

To Study the Factors Causing Traffic Problems in India with Specific Reference to Pune City: A Conceptual Framework

Rashmi Mahajan^{1,*}, Darshan Mahajan²

¹Balaji Institute of International Business, Sri Balaji University, Pune (SBUP), Maharashtra, India

²National Institute of Construction Management and Research (NICMAR), Pune, India

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Abstract Due to consistent development, economic as well as infrastructural, and a lot of lucrative opportunities in the cities, the need for transportation has become very essential. India being a developing country where the population is on the rise, there is a serious traffic issue. The problem of traffic congestion is being faced by most metro cities. In a metro city like Pune, where a lot of people converge to every day for their livelihood and for a better standard of living, the traffic problems are even bigger. Hence, it is imperative to study the traffic and transport infrastructure to find out the various causes so as to identify the probable solutions to have a better planned, designed and cost effective road transportation system. This paper attempts to analyze the various causes of the traffic congestion so that suitable improvements can be made to overcome these problems, thereby providing solutions for effective transportation and infrastructural management through the city. The methodology used was a survey of literature and observation and the researcher has tried to identify the factors causing the traffic congestion. The factors identified are categorized in three broad areas namely; people problems, infrastructural problems and implementation and management problems. The researcher has also established relationships between the factors of the

three broad categories and how one factor influences the other factors negatively, thereby aggravating the overall Traffic Congestion. Since there is interrelationship among the factors, right policies from the Govt., better planning and implementations on the ground and over all better discipline by the citizens can improve the state of affairs leading to a better traffic and infrastructure management.

Keywords Traffic Problems, Traffic Congestion, People Problems, Infrastructural Problems, Implementation and Management Problems

1. Introduction

According to the World Population Review [1], India is the 2nd most populous country in the world which accounts for around 17.88% of the world population. The comparative analysis between the year 2000 vs. 2019 shows that the population of India has crossed more than 1.4 billion in 2019 (Figure 1) as against 1.1 billion in 2000 (Figure 2).

