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ROAD TRAFFIC FLOW INTENSITY IN JAIPUR CITY: CHALLENGES AND SOLUTIONS

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ABSTRACT

Information on road traffic flow intensity is essential for development of measures to improve road Traffic Safety, while its forecasting on the roads is an integral part of the process of designing road facilities outside populated localities. Jaipur being the capital of Rajasthan, is the focus of the socio-economic and political life of State. It witnessed fast growth both physical and demographic. Hence this makes the transport in Jaipur a matter of concern. However, the transportation sector has not been able to keep pace with rising demand and is proving to be a drag on the economy. Major improvements in the sector are therefore required to support the city's continued economic growth and the reduce poverty which poses a challenge. This paper deals with the current status of road traffic flow intensity in the city, concerns, challenges and solutions. For a better, inclusive and sustainable future a quick, safe and eco-friendly road traffic network is a must.

Keywords: *Road Traffic Safety, Demographic, Tourist Destination, Sustainable Environment.*

Introduction

Jaipur being the capital of Rajasthan is the focus of the socio-economic and political life of the state. It is the 10th largest city and one of the fastest growing cities in India. It is the center of both traditional and modern industries and is a very popular tourist destination for cultural heritage and historic architecture. It witnessed fast growth both physical and demographic. Connectivity plays a vital role in the growth of any settlement. The well connectivity of a settlement has a direct impact on the basic infrastructure and economy. Hence all these facts show the significance of a quick, safe and environmentally sustainable road traffic network in Jaipur City. Jaipur's growing economy has witnessed a rise in demand for transport infrastructure and services. However, the sector has not been able to keep pace with rising demand and is proving to be a drag on the economy. Major improvements in the sector are therefore required to support the city's continues economic growth and to reduce poverty.

Study Area

Jaipur is the capital of India's Rajasthan State. It evokes the royal family that once ruled the region and that, in 1727, founded what is now called the old city, or "pink city" for its trademark building color. As of 2011, the city had a population of 3.1 million, making it the tenth most populous city in the country. Its latitude is $26^0$92' N and longitude is $75^0$82' E. Average railfall is 26cm. Density is 6500/km^2. Main transport source is road transport.

