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A Case Study on Indore BRTS with Reference to Other Indian Cities

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Abstract: ***Bus Rapid Transit refers to a set of coordinated changes to a transportation system's facilities, working conditions, efficiencies, and technologies that prioritise bus transportation on city streets. This article provides an overview of the Delhi and Pune BRT systems, also identifies some similar challenges in operating both systems, and offers some solutions to assist improvements in Indore BRTS significantly and effectively, avoiding the bottlenecks that plague Delhi & Pune BRTS. The main objective is to increase the speed of transportation by lowering the cost of public transit and making it accessible to individuals from all socio-economic backgrounds. It alleviates traffic congestion and promotes public transportation and lessens reliance on private cars to enhance the city's traffic management and reduce pollutants thus enhancing environmental conditions.*** *This paper attempts to review implementation of BRTS in Indore. The suggestions are given based on the research's analysis and findings.*

Keywords: BRTS, Delhi, Feeder, Indore, Public transport, Pune, Transport.

I. INTRODUCTION & LITERATURE REVIEW

India's transportation system is based on an anachronism of transit planning and design from the colonial era. Transportation is the backbone of Indian infrastructure. Transportation has had a significant impact on progress in many areas of life. The population of a country has an impact on its economy. Their job daily contributes to the country's overall advantage. The basic form of transportation has evolved over time to match the current nature of people's requirements. It is transportation that makes it possible for people and products to move around easily and conveniently. This necessitates the development of a well-developed and efficient transportation infrastructure which is capable of meeting the requirements of the country's rapidly rising population. An effective model is represented by its capacity to function even when faced with adversity. It consists of a network of the well-designed subsidiary system. Intriguingly, mostly all cities that adopted Bus Rapid Transit (BRT) as a mass transit option before the last millennium and began to consider Public Transportation with metro rail, but in the end, they discovered that the assets necessary to construct a metro rail service are just too large to afford, making this system a costly treatment for urban areas. The Bus Rapid Transit System (BRTS) is a revolutionary, high-capacity, low-cost public transportation technology that may increase urban mobility dramatically. It was also discovered that commuter rail-based public transportation is only conceivable in cities that get disproportionately high financing from their governments, which often have substantial resources as an advantage over state governments. Due to reduced investment needs and more operational flexibility, almost every city in the country has depended on one or more types of the bus system. As a result, private or state bus companies began providing the city's public transit demands all over the country. As a result of this fact, cities began to set aside space on highways for the bus system, which has resulted in the creation of wider bus lanes. The goal was to assure continuous bus circulation on the route to reduce travel time for consumers using public transit. In areas where traffic gridlock became a lifestyle, the concept appeared appealing. The BRT system is the name given to the new system that has emerged. The BRT system, which reserves road capacity for buses, has since been introduced in several cities with local modifications.

Congestion, mobility, and accessibility definitions are given to aid in the construction of performance measurements. The most easily accessible values are those based on travel time, and examples are presented to demonstrate how mobility may be quantified for sites, corridors, and transportation**[1]**. The current backdrop of the urban situation, common transportation challenges in Indian metropolitan areas, features and historical evolution of BRTS, and the necessity for transportation options in Indian metropolitan cities **[2].** Improved urban bus service might help to improve the environment in Indian cities by moving mobility away from private vehicles and toward more efficient, ecologically friendly, and safe means of transportation. It briefly examines the challenges surrounding the inefficient functioning of the present bus system in Indian cities, as well as some recommendations for improving the system's efficiency**[3].**

The findings suggest that BRTS has failed to interest both the poor and the wealthy people. Generally, BRTS serves mostly middle-income people, the majority of which are passive public transportation users. According to the findings, the most significant movement of users was from AMTS, which accounted for 47% of all users. Only 12% of BRTS customers had switched from private automobiles to the BRT system. **[4]**

A spreadsheet tool is used to obtain quantified performance data for numerous indicators for various planning and design combinations. The comparison is made between sixteen hypothetical configurations, two conventional designs in various situations, and two currently functioning design modifications. Bus operational speeds in open systems are around 25% lower than in closed systems, according to the findings. Increased operating speeds, on the other hand, do not compensate for passenger transfer delays for short voyages. For trips smaller than 10 kilometres, open systems enable faster passenger speeds than closed bus operations. For safety reasons, limiting peak bus speed to less than 40 km/h has no effect on passenger operating performance**[5].** Motorised transportation options, which are vital for inclusion and lowering the city's carbon impact, have also been overlooked. The study asks if public transportation should be considered as a technological repair or as part of a larger solution to urban socioeconomic challenges **[6].**

