

Impact Analysis of Parking on Traffic Congestion in Yeshwanthpur Central Business Area of Bangalore City: A Review

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Abstract:- India's population is rapidly increasing every year. With the fast expansion of metro cities throughout the world, the rate of parking generation continues to rise at an astonishing speed, causing serious parking issues in most metropolitan regions. Even though a shortage of parking is not the main cause of traffic congestion, it is a significant one. Drivers seeking free or low-cost on-street parking may choose to avoid off-street parking in order to save money and add to traffic congestion. Off-street parking that is too far away from shopping or retail establishments may induce cars to circle in search of more convenient parking. Congestion and parking are also linked since searching for a parking spot contributes to delays and prevents local circulation. One of the most serious challenges that urban planners and traffic engineers confront is parking, must be solved before any measures to improve the situation can be devised, basic information on the availability of parking spots, the extent of their use, and parking demand is required. Basic statistics on the availability of parking spots, the extent to which they are used, and parking demand are required before any steps to improve the situation can be established. Multi-level parking systems have long been a source of relief because they provide a variety of advantages, including better space utilization, lower maintenance and operational costs, lower construction costs, a secure and environmentally friendly nature, driver comfort, and cost savings for builders by reducing height or depth. They provide benefits such as safety, space, time, and fuel savings, but they also necessitate a more thorough and in-depth review of the parking requirements, available space, and traffic flow.

Keywords:- Metro cities, Central Business Area, Parking, Traffic Congestion, Parking Demand, Multi –Level Parking,.

I. INTRODUCTION

India's ever-increasing population has caused plenty of issues. Car parking is one of the most difficult challenges we face on a daily basis. Apart from the issue of space for moving automobiles on the road, there is also the issue of space for parked vehicles, which is complicated by the fact that most private vehicles are parked for the majority of their time. While residential projects continue to include dedicated parking, the true issue is often with business spaces, which may be solved by using more open parking

spots. One of the primary issues brought on by increased road traffic is parking. It is a result of the evolution of transportation. The scarcity of parking spaces in metropolitan areas has raised demand, particularly in regions like the Central Business District.

Different types of buildings have different parking needs. Only a common parking place is required for residential plots of less than 300 square meters. A minimum of one-fourth of the open land on a residential plot of 500 to 1000 sq.m should be set aside for parking. For every 70 square meters of office space, at least one parking place may be required. In a restaurant, one parking place is sufficient for 10 seats, but theatres and movie halls require just one parking space for 20 seats. As a result, various land use zones have varying parking needs.

Parking is a major issue in India's megacities and towns. Because of the large number of automobiles on the road in India, parking has become a major issue, coupled with pollution and bad road conditions. There are two types of parking systems: off-street and on-street parking. It is available on the street. On the one hand, off-street parking is common in large shopping malls and theatres, as well as large offices that are used by employers, customers, and other stakeholders; on the other hand, on-street parking is a traffic problem generator because it is directly implemented by market stake holders, with single parking spaces, and thus has a high demand, and is also known as public property. The problem can be solved by conducting an accurate survey and managing traffic and pedestrians in a methodical manner. Data on the availability of parking spaces, the amount to which they are used, and parking surveys are required before any actions for upgrading facilities are taken.

Congestion, accidents, pollution, and disruption to firefighting operations are some of the negative consequences of parking. Parking consumes a significant amount of street space, reducing road capacity. As a result, speed will be lowered, but trip duration and delay would rise. The vehicle's operating costs rise, resulting in a significant economic loss for the community. They also pollute the environment by causing noise and pollutants by stopping and starting automobiles when parking and unparking. They also have an aesthetic impact on structures because vehicles parked in every available place give the impression that the building is rising from a plinth of

automobiles. Data on the availability of parking spaces, the level of their use, and parking demand are required before any efforts to improve circumstances may be taken. It is also necessary to calculate parking fees. All of this information is supposed to be provided through parking surveys. Because the length of time spent parking varies depending on the vehicle, numerous statistics are utilized to determine the parking requirement.

