AN INVESTIGATIONAL ANALYSIS OF RAPID TRANSIT CORRIDORS IN HYDERABAD AND BENGALURU- A CASE TO HIGHLIGHT PLANNING PROCESS AS A MAJOR TOOL

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Abstract

Roads are an integral part of any city. A well-planned road helps in the economic growth of a city abreast of delivering social benefits. Along with other things, a strategically planned road facilitates access to education, health services, and employment and has proven to be significant for poverty alleviation. The growth of a city with respect to the area and population poses an additional challenge for planning the intercity roads. To cater to a burgeoning city, Rapid Transit Corridors have been traditionally planned in many cities. A strategically planned road helps layered and incremental planning for future growth and ensures a city's seamless growth. A strategically planned expressway is a facilitator to the growth of a city. The adequacy of roads in a city is defined by the relationship between the road's length and the population. The Bengaluru populace was 84.3 Lakhs (2011), and the population of another major south Indian city of Hyderabad was 68.1 Lakhs (2011). The construction of Rapid Transit Corridor (RTC) named as Nehru Outer ring road in Hyderabad and Secunderabad commenced in 2008 and culminated in 2016. The construction of RTC named as Outer Ring Road in Bengaluru commenced in 1992, and the last phase culminated in 2002. This paper attempts to compare the effect of growth of the population in both cities. It further compares and analyses the features of Transit Corridors of Hyderabad and Bengaluru towards their adequacy. Strategic recommendations are based on the analysis.

Keywords

Rapid Transit Corridors, Ring Road; Outer Ring Road; Inner Ring Road; Road Traffic, Congestion

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1. Introduction

As India has been progressively getting urbanized over the last few years, metro cities started getting crowded with more populace than non-metro cities (Kundu 2006). Owing to the inclease in urban population, there is an increased demand for additional Infrastructure in urban areas to support the rise in pupolation. In a large city, the accessibility to an efficient and effective transportation framework is basic for economic activity, movement of population and the associated development. This requires making a framework that delivers this capacity, and offices run on it (MGI 2010). Good infrastructure encourages exchange and different linkages the city with the area and promotes its development. A significant phenomenon related to urbanization in metro communities is that the rural and peri-metropolitan zones are developing more than urban communities (Sivaramakrishnan and Kundu 2005). Metropolitan planning addresses how individuals will live, and work in a given territory, and as a consequent, regulates and guides the development of metropolitan, rural, or suburban territories. Efficient urban planning would ensure roads facilitating, distribution and transportation of populace, waste, water and other esentials. Road would at times even help in bypassing the centre of city.

Architecture cannot be restricted to mere designs of building but has a larger role and responsibility in the society. The subject cannot work in silo but need integration with other domains as the need of the hour by the creation of physical settings that are conducive to general movement and physical activities. The research and teaching have to be modelled accordingly to the students. Over the years, government and planning legislations involving urban renewal have encouraged research for the continued development and inclusive adaptation of our towns and cities. (Sports Confederation of Denmark, 2009). The trend is projects where architecture and town planning converge towards more researched and

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inclusive living spaces. This necessitates integrated teaching and research in the field of architecture.

These paradigm shift in the concpts of road planning, are continually reflected in planning methodologies, zonal codes, and strategies, making it a profoundly specialized, political, social, monetary and environmental field. If the design which is optimal and aspects concerning the service of a trasit system balances the need of both customers as well as operators, then the probability of success of sustainebale urban transportation system increases (S.C.Wirasinghe et all, 2013). Planning for roads and its development should take in account the uses of transportation; future as well as present. A Road is stragegically planned to support the growth of a city with least monetary and environmental expense. The main objective in planning a road is mandatory as the guiding mission of the project.

The objective could be decongest the traffic from other areas, development of the area in the neighbourhood of the road or conncet to places, to name a few. Distinctive monetary and trade between the metropolitan and periphery zones lead to the interest for transportation among them and over/close by the periphery zones. Ring roads as Rapid Transit Corridor, supports the movement of populace and facilititates economic activies intra region in a city in an organised pattern. Expressways are circumferential interstates

A “ring road,” freeway, circumferential roadway, or circle expressway is a road that encompasses a city to smooth out the downtown traffic course through better dissemination and connectivity between different hubs just as by filling in as a bypass for roadway traffic (Road Traffic

that are found in many urban communities. The roads were developed to disperse the congestion from downtown areas to the city's peripheral areas (Mill, 1981).