Various kinds of transportation cause traffic congestion. Due to the lack of a public transit system, road users must rely on their own vehicles or other modes of transportation. Many road users drive their own cars, which has a negative impact on overall transportation costs and the environment. On the stretch, traffic congestion is becoming worse by the day. Appropriate planning for the Public Transit System is required **[7].** According to the findings, in addition to BRTS, the majority of consumers use AMTS and personal automobiles as alternate modes of transportation. And the vast majority of BRTS clients use the company's services on a regular basis. And the majority of BRTS passengers are dissatisfied with the service. It's not necessary to raise the frequency, but it should be Double Decker. The seating is properly arranged. A music facility should be available to amuse clients. It should be for services that are available 24 hours a day, seven days a week. Smart card holders should also be given preferential treatment. People would prefer BRTS to AMTS because of the advantages of BRTS, such as timely availability, speed, comfort, and bus reach. While using BRTS, consumers feel protected and secure **[8].** The public transportation system is an important part of a country's growth. Performance evaluation is a method that may be used to analyse a company's performance. The word "performance evaluation" refers to the process of determining how effectively policies, programmes, and projects perform in relation to their intended goals and objectives. User satisfaction is an essential aspect of performance evaluation since it is a result of perceived performance, expectations, and outcomes. User satisfaction is proportional to the gap between service quality expectations and actual levels of service. As a result, assessing the operation of transportation systems requires measuring satisfaction and the relevance of measurements, as well as integrating them **[9].**

A. Delhi City

The National Capital Territory (NCT), often referred to as Delhi, is India's capital city. The Delhi BRT scheme began in 1997 as a dedicated bus lane effort in solution to the town's escalating pollutant concentrations. This was followed by a series of decisions, including a global forum on greater bus systems hosted by the Delhi Transport Corporation (DTC) in 2002, which included**[10]** a committee formed by the state government to propose 100 kilometres of dedicated central lanes; the formation of a core group to monitor the Committee's findings, and the state government's allocation of INR 1000 million to the development of BRT in 2003. The BRT took about eight years to develop from concept to execution, during which time a 5.8 kilometer pilot route was built and implemented out of the 100-km plan. The BRT system in Delhi is known as 'Open BRT' and it is shared with current bus services on improved dedicated lanes. Apart from DTC buses, all other vehicles, including hired buses, are permitted to use the route. The BRTS was intended as the centre median in the early stages of the first segment, which was a 5.8 km route. People took some time to adopt this new notion.

Despite the bad media attention, it is now widely accepted because of its numerous benefits. In certain corridors, the BRTS design has evolved from occupying the centre lane to kerb-side lanes. In the first phase, there is a combination of two types of corridors: a central median from Ambedkar Nagar to Moolchand, and a kerb-side lane from Moolchand to Delhi Gate. The bus-only lane is used by general traffic, and there are more left turns that can't be avoided, thus the kerb-side lane doesn't assist much with what BRTS is supposed to achieve and give in terms of safety, dependability, and operating speed. As a result, the buses experience delays. The initial corridors were recognised as routes with a wider road width that carry a large volume of traffic. Regardless of the dedicated lane, the BRT route provided quicker travel time for all buses operating along the corridor after it opened. However, after 8 years of operation (2008-2016), this 5.8 km pilot corridor was disassembled due to the discomfort it caused to individual transportation modes resulting in reduced road capacity and increased traffic jams.

B. Pune City

Pune is one of the districts of Maharashtra in India. The Pune Development Plan of 1987 intended to build a mega design for the town by dispersing retail and secondary sector employment agencies in a planned manner. Regional hubs were planned in a variety of sites, with important metropolitan routes connecting them according to Pune Municipal Corporation, 2006. Only peripheral roads link various portions of the city, all of which originate from or are near to the ancient centre. It lacks ringed roads to finish the infrastructure, and as a result, it is overly reliant on rings to get about the city.