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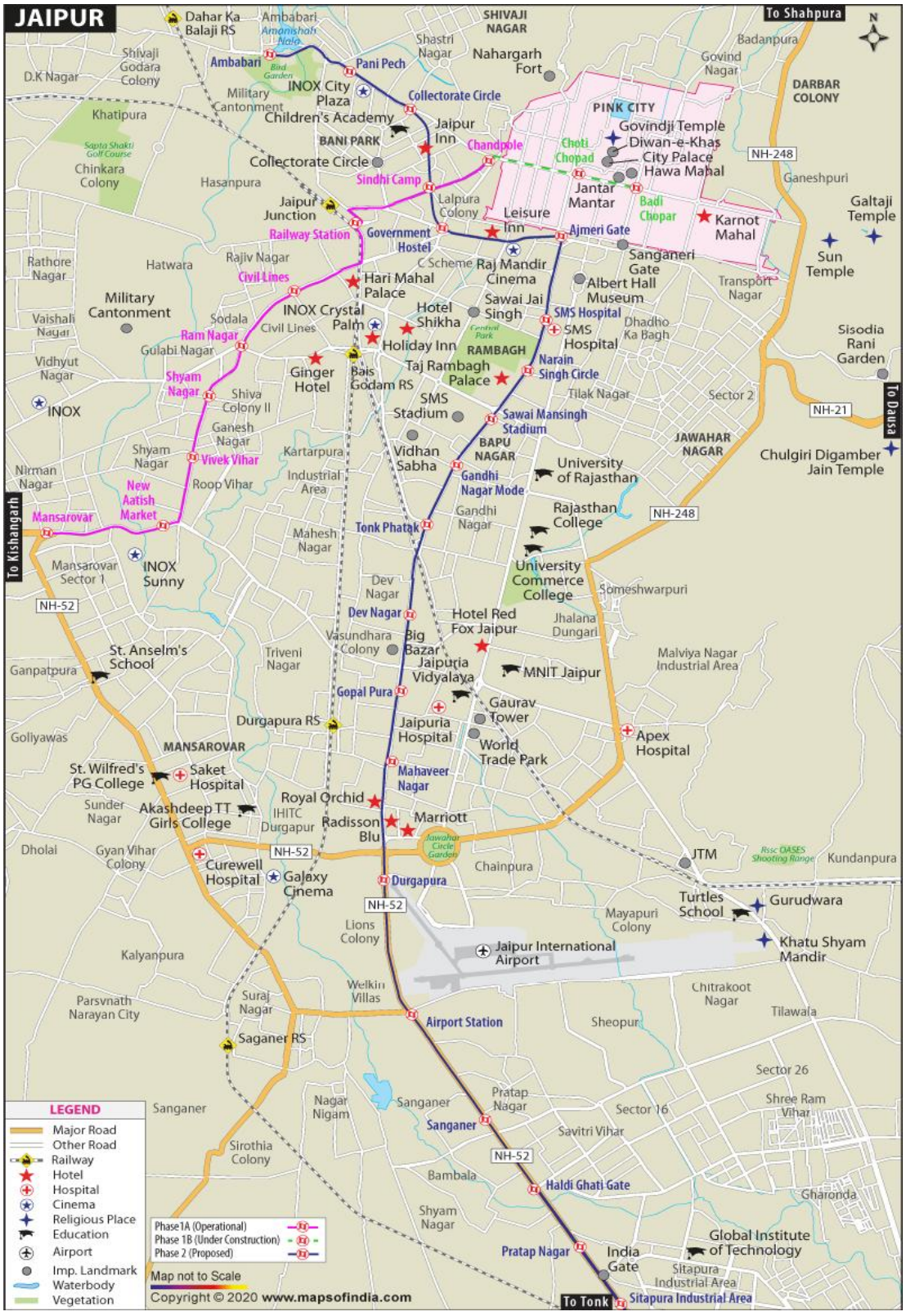
JAIPUR
To Shahpura
To Kishangarh
To Dausa
To Tonk
N
Dahar Ka Balaji RS
Ambabari
Amanishah Nala
Shivaji Godara Colony
D.K Nagar
Military Cantonment
Children's Academy
INOX City Plaza
Pani Pech
Collectorate Circle
Khatipura
Sapta Shakti Golf Course
Chinkara Colony
BANI PARK
Jaipur Inn
Chandpole
Sindhi Camp
Hasanpura
Jaipur Junction
Railway Station
Government Hostel
Lalpura Colony
Leisure Inn
Ajmeri Gate
SHIVAJI NAGAR
Shastri Nagar
Nahargarh Fort
PINK CITY
Govindji Temple
Diwan-e-Khas
City Palace
Hawa Mahal
Choti Chopad
Badi Chopar
Jantar Mantar
Karnot Mahal
Sanganeri Gate
Albert Hall Museum
Raj Mandir Cinema
C Scheme
Rajiv Nagar
Civil Lines
Hari Mahal Palace
Rathore Nagar
Hatwara
Military Cantonment
Vaishali Nagar
Sodala
Ram Nagar
Gulabi Nagar
Vidhyut Nagar
Shyam Nagar
Shiva Colony II
Ganesh Nagar
INOX
INOX Crystal Palm
Hotel Shikha
Holiday Inn
Ginger Hotel
Bais Godam RS
Taj Rambagh Palace
RAMBAGH
Narain Singh Circle
Sawai Jai Singh
SMS Hospital
Dhadho Ka Bagh
Sisodia Rani Garden
Tilak Nagar
Sector 2
SMS Stadium
Sawai Mansingh Stadium
BAPU NAGAR
Vidhan Sabha
Gandhi Nagar Mode
University of Rajasthan
JAWAHAR NAGAR
Chulgiri Digamber Jain Temple
Kartarpura
Industrial Area
Vivek Vihar
Roop Vihar
Nirman Nagar
New Aatish Market
Mansarovar
Mansarovar Sector 1
INOX Sunny
Mahesh Nagar
Tonk Phatak
Gandhi Nagar
Rajasthan College
University Commerce College
Someshwarpuri
Dev Nagar
Hotel Red Fox Jaipur
Jhalana Dungari
Vasundhara Colony
Big Bazar
Jaipuria Vidyalaya
MNIT Jaipur
Malviya Nagar Industrial Area
Triveni Nagar
St. Anselm's School
Ganpatpura
Gopal Pura
Gaurav Tower
Durgapura RS
Jaipuria Hospital
World Trade Park
Apex Hospital
Goliyawas
MANSAROVAR
St. Wilfred's PG College
Saket Hospital
Mahaveer Nagar
Sunder Nagar
Akashdeep TT Girls College
Royal Orchid
IHITC Durgapur
Radisson Blu
Marriott
Dholai
Gyan Vihar Colony
Curewell Hospital
Galaxy Cinema
Durgapura
Jawahar Circle Garden
Chainpura
JTM
Risc OASES Shooting Range
Kundanpura
Turtles School
Gurudwara
Mayapuri Colony
Lions Colony
Jaipur International Airport
Khatu Shyam Mandir
Kalyanpura
Parsvnath Narayan City
Suraj Nagar
Welkin Villas
Airport Station
Chitrakoot Nagar
Tilawala
Sheopur
Saganer RS
Sector 26
Shree Ram Vihar
Nagar Nigam
Sanganer
Pratap Nagar
Sector 16
Savitri Vihar
Sirothia Colony
Bambala
Haldi Ghati Gate
Gharonda
Shyam Nagar
Pratap Nagar
India Gate
Global Institute of Technology
Sitapura Industrial Area
Sitapura Industrial Area
Badanpura
Govind Nagar
DARBAR COLONY
Ganeshpuri
Galtaji Temple
Sun Temple
Transport Nagar
NH-248
NH-21
NH-52
LEGEND
Major Road
Other Road
Railway
Hotel
Hospital
Cinema
Religious Place
Education
Airport
Imp. Landmark
Waterbody
Vegetation
Phase 1A (Operational)
Phase 1B (Under Construction)
Phase 2 (Proposed)
Map not to Scale
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Objectives

