

# A Case Study: Growing Parking Issues and Effective Parking Management Strategies

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**ABSTRACT:** In today’s world, many Indian cities are witnessing a spurt in urban growth. This increase in urban growth is accompanied by the growth in private vehicle ownership. With an explosive growth in the number of automobiles, the demand for parking escalates which results in footpaths and available open spaces being swallowed by informal and formal parking lots. The paper talks about the issues the Indian cities are facing due to ongoing growth of parking demands and the best possible solutions that can be placed in context of it. The current approach of increasing the number of parking lots and reduction in parking rates to keep up with the rising demand doesn’t solve the problem completely. The paper focuses on solving the parking issue by zonal distribution of parking lots. Also, the reformation of existing parking policies and its several dimensions will be the key approach.

**KEYWORDS:** Growth; Private vehicle ownership; Parking demands; Parking policies; Parking management.

## I. INTRODUCTION

In India, buying a car is not an essential part of necessity, it somehow acts as an object that tells about the status symbol of an individual in the society. More and luxurious the car is, wealthier and influential a person is. Today in countries like U.S.A, Japan, Europe, the car ownership is above 450 cars per 1000 population. While in case of India, it is 13 cars per 1000 population [1],[1] Though comparison is completely unjustified but even though with such a less number of cars per 1000 population we are facing a tremendous issues related to the parking of these cars [1]. [1]. Car ownership in million plus cities of India is illustrated in Figure 1. given below.

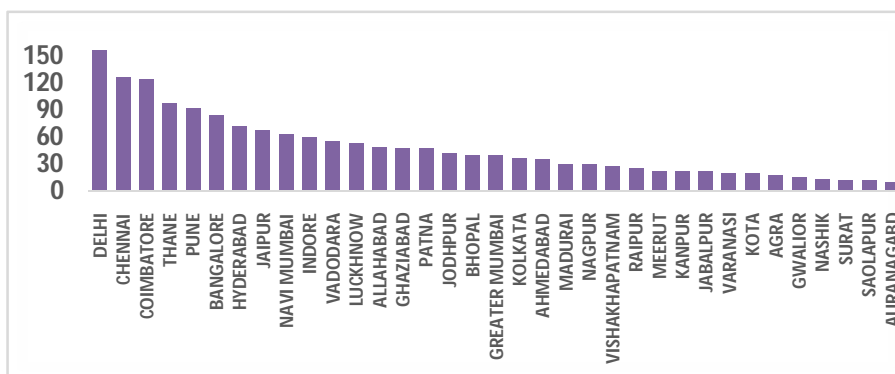


Figure 1. Graph showing car ownership in Million Plus cities of India

Source: TERI

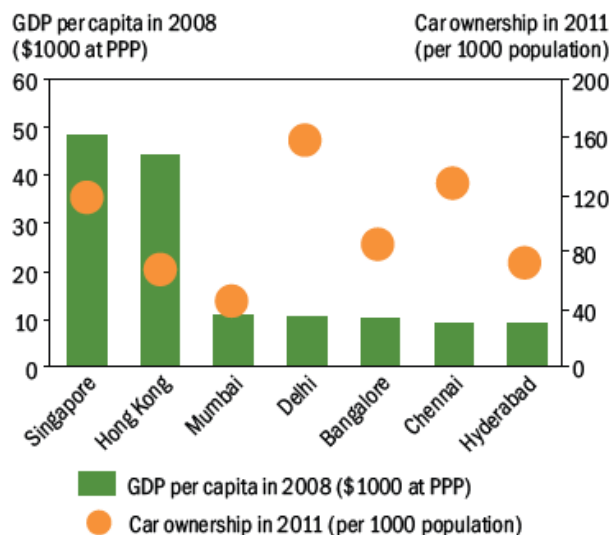
# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 2, February 2017

Taking examples of Hong Kong and Singapore, which are one of the two cities around the world having highest per capita income when compared to the Indian cities in context of car ownership falls short or even half in some cases when compared to cities like Delhi, Chennai etc. The citizens in case of Singapore and Hong Kong can easily afford cars but their low vehicle ownership can simply be a result of their policies which focuses predominantly on mobility for all rather than mobility for automobiles. Car ownership Vs. Gross Domestic Product (GDP) is illustrated in Figure 2 given below.