Multi-level parking systems have long been a source of comfort since they offer a variety of benefits, including better space utilization, cheaper maintenance and operational costs, lower building costs (due to prefabrication), and a more secure and environmentally friendly environment. -environmentally friendly (the subterranean installation frees up outside area for landscaping), convenient for vehicles, and cost-effective for builders by reducing height or depth.

II. CRITICAL REVIEW ON IMPACT OF PARKING TRAFFIC CONGESTION IN CENTRAL BUSINESS AREA

➤ *Naitik Gandhi, Jayesh Juremalani (2019)*

This research is LOOK IN on- street parking problem in Godhar city in the state of Gujarat. Parking surveys have been conducted to gather information on parking availability and demand, as well as their impact on the current situation. For parking demand, a fixed period sampling survey approach is utilized, and a parking space inventory survey is conducted for parking supply in the research region. According to the analysis, peak demand and the parking index are about 1.5 times higher than availability, signaling an alarming stage in the parking crisis. The need for parking has been met by developing off-street parking facilities for on-street parking users, allowing them to park their vehicles securely while also benefiting the transportation system by enhancing carriage way width usage. The design of the multi-level parking space was done using Park CAD(5.0) and in accordance with the SP- 12(2015) Guidelines for parking facilities in urban areas. The study results were concluded in reducing the congestion of on- street parking and diverge the demand to off- street parking. ^[1]

➤ *Ehsan Amini, Shankar B (2017)*

This research aims to discuss parking issues in the central business district and makes recommendations for solutions and strategies to address the city of Sabzevar's main concerns about parking demand. The demand for parking in Sabzevar's central business district is rising, yet the level of service provided is declining. To address the parking problem in Sabzevar City's Central Business District, methods such as integrated grid transportation and public transportation service, fee reduction, and a multi-level automobile parking system as an alternative to conventional parking will be designed and implemented. ^[2]

➤ *Ashish Pandey, Akshay Gulghane (2020)*

This research makes an effort to understand the parking needs of the Indian market. The demand for parking is increasing every day, and there is a lack of effective understanding and management, resulting in an increase in on-street parking challenges. There is a need to develop the most appropriate approach that can be used to regulate and improve the existing parking situation. Increasing off- street parking options is not feasible everywhere, as land is a valuable resource that should not be wasted. To satisfy the expectations, the focus has been on bringing forward the fine evaluation of parking rules, parking demands, and rethinking the present parking scenario in cities, particularly in their CBD regions. There are a few solutions that can be proposed to solve the parking issues. The adoption of a zone-based parking system across the city, which discourages the usage of private automobiles in the city's central business areas. This can be accomplished by improving regional public transportation, distinguishing parking based on vehicle categories, and imposing heavy fines on parking violators and encroachers. It is also recognized that, despite the lack of space, parking may be handled to some extent, but sufficient public education must be provided. As a result, the three E's (Engineering, Education, and Enforcement) must be addressed. If on-street parking must be controlled, minimal charges should be collected so that appropriate maintenance of the parking places may be done by an independent authority. This would not only improve administration, but it would also discourage the use of motorized transport. ^[3]

➤ *Pinky Rome, Sayantani Mukherjee (2013)*

This research concentrates on car parking issues in Kolkata and analyzed that a motorist always considers a free and pleasant parking spot to be an incentive to utilize personal automobiles. This has led in an increase in private automobile traffic and congestion issues as a result of a lack of facilities and mismanagement of parking lots, and it is not an unusual occurrence in big cities. The author considered three study sites in the city of Kolkata. Due to a scarcity of parking, there is a lot of on-street parking and encroachment on the sidewalks. In many instances, on- street parking spots are poorly planned, false, or unlawful. The suggested measures were developed by gathering macroscopic data on peak hour parking length. It is clear that the main reason is a shortage of parking spots, illegally parking, and a lack of public awareness, which leads to parking and traffic congestion every day. Suggested methods include proper management, entrance restrictions, effective pricing, multimodal integration, public awareness, and severe enforcement and penalization. ^[4]