1) Pune received clearance for a BRT development with a route length of 68.80 km and a budgeted cost of Rs 1013.97 crores under JnNURM.
2) A length of 16 kilometres out of a proposed system of 68.80 kilometres has been constructed.
3) BRT has had a route along Vishrantwadi since 2015, and by April 2016, the BRT on Nagar Road will be operational.
4) PMC would want to extend the same for the balance based on the lessons learned from the Pilot BRT, public perception, and the system as a paradigm.

Two BRT lines have been developed by the road department. Vishrantwadi-Alandi, Yerwada-Wagholi Route Network Expansion of the network. People in Pune are clamouring for more after seeing the 16-kilometre Rainbow network today. With 15 km of Rainbow pathways in the works, rapid growth is on the cards. In addition, the city is upgrading 15 kilometres of Pilot BRT lanes to match the Rainbow infrastructure. In Pimpri-Chinchwad, new corridors are being built. The Rainbow network in the Pune Metropolitan Region would be more than 90 km long when built, these corridors in the design phase are finished, offering speedy "Rainbow" travel to more than 7 lakh commuters.

C. Barriers Faced by Pune and Delhi BRTS

In the view of very precious time, the traffic signal signalling system is one of the most clamouring closures for BRTS buses. There was a requirement to make some changes in the Delhi area. The extended signal cycle is intended to favour mixed traffic rather than giving buses precedence. Pune is a special instance since the PMA consists of two municipal corporations and three cantonment boards that are operationally linked. Their governing organisations, on the other hand, have minimal collaborative efforts. Despite the foundation of PMPML, the PMC and PCMC maintain their former routes and operate separate BRT systems. PMPML has limited authority to bring both municipal corporations on board with a unified part of the documentation for these twin cities. Furthermore, the PMPML is solely responsible for the operation of the bus service, whilst the PMC and PCMC are in charge of building infrastructure such as roads, bus stops/terminals, depots, and so on. Furthermore, the PMPML lacks financial independence and is completely reliant on the PMC and PCMC for funding.

The limited length of the bus corridor is the second barrier. It would be beneficial to travellers if the road length were increased and the system was made more bus-friendly than it is today. Because the corridor in Delhi is just 5.8 kilometres long, the fast transit system has had little influence on travellers or as a distinct mode of public transit. The PMC, for its part, has spent all of the JnNURM funding on road expansion, repaving, and other infrastructure projects, therefore BRTS services have yet to start in much of the city. The BRTS was designed to help with transportation for the 2008 Commonwealth Youth Games, which was unable to complete on time. The PMC was opposed to the concept of a public road capacity.

The third obstacle is bus navigation at intersections, when buses become packed up and instead of halting at a predetermined location, halt at alternative locations. Here, there are primarily two issues that Delhi city faced: (i)There is chaos because of two simultaneous combinations of bus shelters in each direction before a junction, and the buses do not stop at the designated stops, (ii) the bus services had to merge into one single carriageway across the junction, and there is an insufficient area for the bus services to negotiate the path length. This leads the buses to pile up even more at the intersection. The fact that the signal sequence at the intersection does not benefit buses adds to the bus system's operational difficulties. In Pune, The BRT system has been criticised by the public since its beginning. The people were ignorant of the system's advantages. The use of promoting the service was not taken seriously. Rather, the system was in the news for all the opposite reasons including corridor accidents. Excluding the dedicated lanes, there are no differences between both the BRTS and regular PMPML lines. Additional issues, such as filthy and badly maintained bus stations, inconsistent bus services etc. are the same as compared to conventional bus services. As a result, the BRT has failed to create an effect on passengers. The fundamental cause for such BRTS corridor mishandling is a paucity of institutional coordination as well as a lack of agreement among governing authorities on BRT operations. In Pune, there have been several operating errors as well. The project was built in a hurry, which resulted in substandard construction in several areas. Only the new bus, especially BRTS drivers were taught, whereas the previous bus drivers were neither trained nor made aware of the corridor's use.

This caused several operational issues on the route, as some people followed the signs and directions while others did not. As the ticket inspectors were not informed beforehand of the project's implementation, they have been hesitant to impose new traffic laws that would ensure the system's smooth operation.