Table 1: Cities with a ring road system

State/ Region	Ring Road
Ahmedabad (India)	Sardar Patel Ring Road
Ankara (Turkey)	Otoyol 20
Bangkok (Thailand)	Kanchanaphisek and Ratchadaphisek
Beijing (China)	Total of six ring roads around the city
Bengaluru (India)	Outer Ring Road
Delhi (India)	Outer and Inner Ring roads
George Town (Malaysia)	Middle Ring Road(Penanag) and Inner Ring Road (George Town)
Hong Kong (Hong Kong)	New Territories Circular Road (Route 9)
Hyderabad (India)	Nehru Outer Ring Road
Jakarta (Indonesia)	Inner, outer and Outer Ring road number 2 in Jakarta
Kathmandu (Nepal)	Kathmandu Ring Road
Kuala Lumpur (Malaysia)	Kuala Lumpur inner, Middle ring road number 1, Middle Ring Road number 2 and Outer Ring Road.
Lahore (Pakistan)	Lahore Ring Road

Source: Collated from City Development Authority web sites

Technology, 2013). It is a significant method for accomplishing transport network and higher traffic speeds, decreasing natural effects on environmental, air, noise pollution and congestion, and better traffic dissemination (Pharande 2015). Given the numerous advantages of such roads, urban

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communities must create them to decongest and regulate traffic as objectives instead of land development of adjoining/ neighbourhood areas. Most expressways are significant reason assembled parkways around a town or city, normally without signs or road or railroad intersections. In the United States, freeways are basic shares of the Interstate Highway System. In the United Kingdom, it is called "orbital motorways". In India, they are called "Ring Roads".

2. Methodology

Existing literature on road planning, traffic management, and features of a ring road as Rapid Transit Corridor were studied. The secondary data on traffic, population, and traffic density was analyzed to assess the reuirement od Rapid Transit Corridor. All data associated with both the ring roads collected were analyzed. Empirically, Hyderabad, and Bengaluru's existing outer ring roads were studied by traveling on them at different times to relate the theory and the secondary data. The recommendations were ideated based on analytical comparisons. The scope is restricted to comparing both the ring roads in terms of meeting the objective of decongesting the city it serves.

3. The ORR in Bengaluru

Bengaluru is situated in southern India, popularly known as "Silicon Valley" because of the many global tech firms. It has acquired the sobriquet "Asia's quickest developing City." While the whole foundation infrastructural frameworks are under gigantic pressure in Bengaluru, the transportation infrastucture is severely hit. The city has an Rapid Transit Corridor in the name of Outer Ring Road. As per the design, all interstates and district roads are radially meeting into the center zone. The road network in Bengaluru has grown by 11% in the previous six years, which is a moderately little development compared to the spatial development of the city. Although Bengaluru has three-ring roads, five significant outspread roads, and five auxiliary spiral roads, it is not able to meet with the city's exponential development. Bengaluru is the third most crowded city in India with an expected populace of around 84.3 lakhs spread more than 821 sq Km. The Bengaluru "ORR is a two-directional road" with two lanes accommodating the traffic to move in either way. The path widths for the whole part of the road were kept up at 4 meters with channels on one or the other side with depth of 1.5 meters. Bengaluru has a spiral road network with five essential roads (National Highways) and five optional roads (State Highways) uniting/veering from the existing Outer Ring Road. Generally, the development of the ORR in Bengaluru was very advantageous, leading to the development of more network of roads and flyovers, which indirectly helped in the growth of software industry. The ORR was planned to go around the ourskirts of the the city of Bengaluru, at its borders. The Bengaluru Development Authority created this 62-kilometer-long (37 mi) road, and various segments were opened between 1996 and 2002. The ORR was planned to be road interfaces all significant parkways around the city – Magadi Road, NH 948/ Bannerghatta Road, Kanakapura Road, NH75/ Old Madras Road, NH44/ Hosur Road, NH 48/ Tumakuru Road, NH 44/ Airport Road and NH 275/ Mysuru Road . It goes through significant areas and rural areas.