➤ *Subhadip Biswas, Indrajith Gosh, Satish Chandra (2017)*

This study has shown a realistic parking scenario. Parking facilities contribute to an area's economic and commercial growth. The study then illustrates the benefits of road user safety by providing on-street parking and how it decreases accident percentages on various types of roads, as well as the implications of road capacity by demonstrating how parking reduces road width and generates congestion.

Measures such as removing angled parking from the CBD and replacing it with parallel parking, which causes fewer accidents but takes up more space. It also includes a numerical analysis of whether street parking impacts speed and the accident rates related with it.^[5]

➤ *Mahak Dawra, Sahil Kulshreshtha (2017)*

In this study they have analyzed the growth of Indian cities has been considerable in recent years, resulting in an increase in the level of living, which has led in an increase in the need for parking, particularly in commercial areas. Increasing the number of parking spots isn't the only option, good management and system approaches may also be used to make the most use of the available resources. It proposes a way of parking zone distribution to balance out demand on a broader scale. If correctly understood, the city has plenty parking places, however the difficulty occurs during peak hours in the commercial district. Drivers park illegally or incorrectly as a result of ineffective management. The study discusses zonal distribution, i.e. zones A, B, C, and D, which are divided into three to four zones. A efficient public transportation network will be enforced in Zone A, with car admittance prohibited. Parking can be discouraged by high parking fees. Zone B includes locations with mixed transit and vehicle characteristics. Parking is reasonably priced. Zone C has a lot of area and hence limited access to public transportation. Parking is free in order to encourage people to park here and then take public transportation. Parking facilities and prices vary depending on zone and weather conditions. Finally, parking should be scattered across the city to reduce the pressure on the CBD regions, and the objective should be to have private and public cars operate in tandem to satisfy parking demands.^[6]

➤ *Prabhat Pandey, Akshit Lamba, Swati Agrawal (2021)*

The purpose of this review is to understand the various architectures, algebra, and the fundamental portion of the staggered vehicle departs in India. The agreement with various basic frameworks, as well as the type of decking frame work, has been investigated. The steel-substantial composite option is a more cost-effective arrangement than RCC for the building of skyscraper staggered vehicle exit framework, according to the writing assessment. The split level sort vehicle leaves have been considered while deciding on the math of vehicle leave structure. Over the other practical foundation, it also provides a powerful and efficient arrangement. The dominant worksheet was used to complete the plan portion of the steel-substantial composite development, such as the deck chunk and brace. When considering composite construction, the analysis demonstrates that multilevel car park development is cost effective. Another result is that when a braced frame is used instead of a moment resistant frame, the weight is reduced by 3.7 percent. The decrease in deflection may also be seen. The load-bearing behaviour of the moment frame via element bending results in a substantial column and girder end moment, which necessitates the use of a bigger section. The connection cost will be impacted by the higher design end moment.^[7]

➤ *B. Infant Malcolm (2018)*

This research presents the findings of a traffic flow study on the effects of on-street parking. In Tiruppur, the research was conducted. Two research locations were chosen, both of which are located on busy roadways that serve retail and commercial operations. The poll was conducted on two weekdays and one weekend day those are Tuesday, Thursday, and Saturday. The survey took place from 9.00 a.m. to 10.15 a.m. on Tuesday, Thursday, and Saturday, and from 5.00 p.m. to 6.15 p.m. on Tuesday, Thursday, and Saturday, respectively. Traffic influx and outflow statistics were obtained from video cameras. The survey was done three times for each route on various days, and the data of vehicles parked was collected manually. Data such as vehicle type and entry time were retrieved from video using the Manual Count Made Easy voice recognition software developed at IIT Madras. PTV-VISSIM is a multi-model simulation software that is utilized in this research. It was used to build roadways and simulate traffic movement. As a result, the significance and feasibility of modelling real-world field traffic have been demonstrated using gathered data. As a consequence, the parking study is completed by collecting data for two sites three times. Data collection through video capture is more accurate and takes less time. As a result, it reduces human error and time consumption in data collection. This video clip is converted to a text file using MCME V2 (Manual Count Made Easy). The collected parking data is used in simulation. The simplest way to justify this quandary is through simulation. It is the most modern method of finding a solution.^[8]

