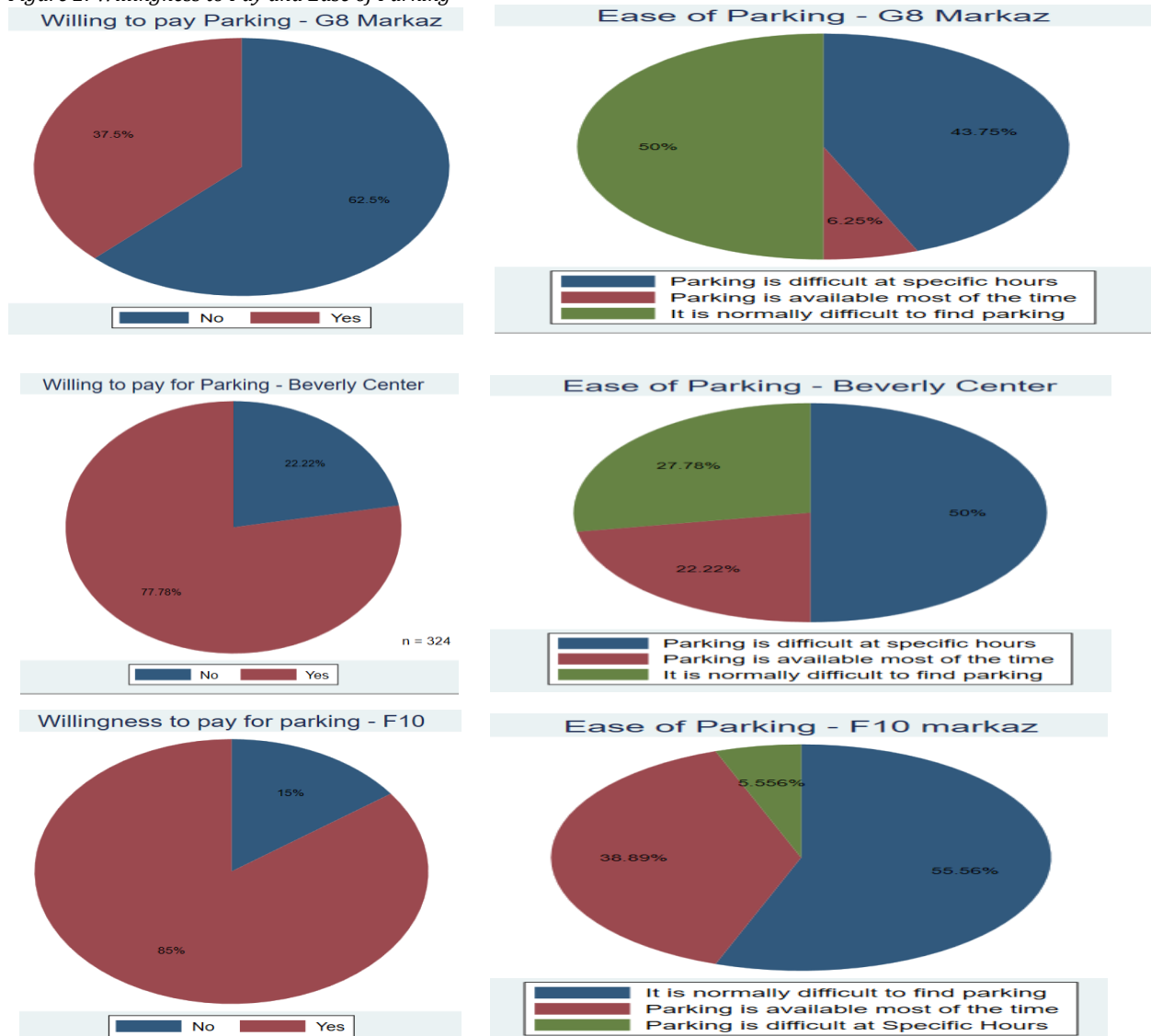
Figure 2 G-6 Aapara market



Willingness to Pay Survey Findings

Majority of the people expressed willingness to pay at least some amount as a parking fee for the purpose. This, however, was not the only finding from the survey. Response to the questions included in the questionnaire also helped us identify the extent of the difficulty experienced by drivers in finding a parking space. For instance, 78% people expressed willingness to pay for parking in Beverly center (in blue area) while 85% were willing to pay in F-10 markaz. The number however came down to just 37.5% in G-8 markaz despite over 93% people expressing difficulty in finding parking there. This suggests that willingness to pay is related to the difficulty experienced as well as income level of the car owners parking at specific locations (Fig 3).