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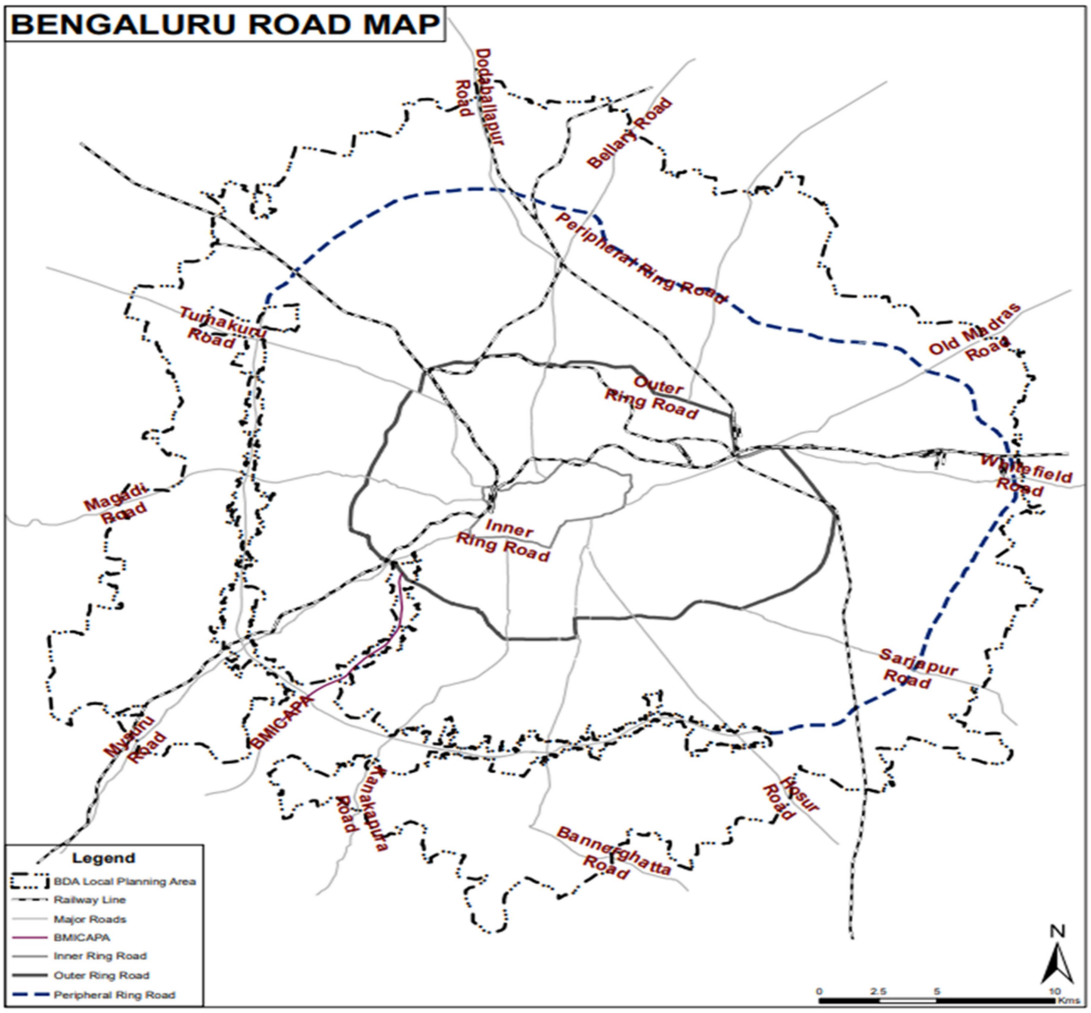

Figure 1: Outer Ring Road Bengaluru with proposed Peripheral Ring Road

Source: BDA, GoK

4. The Outer Ring Road in Hyderabad

The notion of the outer ring road was first conceived by N. Chandrababu Naidu, the chief minister of Andhra Pradesh, in 2001. One fifty-eight kilometer-long expressway encompassing Secunderabad and Hyderabad's urban communities was proposed to counter the metropolitan district's gridlock issues. The goal was to give orbital linkage to arterial roads and admittance to the airport region and other metropolitan regions. The underlying overview on the current NH44 and NH65 showed a necessity of 4/6 lane road. The decision was to build up a road for every crossing roadway. The first road construction Phase required 750 acres of land, out of which the private land gained was acquired was 500 acres of land. The land needed for Second Phase is around 5,500 acres of land, of which the Govt. land is around 1,000 acres of land. The assessed Cost of Acquisition is ₹250 Crores. The undertaking was finished in two phases and is assessed to cost ₹3000 Crores. The Rapid Transit Corridor or the Nehru ORR in Hyderabad is an eight-path ring road interstate with 158 kilometers enclosing Hyderabad city. A huge

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portion of the zone covers metropolitan hubs, including Hyderabad International Airport. There are 20 trade intersections on the external ring road. It gives a network between, NH 161, NH 163, NH 765, NH 65 and NH 44 from Warangal to Vijayawada and Hyderabad just as public interstates prompting Vikarabad Nagarjunasagar and Karimnagar/Mancherial areas. The external ring roads diminishes the movement time from the air terminal to urban areas like Nizamabad and Adilabad as it interfaces with NH44. The freeway associates with the internal ring roads and the impending territorial Ring Road.