PROBLEMS	SUGGESTED SOLUTIONS
Long lines formed in the general traffic lanes.	The sensor must be installed on the bus and the signalised intersection so when the bus approaches the signal from a range of 300m-500m, the signal goes red to stop overall traffic and enable BRTS buses to continue operating unabated, and when the bus passes the signal, the signal turns green for congested areas.
Bus breakdowns disrupted the operation of the bus lanes and stations.	There should be a suitable communication system (ITMS) among buses and bus stations, so that bus stations and buses approaching from behind can take appropriate precautions to reduce gridlock and delays.
Jaywalking by pedestrians was frequent.	Subways or skyways should be available.
Some automobiles obstruct bus lanes.	Guards should be assigned at each intersection.
Bus occupancy is high in peak hours.	The regularity of the broadcasts should be enhanced.
Two-wheelers encroaching on bicycle paths in order to jump motorbike lineups.	On the cycling track, proper regulation must be given.

Table 2. Common BRT Issues in Delhi & Pune BRTS

D. Indore City

In Indore, the BRTS Project aimed to build six-lane roads. The project was supposed to be finished in 2009. However, owing to encroachment in numerous places but because of political meddling and a variety of other factors only half of it has been finished. As a result, an evaluation of the BRTS Project is required, as well as identification of the causes of its success and failure. Many deadlines have been projected for the completion of the BRTS project after 2009, but the construction is still incomplete. At the time of the work order's issue, a proper rate analysis was not completed. The government sanctioning and monitoring committee under the Jawaharlal Nehru National Urban Renewal Mission authorised the Indore BRTS in principle at a cost of Rs 96 crore (JNNURM). Within the city, seven routes have been identified for the development of the BRTS in stages. According to the overall mobility plan, several public transportation routes that would function as feeder routes were also selected. Development of five culverts and 23 bus stations, as well as flyovers at Bhanwar Kuan and Naulakha, is still unfinished, and work on one side of Palasia has only recently begun.Indore Municipal Corporation has built 21 bus stops. The building contract has been awarded to BR Goal, who is said to have shown little interest thus far. Rajeev Gandhi Square, Aditya Nagar, Indrapuri, Bhawarkuan, Holkar College, Zoo, GPO, MY Hospital, Geeta Bhavan, Palasia, Palasia Thana, Industry House, LIG Circle, Press Complex, Shalimar Residency, Orbit Mall, Vijay Nagar, Satya Sai School, Scheme 74, Shalimar Township, Scheme 78, and Lasudiya Mori will all have bus stops. The IDA will remodel all of the squares under BRTS. Actual work, however, has not yet started.

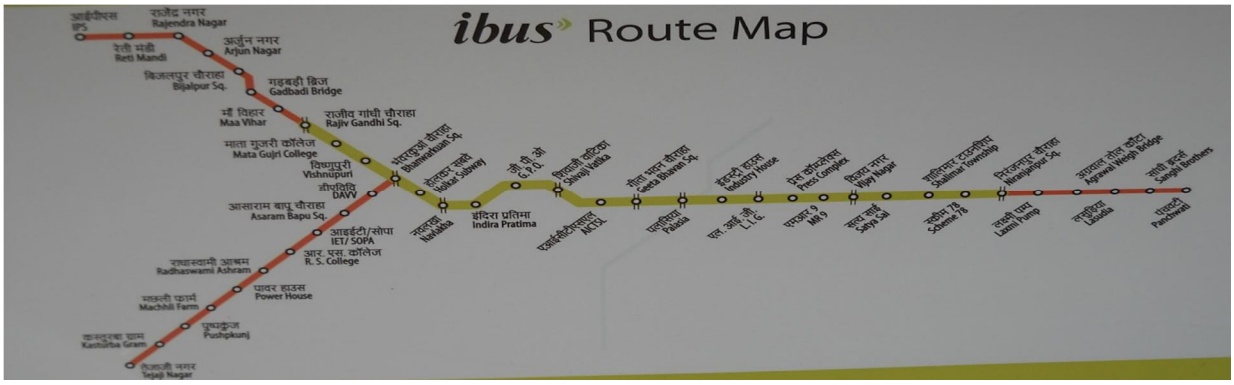

FIG. 1: Indore BRTS Route

E. System Issues in Indore BRTS

The construction of BRTS in Indore is beset with issues. The first big issue is obtaining property for the ROWs from the diverse religious bodies, as there are numerous religious structures along the road's edge. The study researchers discovered 12 such constructions impeding ROWs, particularly walkways and cycling tracks. Another issue that has arisen during construction is the absence of subsurface sewerage and water pipes along the approved path. The water and sewage upgrades along this route were approved at the same time as the BRT project. Indore's BRT project was, in many senses, a massive city operation, with all subsurface infrastructures being reconstructed.