Figure 2: Willingness to Pay and Ease of Parking



Pricing Models

Considering the data collected through the two surveys - Demand & Supply and the willingness to pay survey, we suggest the following three pricing models. The selection of a specific model would depend upon the conditions that prevail in a market/parking lot.

- i. **Flat Pricing:** This is a single per hour rate applicable throughout the day. This is useful for parking areas where there is minimal variation in parking demand during the day.
- ii. **Peak Hour Pricing:** This pricing is suitable for market areas where parking demand remains low in most hours of the day, but in some specific hours there is excess demand. This would discourage people from visiting the place during peak hours unless it is necessary. This may help in shifting the flow to non-peak hours.
- iii. **Marginal Pricing:** This refers to the additional cost incurred for parking a vehicle for an additional unit of time. Our data shows that 35% of vehicles in all marketplaces occupy parking space for more than two hours. Marginal pricing can be used in this situation to discourage long-duration parking.

Public Transport as an Alternate Mobility Source

As mentioned above, introducing a parking fee is more feasible only if alternate mobility sources are available. Public transport, presently negligible in Islamabad, is the major alternate source that we recommend. Our survey findings show that around 50% of the people using cars will be willing to shift to public transport for intra-city commute if it is available from near their residence to the destination. The data also shows that most of the people who visit marketplaces in Islamabad have a driving-time 10-30 minutes to reach their destination, implying that come from within Islamabad (See Figure 4 and Figure 5).

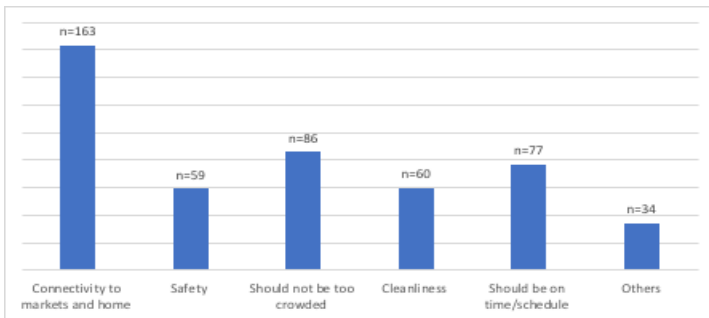


Figure 3: Desired Improvements in Public Transport

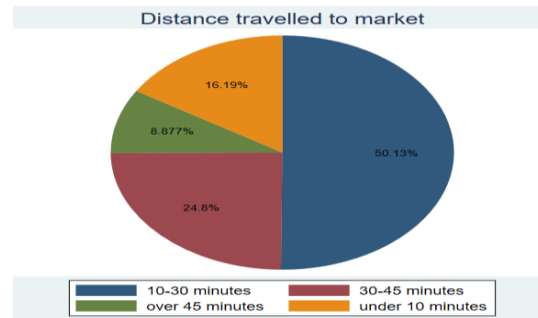


Figure 4: Distance Travelled to Market

Presently, two metro routes serve Islamabad, while the CDA is planning to introduce three new shuttle service routes that would mostly serve people traveling from the outskirts of Islamabad to within the city. Those moving around within Islamabad will still be without any significant public transport system. Given this backdrop, we suggest new routes for public transport for travel within

Islamabad. Figure 6 shows the existing, CDA's planned routes and the additional routes that we suggest for public transport within Islamabad.

IMPLEMENTATION STRATEGY

We have framed a conceptual design and implementation guidelines to implement the paid parking in Islamabad. This is described below.

- I. Identifying Parking type: The types of parking feasible for different conditions are described in Table 2 below.