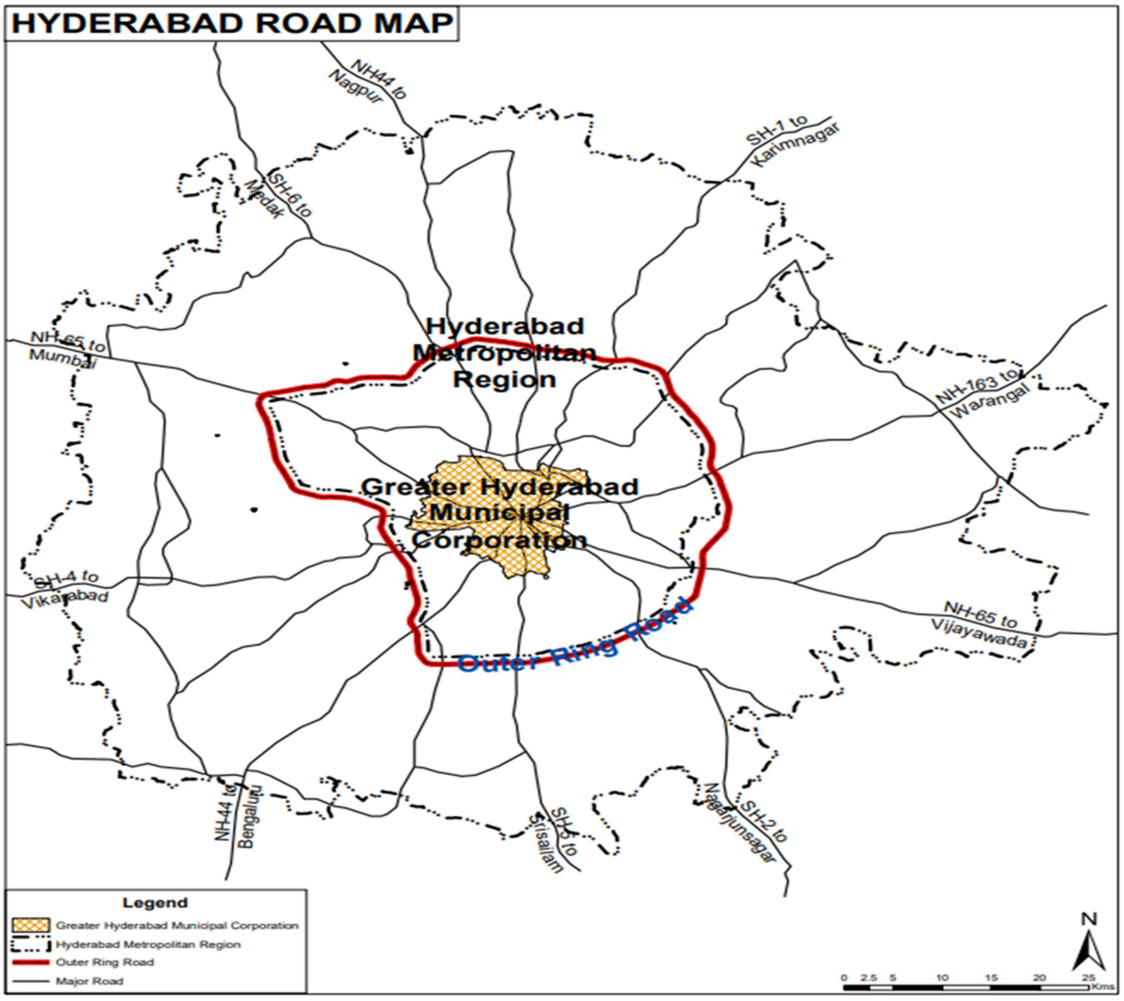

Figure 2. Hyderabad and its outer ring road.

Source: HUDA (GoAP & Telengana)

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Phase II	Construction of 83.7 mi (134.7 km)
14. 09. 08	Shamshabad –Narsingi –Gachibowli (22 km) (access to Hyderabad International Airport)
07. 07 10	Pedda Amberpet - Shamshabad(38 km)
14. 08. 11	Patancheru - Narsingi(23.7 km)
03. 12. 12	Gowdavalli - Patancheru, and Shamirpet – Kandlakoya (38 km) (part completed in 27. 04. 18)
04 .03.15	Ghatkesar - Pedda Amberpet (14 km)
15.07. 16	Shameerpet – Ghatkesar (23 km)

Table 2. Construction of Roads.