➤ *Y. Cao & Z. Z. Yang & Z. Y. Zuo (2016)*

The purpose of this study was to find out whether curb parking influenced people's lives. The consequences for capacity and traffic, and to come up with some fair and practical traffic control methods. The issue of security is being considered. Methods Four route segments with on-street parking were chosen. As the site of the inquiry there are various components to traffic and they are all important. After then, a variety of metrics, including traffic, were examined and counted. Flow volume, speed, headway, and traffic conflict are only a few of the factors to consider. The study's research area consists of four conventional road segments with on-street parking. Despite the modest number of research sites, similar investigations can still refer to the general regularity found via theoretical and practical analysis. And it was concluded that curb parking has a substantial impact on traffic operation safety however, it may be enhanced by employing traffic safety management techniques.^[9]

➤ *Lambang Basri Said, Ilham Syafey (2021)*

The purpose of this research is to investigate congestion and parking spots in order to build a behavioral model of congestion, parking, and traffic performance, as well as to produce scenarios for forecasting congestion reduction in Makassar, Indonesia. The study was divided into three sections, which included the use of surveys to collect data on parking and congestion levels, as well as the public's perceptions in constructing a relating model for the link between parking and congestion. Furthermore, a

resolution scenario and projection model for lowering congestion from 2020 to 2050 were developed.

The findings revealed that severe congestion situations, which impair city transport services, happened as a result of crossroads, T junctions, U-turns, parking, and complicated events. In addition, the relating model revealed the assessment level and shown that fixing parking difficulties had a greater influence on reducing congestion. As a result, focus group discussions offer short, medium, and long-term remedies. Furthermore, estimates over the next 30 years indicate significant improvement when parking difficulties and traffic management are incorporated in congestion reduction initiatives^[10]

➤ *Dr. Kirti Mohan Sharma, Parmesh Prjapati and Mridul Jain (2017)*

The study focuses on issues in the context of Kota city. It is a developing city and the third largest city in Rajasthan. It is also part of the smart city initiative. The city has several companies and coaching centers that contribute to its economy. As a result, there is an increase in population and the amount of automobiles in this city has resulted in traffic congestion and parking issues. Our public space has not risen thus far, yet the population of this city is in the seven digits. Especially in the packed marketplaces, excellent parking spaces for 2 and 4 wheeled cars in the main region of our city are essential, and the government is still unable to handle our traffic concerns and increase parking spaces. The solution to the parking problem, and a healthy city environment should be are there primary concerns. At the city level, Kota requires a specific entity known as the Traffic and Transportation Authority. There are several answers, some of which are short-term in nature and others which are long-term in nature; but, they have work on a long-term strategy while also addressing any discomforts or difficulties that may arise. The study concluded that authority should develop master plans for inner, middle, and outer roadways to aid in the reduction of traffic congestion and accidents in key locations. By encouraging the usage of bicycles in the city, we can travel more comfortably by bicycle. As a result, this approach must be encouraged among coaching students in the city. Our road maps, zebra crossings, parking lots, instructions, and road markers all need to be improved.^[11]