Table 2: Types of Parking

PARKING TYPE	ADVANTAGES/DISADVANTES
Perpendicular	Enables two-way traffic flow but always presents risk of collision with other vehicles while also requiring the most space
Parallel	Although difficult to execute parallel parking but is the most beneficial in narrow parking areas
30 Degree	Allows buffer space between parking spots and thus makes it safer than the above two while requiring less space than 45 and 60 degree parking
45 Degree	No buffer space is possible between parking spots but it fits more cars than parallel and 30-degree parking. It is also easier to maneuver vehicle through such a parking spot.
60 Degree	The easiest way to maneuver your vehicle into the parking sport and out of it is in the 60-degree parking spot. It also allows buffer space between two parking spots.

- II. Demarcating Parking: The parking spots will have to be numbered to make the exact location of the parking spot easily identifiable.
- III. Payment Methods: We suggest multiple payment methods to pay the parking fee. These include installing parking meters and using a custom-designed parking app to pay electronically
- IV. Monitoring and Enforcement: For the successful implementation of the paid parking initiative, effective monitoring and enforcement is a necessity. We suggest using a combination of CCTV cameras and traffic wardens to monitor violations and trends

Though congestion mitigation rather than revenue generation is the primary objective of introducing paid parking, however, our estimates suggest exercise is financially viable.

WAY FORWARD AND CONCLUSION

Going forward, we recommend the following to supplement the paid parking.

- a) Standardized vehicle license plate format
- b) Mandating driving license number for payment of parking fee
- c) Installation of parking sensors to monitor parking occupancy in real-time
- d) Option to book a parking spot before arrival
- e) Introducing a multi-purpose city card with RFID technology allowing payment of; parking fee, buying a ticket of public transport in the city, and any other fees/bills payable using a single card.

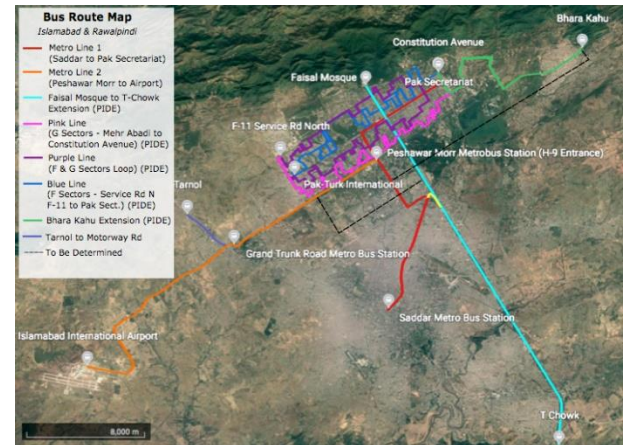


Figure 5: Existing, Planned and Recommended Public Transport Routes



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- f) Other Congestion Mitigation Strategies: Paid parking is an essential but just one strategy that contributes to congestion mitigation in the city. Few other strategies used globally that can be useful in our local context as well are mentioned below.
- I. Odd-Even Car Rationing: Specifying the days allowing entry of either odd or even-numbered vehicles in the city or on any specific road or area of the city to manage congestion
 - II. Car Pooling City App: Allows people to carpool on personal vehicles with people travelling from a similar location to a similar destination
 - III. Congestion Charges: An additional charge levied on vehicles with low occupancy entering any road or area at any specific time during the day when only 1-2 people are seated in the vehicle.
 - IV. High Occupancy Vehicle Lanes: Allowing speedy lanes to cars with more than two passengers.
 - V. Reversible Lanes: Lanes that could be used to allow vehicles to travel in either direction (only one direction at any given time) based upon the rush on the road and the need for traffic flow management.

Alain Bertaud (Bertaud, 2018) in his book 'Order without Design' argues that cities are over-designed by planners and not subject to market forces resulting in extra costs to the society due to market inefficiencies. The introduction of paid parking will help reduce some of the inefficiencies in Islamabad and will ensure better management and use of public land. Moving forward, a similar proposal can be developed for other cities facing similar and, in some cases, more severe challenges of traffic congestion.

REFERENCES

Shoup, Donald C. (2005) *The High Cost of Free Parking*, Chicago, IL: American Planning Association, Planners Press.

Bertaud, A. (2018). *Order Without Design: How Markets Shape Cities*. MIT Press.