Source: Indian Journal of Transport Management, Volume 38 (April – June 2014), HUDA and GoAP project reports]

5. Analysis

The growth of Bengaluru city has been exceptional in the last couple of decades. As per Department of economic and social affairs, (UNO), the populace in Bengaluru Municipalities and Urban Region would expanded from 30 lakh to 143.95 Lakhs by 2025. The same department predicts that the population of Hyderaabd would be 113.38 lakhs by 2025. The explosive population growth in Bengaluru has resulted in the transportation infrastructure being severely affected due to excessive traffic movements in the city and the ring radial road pattern. BDA had executed and implemented the outer ring road and inner ring road traffic managegement plan as a part of the Comprehensive Development Plan(CDP). The ring road helps in reducing the core traffic in the city. Bengaluru has two ring roads. The inner ring road connects Indiranagar and Koramangala area, the outer ring road connects “all the major highways around the city.” The traffic movements to and from all majot highways, resulted in immense growth in intra-city traffic movements. The urban congestion ranking worldwide shows that Bengaluru ranks number one amongst 28 countries with eight million (Datacorp, 2019). The outer ring road was constructed as a bypass to the city for commercial vehicles and personalized vehicles (Rejeet et all 2017). However, due to increased traffic on the outer ring road and interconnected roads, volumous traffic at all major intersections has led to traffic congestion. The shift in the International airport from HAL, Domlur to Devanahalli has also resulted in traffic congestions. The most noteworthy gridlock is found in the Hebbal and Silk Board intersection because of the number of tech and other major firms working in the region and its connectivity to the airport. The outer ring road has not relieved traffic congestion between junctions; hence, a second ring road is needed at a radius of about 17 to 25 km from the core of the city. A Rapid Transit Corridor call the peripheral ring road is planned to improve the connectivity of areas beyond the outer ring road and ease traffic congestion.

6. Comparison Analysis

The BATF (Bangalore Action Task Force), which functioned from 1999 till 2004,

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demonstrated some promise to relieve some congestion issues; however, no authentic exertion has been made to implement any tangible plan. Also, so far no effort has been seen to include the general population in planning issues. A few answers for decongesting the traffic on ORR Bengaluru have been resident-driven yet formally they never joined in the the official planning process to decongest the ORR (Bengaluru) or the city. The Hyderabad ORR has been strategically planned and methodically executed. It takes into account the development of the city and the related traffic. The development of the zones around the external ring road is arranged to control the road congestion. Contrasted with ORR Bengaluru, in Hyderabad, the settlements of any sort, be it business or private, are far from the ORR limit. ORR in Bengaluru can be accessed at any place without any regulated entry or exit compared to ORR at Hyderabad. The process and the land use plan of the ORR Hyderabad ensures a de facto buffer to the eight-lane expressway and the associated service lane. There are no at-grade intersections and the provision of suitable interchanges like for National and State Highways and other important urban roads exists at convenient points. This provision to regulate the traffic is not there in Bengaluru Outer Ring Road. Unlike Hyderabad Outer Ring Road, the development and construction at many places have been incremental and continue to be in installments based on the new requirements.

Except for in cases of emergencies, on Nehru ORR, there is no arrangement of parking. There are committed paths for vehicles like trucks and transports with heavy ladedn weights only on the left two lanes. No vehicles like bikes and autorikshaws are permitted. This arrangement and system separates it from the Bengaluru ORR.There are no settlements close to the Nehru ORR, Hyderabad which requires parking near the ring road. The road is additionally not utilized for travelling short distances. There are 19 exchanges where the vehicle can join the ORR or can exit. Each exchange is at a normal separation of 8.4 km. It understands that it is practical to utilize the ORR if the normal distance to be travelled is in excess of 10 Km.

In ORR Bengaluru, there is no ban or embargo of any kind on any vehicle to utilize the ring road for travelling short distances. Unregulated and unplanned growth along ORR lead to uncontrolled development of the area. Unregulated and spontaneous development along ORR has prompted and pamperred the uncontrolled development of the zone. Notwithstanding the workplaces and business foundations, neighborhoods have sprung up to oblige those working at the workplaces and ORR, adding to more population, vehicles and chaos in the neighbourhood. The cost of construction or the land acquisition factored are not compared because, they are plausible based on the strategic plan made.