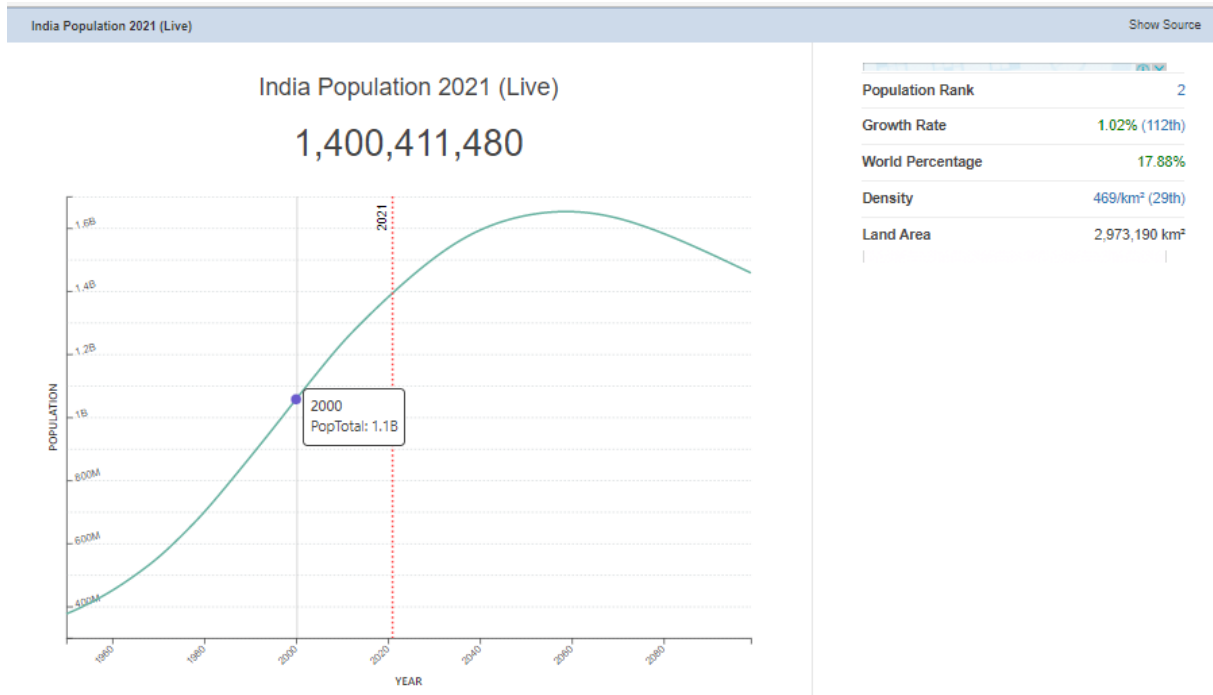


Figure 1. Population of India in the year 2000

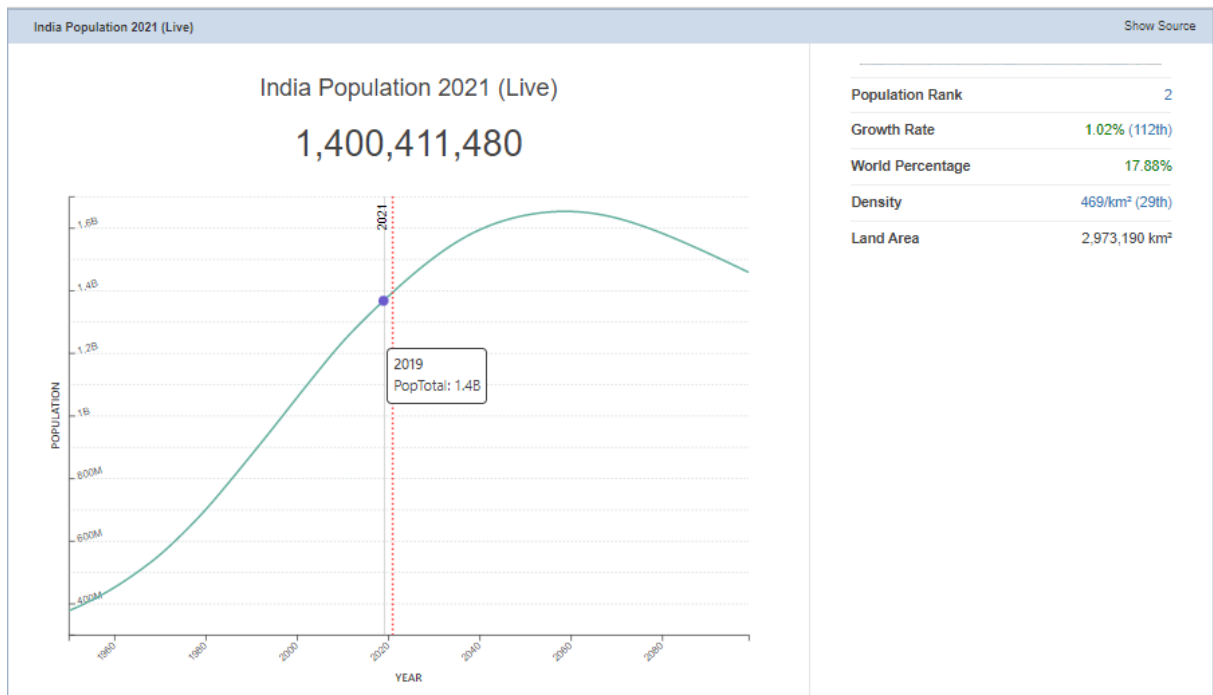


Figure 2. Population of India in the year 2019

According to the comparative analysis done on the data published by World Bank [2], around 34.47% of the total population of India resided in the urban areas in 2019 (Figure 3), which was 27.66% in 2000 (Figure 4) and 23.1% in 1980, which shows a steep growth rate which has doubled in the last 2 decades.