There is a major contribution of an automobile manufacturing industry in India's growth. In the year 2010-2011 GDP, the contribution of an automobile industry comes up to about 6 percent. It resulted as one of the important ways of providing employment to 13.1 million workers [2]. (MoHIPE, 2012) The dependency of individuals on private vehicles has enhanced due to lack in appropriate facilities of public transport.

## II. PARKING RELATED ISSUES

Parking demand is ravenous. Uncontrolled conditions of parking supply results in increasing dependency on motorized vehicles majorly cars. Cars are belligerently encroaching the limited urban space that can have other and more important uses.

Due to unplanned provisions of on - street planning, the road and footpaths are being engulfed for the purpose of parking the vehicles on it. Due to improper parking management, the pedestrians suffer. Unplanned and on-road parking engulfs the space for pedestrians.

By providing the space designated to pedestrians, for parking the motorized vehicles, enhances the car owners to use more number of cars. There is an improper way for pricing the parked vehicles.

In context with the urban land, the illegal parking of vehicles on the undesignated areas has enhanced the other social issues. An area of 23 sq. metres is needed to park a car. Though a city can never afford so much land meant for parking purpose. A large proportion of land is needed to provide parking for very few number of persons.

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Vol. 6, Issue 2, February 2017

## III. BENEFITS OF PARKING MANAGEMENT

Parking if managed properly not only decreases the demand for parking but also restrains the car usage. Some of the benefits of the well managed parking and parking restraints are as follows.

### I. Benefits to the user

The car users can reduce their time spent during search for available parking spaces, by knowing the places having empty parking lots. It not only reduces the time taken to search for a parking lot but also reduces the amount of fuel spent by the user. In order to make the process transparent in nature, efficient ways should be considered for billing purpose.

### II. Benefits to other persons

If parking is carried in a managed way, it will protect the sidewalks and footpaths, that are meant majorly for the pedestrians. A common area parking majorly for ambulances and fire trucks; enhances the safety and deals with providing health related facilities on time. If a car is parked in the facade of a commercial shop, it behaves as a barrier in front of the shop. The walking zone provided in front of the shops enhances the sales of the shops. It results in the growing mixed use development all through the street.

### III. Benefits related to Environment

To control the increasing problem of air pollution, a well-managed parking system can be initialized. Long term exposure to polluted air results in various diseases like asthma, cardiac problems. Elder persons are the major victims of several diseases due to air pollution and noise pollution. Rising number of motorized vehicular traffic increases the congestion and air pollution. If travel demand management is carried out incorporating the parking policies, it helps in reducing the number of car users and along with it, reduction will be observed in the air emissions and congestion. In the New York, reducing the spaces provided for parking and increasing the fees incurred for parking to a higher rates had resulted in lowering down the number of car owners in the city. In Portland, Oregon has experienced an increase in the usage of the public transportation services by providing parking facilities.

## IV. CASE STUDY: EUROPEAN CITIES

### I. Reformation of Parking Policies in European Cities

The World has incorporated the interventions of parking policies provided by European cities. The citizens of the European cities were frustrated due to the encroachment of the public spaces and footpath due to the increasing on-street parking. The area under parking varies from 15 sq. m to 30 sq. m per individual. It is observed that increasing the parking garages won't reduce the increasing congestion on the urban roads. People even travel more and create more nuisance while searching the parking lots [3]. [2]

Different parking reforms and management strategies have come up with their respective interest. Few of them had the air quality as one of the major reasons behind the given reform. Reduction in the usage of private motorized vehicular traffic also resulted in the formation of policies. The policies do affects the area available for the purpose of parking in a city. The policies for on-street parking are municipal policy while in the case of off- street parking, the building regulations are considered.

### II. Effective Parking Management Strategies Followed in European Cities

Four main approaches that are used for effective parking management are: - Economic mechanisms, Regulatory mechanisms, Physical design, Quality of service contracting.

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## A. ECONOMIC MECHANISM

In order to maintain an occupancy rate of 85%, most of the cities have agreed to the proposal of proving on-street and off-street parking fees. Many of the progressing cities are earmarking the revenues collected through the parking in order to support the public transit system.