➤ *Amrita Winaya (2020)*

The study intends to identify on-street parking in the Jl.Kapasan retail district, the repercussions of parking on the road, and the degree of service or performance of roads surrounding this shopping centre. The analysis methodologies employed are based on the Indonesian Highway Capacity Manual 1997. Based on calculations and study, the capacity of Jl.Kapasan without road parking was 1468. Pcu/hour and 1276 pcu/hour with on-street parking. Some of the findings that may be drawn as a result of the data collection and analysis are as follows: The largest parking space need is 598 square metres, and the lowest is 80.5 square metres, based on the calculation of parking space unit. The analysis of the road capacity revealed that there is a 192 pcu/hour difference in the capacity of the road

when there is on-street parking and when there is no on-street parking. The great majority of traffic through Jl.Kapasan is quite disrupted, as seen by the primarily C quality of service. It means that movement within the traffic flow is clearly restricted. The highest parking volume and accumulation was 47 vehicles, while the lowest was only 7 vehicles.^[12]

➤ *Ogundare, Babatope Andrew, Ogunbodede, Emman F (Ph.D) (2014)*

The study covered an empirical method to examine traffic congestion and parking difficulties in the study region of Akure, Nigeria. Twelve congestion locations were selected by field observation, and primary source data was utilised to determine the distance travelled within the research region, periods when traffic hold-ups occur, and time wasted due to traffic hold-up in a journey. Parking issues in Akure's Central Business District were identified as a key cause of traffic congestion in the research. As a result, the report suggests that traffic flow along important metropolitan highways should be monitored and managed on a regular basis. Parking is also required not just in the CBD but also in other designated land use zones.^[13]

➤ *Owais Ahmed Shaikh, Magandeep (2018)*

Parking issues in Srinagar's core business centre can have a direct impact on the region's economic development. The negative impacts of illegal parking have consequences that are harmful to economic growth. The area's main issues include traffic congestion, high accident rates, and high fuel wastage each year. However, if all of the automobiles in the area were parked in legal lots, the region's economic and social growth would be boosted. It is unavoidable that providing appropriate parking spaces will lower traffic congestion and accident rates. As a result, the workforce will be on time for work, annual fuel waste will be reduced, and firefighting operations will be made easier. The challenges caused by insufficient and illegal parking can push the city to the point of economic disaster if not addressed properly and efficiently. The growing disparity between parking availability and demand should be addressed in a methodical manner. All of these elements might contribute to the overall growth of the region.^[14]

➤ *Herin K.J, Jisha Akkara (2019)*

This study focuses on on-street and off-street choosing behavior and found that the data gathered for the study from various Central business area sub-areas was calculated to provide a global perspective of parking behavior in Central Business area, as well as advanced parking technologies and supply and management approaches including park and broadfacilities. The data utilized to estimate several log it models with varied utility functions. To address the problem, dynamic pricing or customer segmentation, as well as consumer/provider constraints, have been recommended. The database was then used to create a correlation matrix using the SPSS programme. These projected models aid a designer in creating a model that is appropriate for parking decision behaviour. Parking consumes a significant amount of street

space, reducing road capacity. As a result, speed will be lowered, but journey duration and delay would rise. The vehicle's operating costs rise, resulting in a significant economic loss for the community. According to a parking analysis of current traffic conditions on the road network, removing on- street parking is necessary for an effective transportation system. Careless parking and un-parking results in accidents. They also pollute the environment since cars stop and start when parking and un-parking, resulting in noise and emissions. To limit vehicle parking, they have taken remedial measures. To monitor and regulate parking in the short term, a pay-and-park system are used during peak hours. Besides that, there's one additional Long-term solutions was given is that within a 1-kilometer radius of the CBD, off-street parking must be available.^[15]