II. ENVIRONMENTAL CONCERNS

Buses powered by diesel emit high levels of pollution, noise, and vibration. The method might eliminate the cost of constructing overhead wires while also providing environmental benefits by reducing the use of centrally generated electricity, especially in cities where electricity is a less expensive form of energy. Furthermore, most trolleybus applications can be converted to light rail with simply the cost of laying and maintaining tram rails in the street.

A. Major Issues Affecting Delhi and Pune BRTs That Could Also Emerge in Indore BRTs

Signal cycle for long traffic (4 minutes in the peak hour). General traffic lanes are subjected to long lines. Because the bus queue was longer than the station platform length, some passengers aligned and boarded outside the platform. In case of bus breakdown, and pedestrian irresponsibility the operation of the bus lanes and the station was hampered. Some motor vehicles also encroached on bus lanes. Bus occupancy levels were high, especially during peak hours. Bus operators showed a lot of variation in intervals and business speeds. Two-wheelers have also encroached on bicycle tracks to bypass motor vehicle lines.

S.No.	Corridor (including bus and ifeeder)	Length(km.)
1	Niranjanpur-Scheme no.78-Shalimar townshipBRT-Satya Sai-Vijay Nagar Brt-MR 9 Square -Press Complex-LIG Square-Industry House-Palasia-Gita Bhawan -Aictsl- GPO BRT-Indira Pratima-Navlakha Square BRT-Holkar Subway BRT-Bhawarkua BRT-Vishnupuri-Mata Gujri-Rajiv Gandhi-AB Road-Maa vihar-Bijalpur-Durga Nagar-Reti Mandi2-Gamla Pulia-IPS-Jivan Jyoti-Rau Petrol Pump -Rau Bus Stand-Mama Ji Dhaba-Rau Bypass	21.7
2	Mhow Chowk-Kukut Bhawan-Ranjit Hanuman-Venktesh Gate-Footi Kothi 1- Hawa Bangla-Footi Kothi2-Gopur Square-Chanakyapuri Square 1-Kesar Bagh Bridge-Choithram Mandi Gate-Rajiv Gandhi	11.2
3	Mhow Railway Station-Hari Fatak-Indira Colony-Kishan Ganj1-eye care Hospital -IIT Indore-HD Bansalcollege-Keshav Park-Pritampura bypass1-Pigdamber-Medicaps-Alpha-Hardia Hospital-Rau bypass-Mama Ji Dhaba-Rau Bus Stand-Rau Petrol Pump-Jivan Jyoti-Silicon city-Gamla Pulia-Reti Mandi2-Bijalpur--Durga Nagar-Maa vihar1-AB Road-Rajiv Gandhi	21.2
4	Rajiv Gandhi-AB Road-Maa vihar-Bijalpur-Durga Nagar-Reti Mandi2-Gamla Pulia-IPS-Jivan Jyoti-Rau Petrol Pump -Rau Bus Stand-Mama Ji Dhaba-Rau Bypass	10.4
5	Rajiv Gandhi-regional park gate	1.5
6	Rajiv Gandhi-AB Road-Maa vihar-Bijalpur-Durga Nagar-Reti Mandi2-Gamla Pulia-IPSRajiv Gandhi-ABRoad-Maa vihar-Bijalpur-Durga Nagar-Reti Mandi2-Gamla Pulia-IPS-Silicon city	6.9