- To study increase in number of vehicles.
- To find out the challenges.
- To suggest road traffic solutions in study area

Hypothesis

Increase in number of personal vehicles is the main cause of high road traffic intensity.

Methodology

Methodology in this research paper is defined as the systematic method to resolve a research problem through data gathering using various techniques, providing an interpretation of data gathered and drawing conclusions about the research data. Primary data collected from survey. Secondary data collected from various departments, books and research works.

Challenges

To assess the existing road traffic issues a large scale data collection effort that included several traffic and socio-economic surveys were undertaken. The road traffic related issues in Jaipur that must be addressed for its impact on the road traffic intensity includes.

- **Road Infrastructure**

Jaipur has a total road network of around 1500 km. Approximately 34% of the roads are two lane roads. Although 52% of the roads surveyed are four lane. Parking and encroachments on carriageway has led to under utilization of the road capacity. Due to spatial disparity in growth, traffic movement is from periphery to the core city. The radial roads especially in the periphery are inadequate, with the absence of more circumferential roads connecting the radial roadway system.

- **Personalized Transport**

The average annual growth rate of vehicles in Jaipur is around 8.4%. increase in the number of registered vehicles on the limited road space has led to overcrowding and congestion roads.

Registration of Vehicles in Jaipur District upto the Year (Cumulative)

Year	Number of Vehicles	Annual Growth Rate (in Percentage)
2006-07	1176754	-
2007-08	1324624	12.57
2008-09	1387857	4.77
2009-10	1549737	11.66
2010-11	1695302	9.39
2011-12	1870976	10.36
2012-13	2038565	8.96
2013-14	2222060	9.00
2014-15	2389124	7.52
2015-16	2423648	1.44

Jaipur district has a total number of 2423648 motor vehicles registered till the year 2016, of which two wheelers and cars constitute 73.18% and 13.76% respectively.

Types of Vehicles upto the Year 2015-16 (Cumulative)

Types of Vehicles	Number of Vehicle
Two wheeler	1773513
Auto Rickshaw	27448
Tempo Passenger	6128
Tempo Goods	14611
Car	333587
Jeep	71618
Tractor	48496
Trailer	2911
Taxi	31939
Bus	24338
Truck	83262
Others	5797

- **Public Transport**

The bus system both public and private is inadequate in terms of comfort and frequency. They always operate at crush capacity. The available buses per lakh population are around 30 which is less than desirable (50 per lakh).

Due to in-efficient rationalization of routes, public transit routes are unregulated with too many buses in one route causing confusion and congestion.

Jaipur Metro is also at very initial stage and does not provide proper connectivity and mobility.