➤ *Mayuri PatelI, Sanjay Dave (2016)*

The study used descriptive and statistical models to predict the anticipated reaction to two proposed parking policy alternatives for on-street parking in Surat, Gujarat, based on the "NUTP (National urban transportation policy) 2006" standards. The city centers feature a mixed land use structure, with little off-street parking and a large number of prospective shoppers. They have done a 12-hour on-street parking inventory study using the License Plate technique, very little vehicle turnover was found on all six routes examined in the CBD region. In peak demand, around half of all two-wheeler parking is illegally, resulting in an overflow of parked cars that lasts virtually the whole day. Time constraint policy (progressive parking fee policy) and space restraint policy (priority parking for emergency vehicles such as ambulances, fire trucks, and disabled people, among others) were offered as parking policy options. Models were developed using data from a roadside field questionnaire survey of city visitors. They came to the conclusion that the amount of time spent parking and the amount of time it took to get there had a major impact on parking decisions. If the duration and travel time exceed the user's expectations, the user has the option to park off-street or change modes of transportation. If there is no longer any open parking, long-term parkers will move. Due to a shortage of supply against demand, parking spots in the study area are in short supply. This also illustrates people's preference for parking near their destination. Restriction noncompliance was frequent in the study area^[16]

➤ *Mr.Manish bhati, Dr.Sanjeev Gill (2018)*

This study is focused on various type of parking space and discussed about multi-level parking system and analyzed that. Conventional parking is becoming unfeasible as land in metropolitan centres and other higher-order cities becomes scarce and expensive, and plots get smaller. The multi-level vehicle parking system is the solution for the parking requirements since it maximizes automobile parking capacity by utilizing vertical space rather of extending horizontally. In terms of technology, automated (lift-based) is the most popular choice, with over 70% of consumers choosing it. According to the PARI Case Study, the Auto Car Parking System reduces parking and retrieval time. Saves time spent seeking for empty parking places as well as looking for a parked car. They concluded that the Auto

Car Parking System is ecologically friendly. Because the automotive engines are shut off during the autonomous parking operation, there is no pollution. The Auto Car Parking System is less expensive to maintain than standard parking systems. Automobile Parking System provides automobile parking solutions that fit the most cars in the smallest amount of space. The Automatic Car Parking System increases the financial sustainability of commercial and residential complexes.^[17]

➤ *Rutul M. Diyora, Henis M. Dhameliya (2020)*

This study is focused on assessment of on- street parking in congestion areas of Vadodara city and analyzed that, On-street parking is an issue in India's major cities, particularly in the downtown region. Due to a lack of data on on-street parking demand and the lack of a defined parking regulation, main roadways in the CBD area are operating as normal. As a result, a 12-hour parking inventory was conducted utilizing the license plate approach for two main urban streets in Vadodara's CBD region. According to the survey, demand outstripped supply, resulting in low inventory turnover for the majority of the time. This study attempted to simulate the reaction of car parkers utilizing on-street parking in the CBD region for a policy measure established within the guidelines of the National Urban Transport Policy (NUTP 2014). The survey data was analyzed using a fuzzy approach, which demonstrated that the driver's parking decision behaviour as impacted by household income, frequency of trips, and parking time.^[18]

➤ *Janak Parmar, Pritikana Das, Sanjay kumar M.Dave (2019)*

This study focuses on demand and characteristics in urban area, It explores previous studies that focused on parking features and advancements in parking decision behaviour models, both at the aggregate and disaggregate levels. The study also looked at a number of ways for anticipating parking demand. For developing parking demand forecasting models, a variety of approaches have been used, including linear regression, least square regression, unit graph technique, logistic models, principal component analysis, random utility and game theories, Gaussian mixture model, and grey correlation analysis. Parking issues are more critical in emerging nations, and only a little amount of study has been done in this area thus far. As a result, at the planning and design stages, urban transportation planners should properly grasp the interplay of parking factors. A lot of elements have a significant influence in affecting decision-making. The studies on strategies that might be beneficial for effective resource usage and have a favourable influence on the sustainable transportation concept have been evaluated. Parking policy should be regarded an intrinsic aspect of transportation planning and administration, which is extraordinary. In general, car- restricted parking policies and advances in public transportation play major roles in freezing or reducing private automobile traffic in metropolitan areas. It was concluded that expanding parking availability is not a viable solution to parking issues. Improvements in parking performance and a focus on sustainability will assist

transportation planners in creating a long-term parking ecosystem. Finally, the primary effects of car sharing have been briefly reviewed, with the potential to deliver enormous economic, social, and environmental advantages. All of these studies, when taken together, provide readers with valuable information on the parking system as a whole.^[19]