7. Conclusion

The integration at all levels have become imperative for an inclusive and collective strategic growth- and rightly so. The concept is also mutually beneficial to all associated domains. Strategic growth is only sustained with relevant and associated research. veritable and planned accessibility to and from living spaces espousing sustainable, attractive, and high-quality urban designs. Pedagogy in the field of architecture hence,

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must be inclusive and not restricted one domain.

The human welfare and environment is challenged in many developing countries of Asia due to rapid and uncontrolled development of transportation (Ryosuke et all, 2006). Alongside the expansion in populace number of vehicles has likewise expanded. The vehicle populace in Bangalore has expanded from 41 lakh (1991) to 80.45 lakh (2019) during the recent years. The existing roads cannot be expanded due to permanent commercial and residential areas which have come into exisrtence in the name of development all along the ring road. The Ring road which acted as a catalyst for the unregulated development of neighbourhood is suffering due congestion due to the same development. Bengaluru is a ring-spiral/ radial-designed city like Delhi, Hyderabad, and Ahmedabad. Travel time in a ring-spiral/ radial designed city – without a well-formed grid network is more when contrasted with a city with non radial/ straight roads. (e.g., Mumbai, Chennai, and Kolkata). Bengaluru is a mix of towns devoured by the city's digestion. The city's normal road width is only 15 m or 50 ft, which is insufficient to utilise it for any mass transport public vehicle. For instance, BRTS (Bus Rapid Transit System) requires the least road width of 36 m. The BDA, Revised Master Plan (RMP 2031) reported that 7.39% of Bengaluru's territory utilized was for transport (which incorporates road and other vehicle-related frameworks). One may contend this is generally low when contrasted with 21% in Delhi (however, Delhi has many traffic issues despite its wide road network). Various arranging rules like the Urban and Regional Development Plans Formulation and Implementation (URDPFI) recommend between 10-15% land use for street framework in any metropolitan city. In Bengaluru, similar to some other city, the ring road is an economic corridor and facilitates development. In any case, the development along the ring road was not directed or controlled. The road were not futuristically planned in a strategic manner to meet the requirement of future growth in traffic. When contrasted with Bengaluru, Hyderabad Nehru ORR is futuristically planned in a strategic manner in terms of design and the regulations to meet all the objectives.

8. Recommendation

Any growth must be regulated and planned strategically. The planning of roads should not be restricted to a good design but should provide a balanced solution. A new strategically planned peripheral ring road (PRR) is required without any delay in Bengaluru to mitigate the ORR's traffic congestion issues. It is seen that the success of any road is not restricted only to an adept design. Many well-made plans have failed to meet its aim & objectives. Hence based on the case seen so far, the paper recommends the following: -

- Ring roads as Rapid Transit Corridor should be to decongest the traffic and not develop land space for commercial use. If the growth is not regulated, the development will congest the very ring road constructed to decongest the traffic. Though not planned or foreseen, the same has happened around ORR in Bengaluru.
- The policy on land use should be strategic. This policy on land use should be

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supported by allied regulations, adept design, and procedures for ring road use.

- Hike the cost of registration of new personal vehicles. However, regulations should be in place to monitor the private use of vehicles registered for commercial use.
- The congestion could be eased to some extent by congestion pricing for existing places.
- All (single or apartment) Home Plans to be only approved with designated car parking. This would reduce the cases of cars being parked on roads (Other than ring road). The minimum plot size could be decided based on other factors to cater to lower economic strata.
- No issue of license to do business if there is no provision of parking space. A perennial problem faces on New BEL Road and 80 feet road (RMV II stage). In fact, in the name of development, areas like New BEL road have been developed uncontrolled. The road has become a shopping destination, but there is no parking space by the road for shoppers.
- Regulations to put responsibility on the employer's so that the employees use more of the public transport system.
- The government could promote shared transport through policies by giving tax benefit/ any other benefit like no toll tax for four or more occupants in a car/ Priority lane or parking etc
- Facilitate mass transit by more creating more stations and ease the use of mass transport systems.
- The shift from design based towards an integrated approach to road planning. Incorporating the appended points enunciate an integrated approach:-

a) Regulations on land use.

b) Socio-economic profile of the area where the road is being planned

c) Motor vehicle sales forecasts along with traffic growth forecasts

d) Public transport systems

e) Outcome-based strategic planning that focuses on area-based development and participation of the public

f) Aligning the new roads with existing roads

g) Dynamic for future expansions

h) The design and standard specifications

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