- 1) *Pricing*: In order to keep the occupancy rate of parking spaces at 85%, the European cities have set the parking fees that varies at different locations. Cities like Strasbourg have left behind several US cities in terms of well coordinating the on-street and off-street parking supply and pricing [3]. [2].
- 2) *Emission-Based Parking Charges*: Based on the emission levels of carbon dioxide gas, the parking charges for vehicles vary in Amsterdam. Vehicles that will pollute more will pay high parking rates.
- 3) *Workplace Levies*: In Nottingham, UK, the companies having more than ten parking lots have to pay a tax of £250 annually. Cities like Hamburg are giving provisions for lesser parking spaces to the employees [3]. [2]
- 4) *Earmarking/ Ring Fencing*: Revenue generated from parking fees is utilized by supporting the sustainable transport goals. In Barcelona, all the generated parking fees is used directly for the purpose of supporting biking [3]. [2]

## B. REGULATORY MECHANISMS

While internationally, most cities force developers to construct a lesser number of parking spaces. In Europe these minimums are quite low, and they are particularly low around transit stations. More cities are also regulating where parking is allowed in such ways that improves the quality of public space and discourages car use.

- 1) *Parking Supply Caps*: There is no space available for the parking purpose in the heart of the city majorly the central business district area of the city in case of cities like Zurich. In order to make available the space for utilizing it for other purposes rather than parking, new spaces are allotted for off-street parking. New parking spaces are provided after considering the capacity of the adjoining roads and the air quality of the particular areas [3]. [2]
- 2) *Parking Maximums*: Previously, the planners thought of giving the contracts of constructing the parking spaces to the private builders will help them but they forgot that it will emphasize the builders to construct more number of parking spaces. This not only reduces the amount of land available for development but also increases the car usage. European cities are now abolishing these policies to deal with this unexpected outgrown problem [3]. [2]. Paris abolished the parking minimum requirements. Several other cities have established the zone-based mechanism. The cities of Dutch has divided their areas into three zones: Zone A, Zone B, Zone C; Zone A provides good transit facility while poor access to cars. Zone B are the areas having facilities to both transit as well as cars. Zone C has poor access to public transit system. Parking facilities and charges changes according to the zones.
- 3) *Regulating the Location of Parking*: To encourage the transit use and create much vibrant street life, the European cities have utilized this power of relocating the parking spaces at different time intervals of the day more frequently. Many cities have provided the parking spaces at the peripheral locations so as to provide the transit users and the cyclists more convenience than private motorists.

## C. PHYSICAL DESIGN

In Europe, streets are being designed with the aim to minimize the adverse impact on pedestrians of vehicles entering parking facilities. To prevent the encroachment of the pedestrian space by the parking vehicles, the bollards are extensively being used.

- 1) *Bollards*: As the vehicles being parked on the walkways enhances the safety issues, these can be avoided by providing the physical obstructions in the form of erecting the bollards wherever needed.

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Vol. 6, Issue 2, February 2017

- 2) *Striped Lines*: Stockholm uses painted lines to mark the spaces as reserved for the vehicles. At times the entire sections of curb side are demarcated with one large box [3].[2]
- 3) *Repurposing Public Spaces*: Copenhagen has eliminated hundreds of its parking spaces to create paths for bicyclists and pedestrians. A city can encourage the use of public transportation systems by reducing the number of on-street parking spaces [3].[2]
- 4) *Street Geometry*: By arranging the existing parking spaces can help in making the street more comfortable for other users. In Zurich, alternating the parking spaces on the two sides of a street acts as a chicane that slows down the vehicular speed. Paris and Copenhagen uses the parked vehicles as a barrier to protect the bicyclists [3].[2].

## D. QUALITY OF SERVICE CONTRACTING AND TECHNOLOGIES

Government has moved to more austere times, setting up performance-based contracts to handle functions such as fee collection and enforcement can help meet parking-related policy targets most efficiently.

- 1) *Electronic Parking Guidance Systems*: While searching for the available parking space, a person spends nearly 25% of his travel time. By installing the advanced technology that provides information about the real-time available parking spaces, it can be resolved. These systems are already installed in cities like Barcelona, Antwerp, Paris [3].[2]
- 2) *Pay-by-phone*: The payment of the parking charges should be done through phone. It not only saves time but also eliminates the problems of corruption.
- 3) *Smart Meters*: Paris uses this technology, it helps in recognizing the vehicle using the magnetic induction through the installed smart meters. It provides the information about the stay of a particular vehicle in the parking space.
- 4) *Scan Cars*: To improve the performance of a parking program, it is essential that all the vehicles should be registered. This technology helps in scanning all the cars and then monitoring it.