➤ *Ashish Pandey, Akshay Gulghane, Vatsal Shah, Dr. Bhalchandra Khode (2020)*

In this study they have gone through various case studies and analyzed the requirement for parking in India's CBD areas has risen to unprecedented levels, and poor management has resulted in traffic congestion and other issues. Finding the most efficient strategies to tackle the current parking situation appears to be the pressing necessity of the hour. Increasing the number of parking spots while lowering parking fees isn't enough to meet the demand. The focus has been on a careful examination of parking rules, parking demands, and revamping the present parking scenario in cities, particularly in their CBD regions, to fulfil the expectations. A transportation planner should be concerned about issues related to parking system mismanagement. Every car owner chooses a decent parking spot that is conveniently accessible, inexpensive, and close to the destination of the journey. It is critical to comprehend and facilitate the requirements of a good parking system. It has also been noticed that present parking spots are underused, hence there is no need to supply new parking places in most circumstances. A good study and literature are essential to comprehend the numerous factors in On-street parking studies and hence decide for various sorts of metrics. A variety of remedies are available, but they can only be implemented with adequate management and education of road users.^[20]

➤ *Javaid Ahmad Tali, Mohammad Reza Emtehani, Dr. Krishna Murthy, Dr. H. N. Nagendra (2012)*

The research focuses on the CBD area's future threads. Bangalore was chosen as the research location. Cities' Central Business Districts have been threatened by rapid expansion (CBD). This may be evident in people's desire to relocate to the outskirts. A number of academics have investigated the interplay inside municipal borders. Studying the characteristics of a city's CBD is quite intriguing. From 1971 to 2001, an attempt was made to examine developments in Bangalore's Central Business District. According to the statistics, the CBD land use pattern shows a tendency toward commercial usage, which covers a larger share of the CBD, and this trend is projected to continue in the coming years. Changes in land usage, population, land value, socio-economic profile, and future hazards have all been studied. And it's concluded that the centre of a metropolitan city, such as Bangalore, would become more concentrated as it becomes more valued owing to its position, functions, and accessibility. The incorporation of society's growing needs into core sectors must be mindful to certain existing functions and forms that have evolved through time. CBD must grow on its own, contending with the development of sub-centers in the surrounding areas. To accomplish this, it must be more adaptable in order to absorb new activities while

maintaining old functionality.^[21]

➤ *Rafiat Oluwatosin Omisore And Joseph O. Oyedep (2019)*

This study is focused on Evaluation of Off-Street Parking in Southeastern Nigeria's Central Business District. Parking rules and management methods have been shown to have a direct impact on land use, air quality, traffic congestion, travel behaviour, and economic growth. Having an efficient system for regulating off-street parking, however, remains a serious difficulty in large urban cities in Nigeria's southwest. Parking surveys were done in this study to assess the efficacy of employing both closed and open-ended questions. Three parking lots (CBP1, CBP2, and CBP3) and four road lots (CBR1, CBR2, CBR3, and CBR4) were used for the five main components of Akure's Central Business District in Ondo State, Nigeria. The collected data were analysed to determine the demand and supply of parking facilities in order to develop strategies for better and more efficient management of off-street parking in the study area, and their efficiency was calculated to be 42.5 percent, 69.52 percent, 74.88 percent, and 26.66 percent, respectively. When compared to Policy 7 of the Parking Space Requirements in Parking Code Guidance 2012 of the San Francisco Department of Transportation, the analysis demonstrates that CBP1 operated below the maximum capacity at parking indexes less than 50%, while CBP2 and CBP3 operated beyond the maximum capacity. The study reveals insufficient parking signs and a lack of enforcement by city management as a result, better communication, parking enforcement, operational efficiency, and parking signage provision should be implemented in the study region.^[22]