Table 1: Indore BRTS corridor

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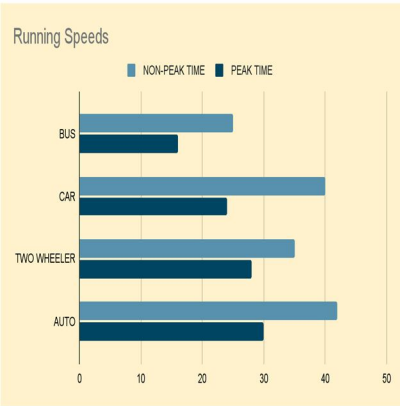
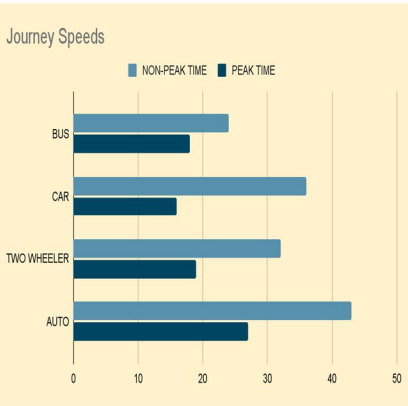
III. STUDY AREA

For the study, the LIG Chowk to Vijay Nagar section consisting of approx 3.0 Kms of Niranjanpur Chauraha to Rajiv Gandhi BRT has been identified. It connects the areas of eastern Indore, which are transit hubs and highly dense commercial areas. The pilot corridor however is a crucial link between the residential pockets of AB Road, Palasia etc. with the commercial hubs located around AB Road and Vijay Nagar. This accounts for the heavy traffic on the corridor. This area can be considered as a CBD of eastern Indore. For Data Collection, Speed Delay Survey and Queue Length Survey were carried out in the identified study areas during peak hours and off-peak hours.





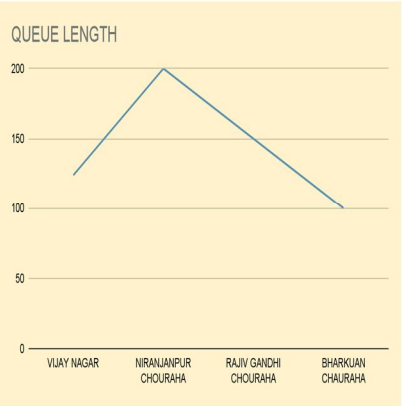


FIG.2 FIG.3 FIG.4

FIG. 2 & 3: Shows the Average running speed and journey speed for the selected corridor
FIG.4: Average Queue Length at Intersections of selected corrido

IV. PROPOSALS

1) BRT systems are not considered unique. In regards to physical accessibility, ticket, and governance mechanisms the old systems must be integrated with new systems.
2) Instead of a single specified blueprint, Indian towns are adapting BRT in a variety of ways.
3) To better capacity carriage and to reduce the usage of private automobiles, BRT should be combined with other forms of public transport.
4) In metropolitan areas, the lower and mid classes are the most loyal and captivated bus travellers. It may be possible for BRT to lower ticket prices to make it accessible to these groups. The price of BRT tickets might put people off and deter them from using them.
5) Focus on pedestrian paths to BRT stops in the layout.
6) Feeder activities must be offered at no cost.
7) If necessary, an open evaluation must be conducted on a regular basis in order to enhance the system.
8) BRTS must be efficient for private automobiles in metropolitan areas.
9) Mainly during peak traffic hours travellers must count on BRTS as the ideal alternative for collective pooling and reducing the pressure on city roads
10) Municipal authorities should take all appropriate actions to ensure that the BRTS is on time, effective, pleasant, commuter-friendly, and trouble-free.

V. REFINEMENTS THAT ARE NEEDED

1) *Access to BRTS Bus Stops on a Local Level:* The BRTS Bus Stops, sharing taxi service (on a per-seat basis, comparable to being outside Mumbai Railway Stations) should be encouraged. This implies that passengers will have to walk at least 1 kilometre to travel to the nearest BRTS Bus station. Additionally, the Traffic Police have established "No Parking Zones" on both sides of the BRTS route, making it impossible for anyone to drive by car, or park near the station and proceed further. For a few stops on the BRTS, parking has been provided.
2) *Easy Accessibility:* BRTS bus stations are located distant from intersections, whereas traditional bus stations were in handy places. Travellers must not travel long distances to reach subway stations.