This substantial and steep rise in the overall population as well as the rise in the number of people living in the urban areas has put a tremendous pressure on the overall

infrastructure such as the water, sanitation and road transport of the country. The infrastructure of the urban cities is tested almost on a daily basis and most occasions are in the red zone. Citizens living in these urban cities often have to adjust to these hassles created by the pressures on the infrastructure. This paper tries to identify such infrastructural problems pertaining to the road and traffic congestion problems in India with reference to Pune city.

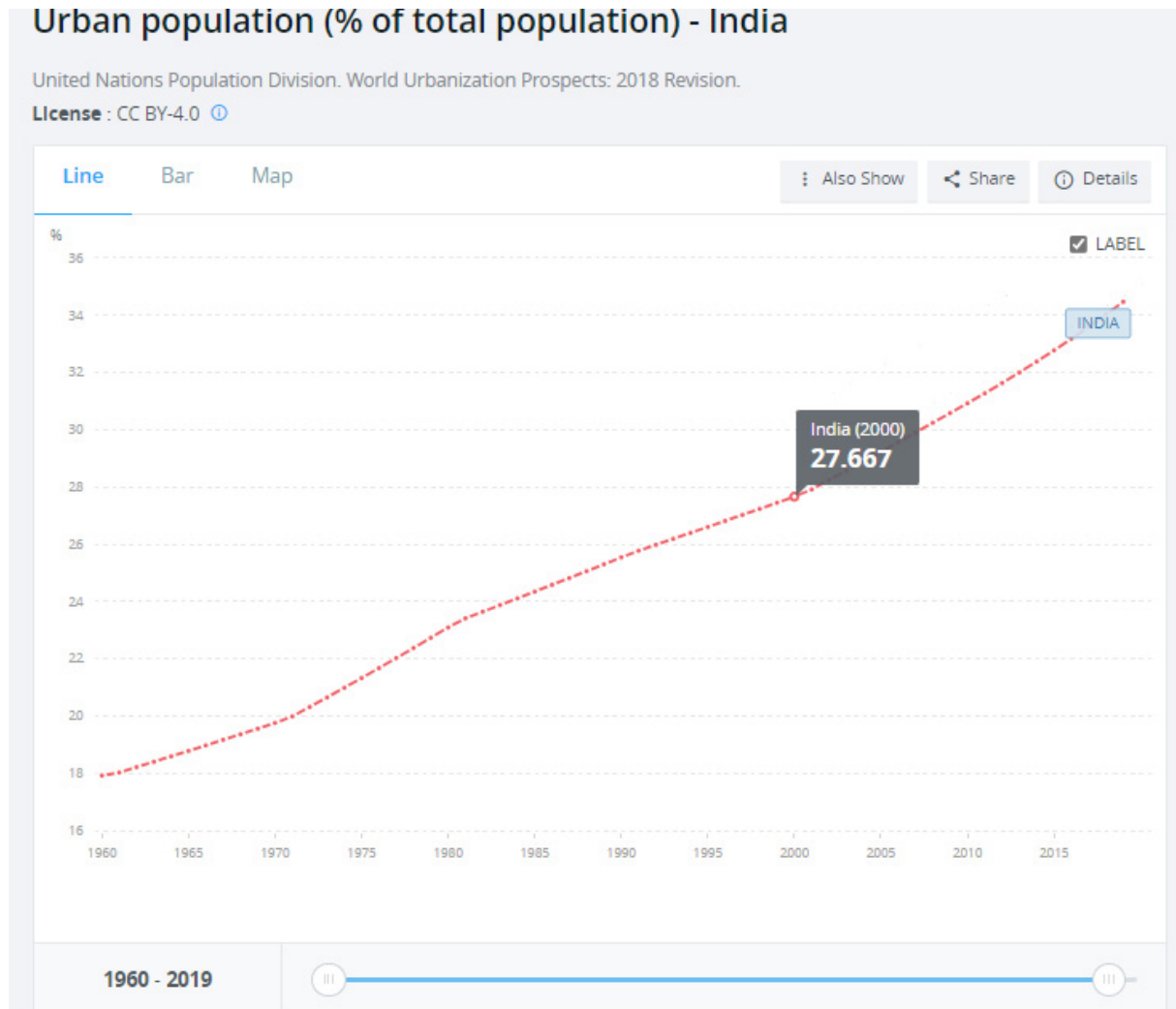


Figure 3. Urban Population of India in 2000

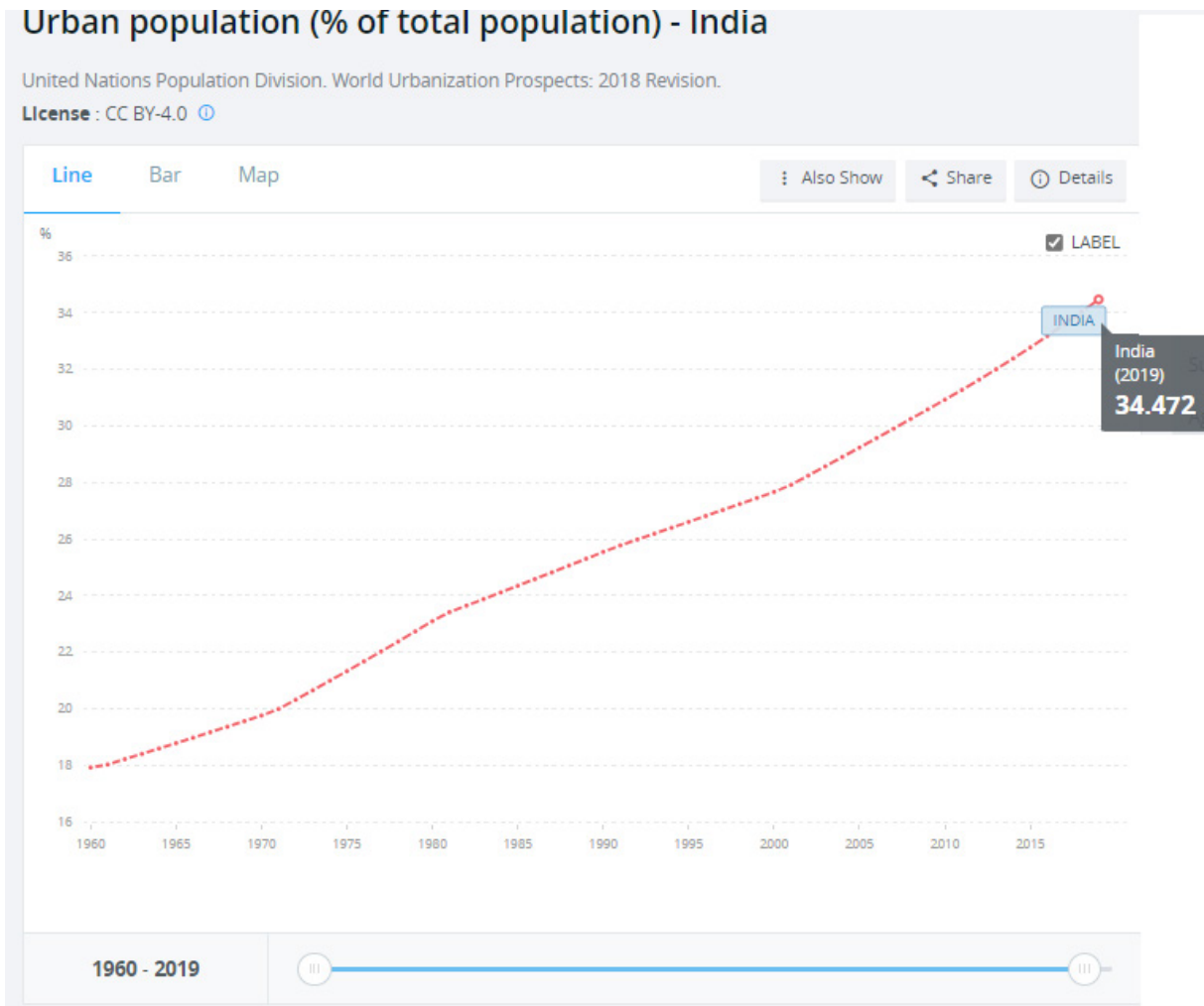


Figure 4. Urban Population of India in 2019

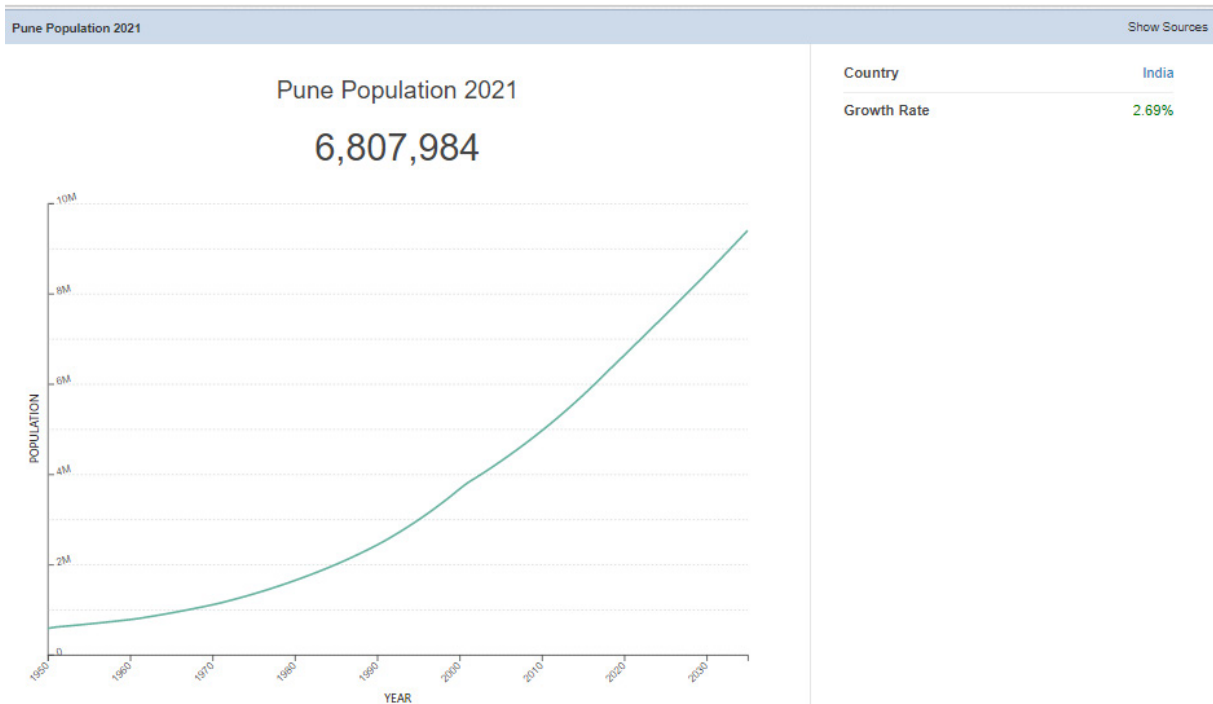


Figure 5. Population of Pune City

2. Context of the Study: Pune City

Pune city is located on the Mutha River and is the second-largest city in Maharashtra, India and the ninth largest city in the country. Today, the city is considered Maharashtra's culture capital and has an estimated population of around 6,807,984 (Figure 5). Pune is one of the fastest-growing cities in the Asian-Pacific and this has been true for some time. Between 1991 and 2001, the city grew by 40%, increasing from 16 lakhs to about 26 lakhs. According to a report published by World Population Review [3], the decadal growth rate of Pune for the last 40 years has been at least 40%.