➤ *Mrs Priyanka. Kolhar (2012)*

This study focuses on on-street parking management plan for Dharwad city and analyze that the parking accumulation and supply survey in Dharwad was used to explore difficulties with present parking practises. WTP survey was done to determine potential users' willingness to pay the appropriate parking cost for the new services. Specific parking management solutions (short, medium, and long term) are reviewed, as well as how they might be applied. It is estimated the expenses of planned parking facilities, as well as the savings and improvements that can arise from better administration. Parking demand models are created using SPSS software. Short-term solutions with congestion pricing are advised to handle parking problems immediately since operation and maintenance costs are substantially lower for on-street parking management than off-street parking management, and the internal rate of return is higher in on-street parking management. However, a long-term management strategy (supply of multi-level parking) can be established depending on projected parking demand in the studied regions.^[23]

➤ *Joseph O. Oyedepo (2016)*

This research focuses on the performance of street parking in akure southwest Nigeria's Central Business Districts, which are heavily populated areas with parking challenges. Four parks in Nigeria's capital, Akure, were

chosen for further study. Parking surveys were conducted using both closed and open-ended questions to assess their parking index were 42.5 percent, 69.52 percent, 74.88percent, and 26.66 percent, respectively. When compared to Policy 7 of the Parking Space Requirements in Parking Code Guidance 2012 of the San Francisco Department of Transportation, the study shows that OFP1 and OFP4 operated below the maximum capacity at parking indexes less than 50%, while OFP2 and OFP3 operated above the maximum capacity. Furthermore, 50%, 36%, and 14% of respondents agreed that the facilities are inadequate, adequate, and extremely adequate, respectively. Management was found to be ineffective in terms of parking signs and enforcement. Appropriate and very appropriate are two words that come to mind while describing these two Management was found to be lacking in terms of parking notice and enforcement. However, in the study region, effective communication, parking enforcement, operational efficiency, and parking signs should all be implemented.^[24]

➤ *Er. Gurpreet Singh, Er. Harpreet Singh (2016)*

The purpose of this research of parking characteristics in Chandigarh's sector 17 is to determine the sufficiency of current parking spaces and the need for additional parking lots in the future. The issue is thoroughly explored, and possible as well as appropriate remedies are proposed to reduce the parking problem in the study region. The 17 sectors of Chandigarh city have been separated into several parking lots for research purposes. The research was carried out using a variety of approaches based on the number of registered vehicles, with a particular focus on the accumulation and duration study methodologies. Various parking metrics, such as peak accumulation (before and after lunch), parking volume, parking load, vehicle per space and vehicle participation in total accumulation, and average parking time in various lots, are computed and recorded. The findings and recommendations of this research will assist the administration in resolving the parking problem in Chandigarh's sector 17 and providing residents with a trouble-free parking place in the coming years.^[25]

III. CONCLUSION

Looking at numerous case studies under various circumstances, it has been found that parking studies, both on and off the street, are an important part for today's transportation planner. People acquire cars not just for transportation but also as a status symbol, resulting in a massive growth in the number of cars on the road today. Naturally, the toll has been imposed on the city's transportation network, as roadways in the city's central business district see daily traffic congestion. In addition, the number of accidents and pollution levels have risen. Mismanagement, according to studies, has been a key contributor to the failing to handle traffic demand. In most cases, it is also found that present parking spots are underutilized, and hence there is no need to create more parking places. A detailed research and review of the literature is important for understanding the numerous factors in on-street parking studies and, as a result, several sorts of interventions may be implemented. There are a

number of remedies available, but they can only be implemented with adequate education and management of road users.

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