3) *Routes Should be Improved Depending on Traffic Patterns:* Organised bus routes and schedules based on Passenger Requirements, Occupancy, Traffic Conditions, Peak Hours, and other factors. BRTS wardens/workers stationed at bus stations can play an important role in educating customers about traffic intensity and demands. Long bus routes such as "Manglia to Rau" can be implemented since traffic will flow in both directions at all times. We could have a bus every 5-10 minutes and it would still be crowded both ways.
4) *Retain the Same Appearance and Feel for Buses:* AiCTSL now supports a wide range of bus designs and sizes. Buses on BRTS routes should have a uniform colour scheme and advertising and ads should not be painted or pasted across the entire bus exterior. It appears to be somewhat unsightly. Only a limited number of stand-ins should be made accessible for putting adverts to generate income. LED displays onboard the bus may potentially be used to generate cash by displaying adverts. Unwanted posters should be prohibited from being displayed on BRTS assets, especially buses, and bus stops.
5) *Sanitation:* Buses are rarely washed inside and out. Every night before the bus is placed on the trip, we must sanitise it from the inside out using pressure jets (which use less water). There must be an inspector whose job it is to make sure that the bus that is placed on the path in the early hours (i) has been cleaned both inside and out (ii) the LED displays are functioning properly and that they are fully set (iii) there are no mechanical faults (iv) the tyre pressure/treads, fuel and battery are all in good working order.
6) *BRTS Should Operate their Depots:* BRTS should have their bus terminals where buses may be stored, sanitised and regular repairs performed.
7) *Passenger Intersections:* The raised pathways to cross the street near BRTS Bus Stations should be lighted from the top or sides so that commuters crossing a road are easily visible to motorists from a range at night. To mark the pedestrian crossing, there should be signboards and flashing lights in addition to the traffic signals that we now have.
8) *Unexpected visits/inspections are Required:* A uniformed TC(Ticket Checker) should be introduced to examine tickets, and bus stations and to resolve the necessity of extra buses at peak hours. This is to ensure that those in charge of the BRTS and passengers who utilise them are held to a higher standard of control and regulation.
9) *Enhance Bus Recurrence and Schedules:* Bus frequency, particularly for long-distance buses should be increased and BRTS bus routes should be open until at least midnight. In reality, a 24-hour bus service linking the train stations and airport to the core of the city should be available. During peak hours, most of the travellers use public transportation
10) *Lower BRTS Signal by 15 Seconds:* The new BRTS signals, which have been erected at every intersection, is causing traffic congestion for persons who wish to make a right turn at the junction such as at AB Road. Instead, the BRTS signal should be shortened to 15 seconds (permitting only buses halted at the signals to pass), giving the right turn signal an extra 20 seconds.

VI. CONCLUSION

This paper attempts to review implementation of BRTS in Indore. The following suggestions are given based on the research's analysis and findings. The main findings of the study are summarised as following:

1) BRT has to have a place in the route with the largest passenger flow when combined with other important modes of travel.
2) Both development and monitoring have contributed to shaping BRT more effectively, efficiently and dependably. Signal timing is influenced by the number of vehicles on the road during peak times such as 2-wheeler and 4-wheeler vehicles. If these are not appropriately counted and updated on time it may result in traffic delays at intersections.
3) Customer satisfaction must be considered while evaluating the feeder system. The System will have a significant influence on BRTS revenue.
4) BRTS trips during peak times should be carefully planned. It is crucial and fulfilling more to exact calculations of the volume of passengers on weekdays and weekends, the area with other modes of transportation, the number of transit lanes, and the significance of BRT stations on the local map.
5) Because no passenger enjoys changing modes of transportation until they get to their intended destination, transportation planners should create routes so that passengers do not have to change buses frequently. Learning about their travel needs, travel patterns, bus stop choice, distances between the same pick-up times, recurrence, and delays, as well as facilities and entering. Rider's most pressing concern is the service's dependability.
6) The fare collecting system used for the BRT must be adaptable and adaptive to future demands, as well as allow smooth mobility throughout all kinds of services offered. Fare collecting must be responsive to changing business requirements when passengers or operations require it.

7) Passengers should be aware of any disruptions, as well as when the next bus would reach and any timetable modifications. The importance of actual info at terminals cannot be overstated.