2.1. Pune City Size and Population Density

The city has a population density of 5,600 people per square kilometer and encompasses a total surface area of 331.26 km². The larger metropolitan area has a population of 5 million, which makes it the 7th largest metro area by population in India. [3]

3. Research Methodology

In order to study the factors causing traffic problems in major cities in India, an incorporated methodology is applied in this research. This mainly includes the literature

review, direct observation and monitoring the traffic scenario with the help of a website that records the traffic in Pune City. With a focus on the above methods, this paper mainly aims to study the current situation of traffic in Pune city and to list down the factors and conceptual frame work of the relationships between the factors causing the traffic congestion.

2 methods were used for the study: Monitoring and Research carried out by other researchers.

3.1. Monitoring

The researcher relied on the traffic monitoring website such as Tomtom.com for the statistical data. The website gives a lot of insights with respect to the kind of traffic and the trends of traffic congestion, the area where traffic congestion is high as well as the time of the day when congestion is high.

Pune Traffic Report generated by Tomtom.com [7], ranked Pune to be the 5th most congested city in the world in 2019, with the congestion levels recorded at 59% (Figure 6). Around 43,247,828 km were covered for the survey and it was observed that around 49% congestions were recorded on the highways and 63% congestions were recorded on the non-highways, concluding that congestions are seen in both types of roads. The same report also recorded about 70% morning rush and 99% evening rush as everyday rush hours.