## V. INTERVENTIONS TO BE CONSIDERED WHILE REFORMING THE PARKING POLICIES IN INDIAN CITIES

Some of the possible interventions that could be considered from while reforming the parking policies in Indian cities are: -

The entire city should be divided into several zones, based on the level of congestion. The zoning may vary from city to city as per the city's characteristics. For instance, the zones can be named as *Zone A*, *Zone B* and *Zone C*. *Zone A* can be the multiple attraction points of the city. *Zone B* can be the zone with the major mobility corridors and *Zone C* will be the remaining area. As per the zones defined, the zones A and B should have well connected public transport facility. The parking should be highly restricted in several areas of these zones and other areas should have higher parking charges as compared with *Zone C*. All efforts shall be made to provide good public transport connectivity for areas in *Zone C*. This zone is presently not adequately served by the public transport within the city. This might encourage the people to use public transport over their private vehicles. The parking charges shall be decided after considering the zone, parking demand and Equivalent car space (ECS) of the vehicle.

Entry of freight vehicles should be prohibited to several areas mainly around the Central Business District. These vehicles should be allowed for off-loading the goods only at night or in early morning.

No parking charges should be applied on the cycles and school buses to encourage the use of cycles.

Pickup points and convenient parking for para-transit should be provided within the city. While considering the land use, there should be pickup and drop off points available near all the hospitals and other medical establishments. At the railway stations; based on the parking demand, the commuter parking shall be provided in order to facilitate the commuters.

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Vol. 6, Issue 2, February 2017

The strategy for the management of parking spaces, zone wise is shown in the Table1. given below.

Table. I. Representing the Zone-Wise Implementation Strategies.

	<i>ZONE A</i>	<i>ZONE B</i>	<i>ZONE C</i>	<i>ZONE D</i>
<i>IMPLEMENTING PLACES</i>	Central Business Districts, market places.	100m buffer area, zones along major mobility corridors.	200m buffer area, beyond Zone B.	metro stations, universities, places of workshops.
PRICING	very high in peak hours, should vary according to vehicle size and fuel used(Compressed Natural Gas cars to be charged less).	less than Zone A and similar concepts of size and fuel depending on the pricing to be followed.	no parking price to attract more parking in this zone.	very high parking prices to make people shift to public transport.
UNIQUE SELLING POINT	use of parking guidance system, cash out private parking spaces in compensation of lesser taxes or higher floor area ratio.	using part of residential parking spaces during peak hours when parking spaces are empty in compensation to free water or low electricity charges.	similar to that of Zone B and creation of multi-level parking along with some commercial buildings responsible for maintenance and increasing competition among off - street parking places.	Parking guidance system, paid parking..

## VI. CONCLUSION

Looking around the case studies around the world it is pretty much evident that restraining people from using private cars is not a viable option or rather it won't be wrong to say that it isn't possible to have such solution. There is no such country which can make its population completely dependent on its public transport and especially in a county such as India where population of wards of few cities is equivalent to population of few European countries. Specifically, in the case of India, rather than restricting the parking spaces, the main focus should be on distributing the parking spaces which are concentrated in major attraction points which cannot be done in seclusion. This can only be achieved by promoting mixed land use, using non- motorized transport and other options. Accumulation of parking spaces over a small area creates such chaos which on public domain portrays itself as a problem to which parking restriction seems to be a solution. Parking spaces should spread, throughout the city in such a way that the minimum requirement of every individual is fulfilled. Several areas should not be clustered of these spaces, there should be availability of space for other activities. The preference should be given to the pedestrians mainly in the major locations. If proper distribution of parking spaces is done along with the proper implementation of the parking policies for the management of parking spaces, the increasing problem of parking can be solved. There is a need to provide major concern to the increasing problems faced by the Indian cities due to the parking by taking several interventions and applying them.

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ISSN(Online) : 2319-8753  
ISSN (Print) : 2347-6710

# International Journal of Innovative Research in Science, Engineering and Technology

*(An ISO 3297: 2007 Certified Organization)*

Website: [www.ijirset.com](http://www.ijirset.com)

Vol. 6, Issue 2, February 2017

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