8) Smartphones and tablets may be a better option for real-time data updates.

9) From the perspective of safety and emergency management, critical and accurate administration and execution of the BRT system are required. This enables improved fleet management, which benefits end users.

10) An effective BRT system requires accessibility and reliability. Because the first and last kilometres are the most difficult for BRT beginners, including way-finding indicators and interactive booths on stations that direct users to tourist landmarks.

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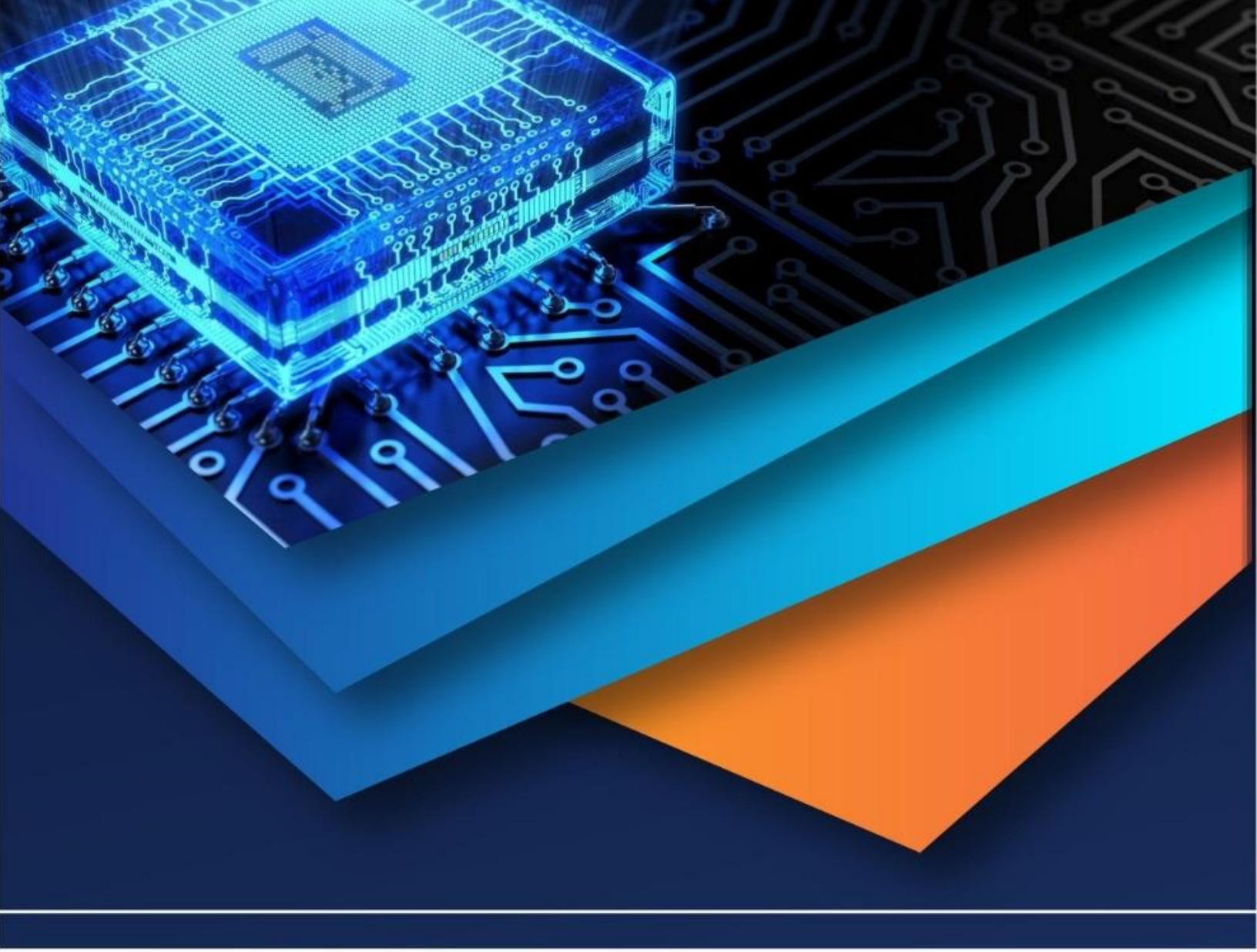

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