- **Traffic**

Traffic volumes are very high in the Walled City vicinity, Jhotwara, Raja Park, Sodala, Sindhi Camp etc. Volume Capacity Ratio is found to be more than 1 during the peak periods sometimes. Volume Capacity Ratio in the range of 0.75 - 0.90 represents traffic operations approaching unstable flow of heavy congestion and characterized by restrictions in maneuverability. Volume Capacity Ratio or V/C Ratio for few important roads in the Walled City of Jaipur are listed below-

Road Name	Location	Peak Hour Traffic (PCU)	Capacity of Road (PCU)	V/C Ratio
Surajpol-Chandpol Road	Tripolia Bazar	3831	5100	0.75
Amer Road	Johari Bazar	4347	5100	0.85
MI Road	Ghat Gate to Sanganeri Gate	4123	5100	0.81

This traffic congestion reduces the average speed and hence increases the pollution. The average speed in the commercial areas of the city is 16 km per hour during peak hours.

- **Parking**

Absence of off-street parking results in the reduction of efficient carriage way. Under utilization of road capacity and lead to congestion on roads. Parking space has become and indispensible requirement. With the constant increase in number of vehicles with the increasing traffic volume on the prime roads, available parking spaces are fast being outnumbered by the demand. In absence of available parking spaces, people tend to halt their vehicles, especially cars and autos on the carriageway waiting for their co-riders to finish their work and return. This in turn proves obstruction to the already slow moving traffic.

Parking spaces provided for auto rickshaws and manual rickshaws are less in comparison to the required numbers. Hence these vehicles can be seen waiting for potential customers along the road side. Structures like transformers, ramps, un-used tree guards and hand pumps also prove to be an obstruction in optimization of the available on-street parking space. Various informal activities and spillage of products on the pedestrian walkway and parking space force the users to occupy additional space on the carriageway and hinder the traffic.

- **Others**

Some other transportation issues are as below:

- Lack of enforcement of traffic rules, especially inside the walled city‘‘
- Lack of traffic awareness among the citizens
- Lack of organized Non-Motorized Transport facilities like pedestrian crossings, cycle rickshaw stands, bicycle lanes etc.

Solutions

The present situation in Jaipur will continue to worsen if nothing is done. Do-Nothing forecasts show lower network speed of 14 km per hour in 2031. the mobility goals for the Jaipur region will need to be addressed through a multipronged approach. Some strategies are as below-

- **Moving People Rather than Vehicles**

Promotion of public transport will ideally reduce the traffic congestion on the streets by discouraging the use of personal vehicles. One important factor which can help in this regard is the provision of dedicated bus lanes, which will greatly improve the speed of the bus traffic and may help in turning people to use public transport by establishing it as a faster mode of travel. Also eradicating of controlling traffic situation will help in easing the stress level in traffic.

- **Integrating Land Use and Urban Road Traffic**

While most of the economic activities are located in the Walled City area, the residential colonies have grown in the western and southern parts, which are far from the main centre of activities. This imbalance in the location of jobs and residences over space coupled with inadequacy of public transport system generates huge volumes of intermediate and personalized traffic especially on arterial roads. Hence land use and urban transportation need to be integrated.

- **Priorities to Non-Motorized Transport**

Footpaths should be made in residential streets and on major roads with commercial activities and the existing footpaths should be redeemed from encroachments and obstructions. Besides road space should be demarcated exclusively for movement by pedestrian and cyclists.

- **Putting a Parking Policy in Place**

Availability of space and cost of infrastructure for building new parking spaces are the two important factors which will guide the construction of parking lots in the coming future. Hence these two factors guide us to find a solution like:

- Mandatory off-street parking norms for various land uses
- Develop multi-level parking at major traffic generating locations
- Develop park and ride facility at all critical sub-urban/RTS/Metro Rail stations
- Restrict/ban on-street parking on critical commercial streets
- Part pricing to reduce the use of private modes
- Construction of parking complexes on government agencies land.

The above discussed measures are not the only solutions but only some are discussed here in this paper. Solutions must be sought in the light of social acceptance, economic feasibility and practical applicability in local context.

Conclusion

Road traffic flow intensity concept is very important for road users. Challenges and solutions suggested are useful for road traffic control of study area.Always drive in average speed, follow the traffic signals, walk in foot path, don't drink and drive, always be careful on the road.

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