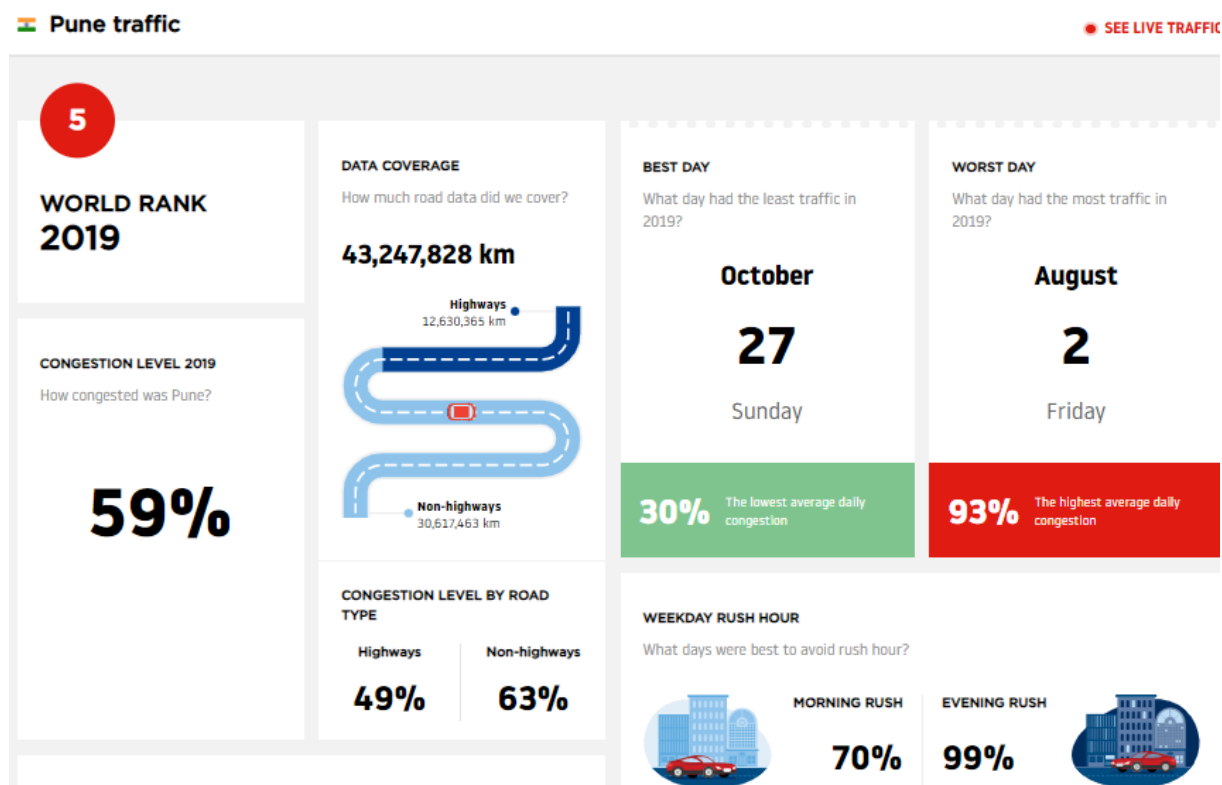


Figure 6. Pune Traffic Congestion Level

WEEKLY CONGESTION

Compare weekly congestion levels in corresponding weeks of 2019 and 2020.

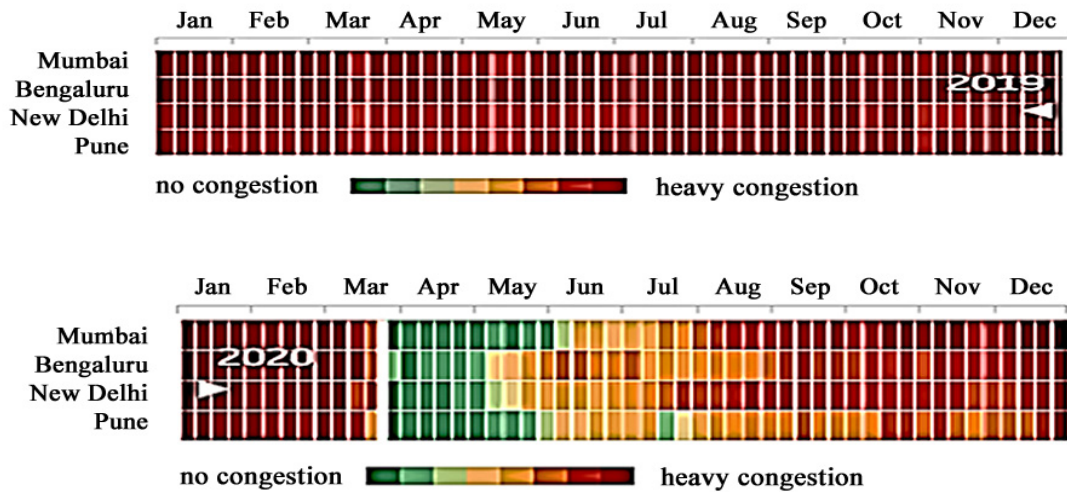


Figure 7. Pune and other Major Cities Traffic Congestion Level

The weekly Traffic congestion comparison of major cities of India such as; Mumbai, Bengaluru, New Delhi and **Pune**, show the problem of the traffic problems. It is clearly visible from the above Figure 7 that all the major cities including **Pune**, face major traffic congestion problems all throughout the year 2019 as well as the first 3 months of 2020. The lock down was imposed in the month of April 2020, which is clearly evident in the subsequent recordings.

Therefore, it is essential to find out the factors that cause traffic congestions, which leads to an infinite amount of man-hours wasted in waiting in the congestions as well as a lot of wastage of precious fuel being burnt creating a huge pressure on the infrastructure that is already stretched to its brink. The identification of the factors causing the congestion can lead to finding the solutions and measures taken to overcome the congestion and plan a better traffic management system.

3.2. Review of Literature

Various research papers and articles were reviewed that talked about problems with traffic congestion. Various authors talked about various different reasons for the problems.

3.3. Traffic and Congestion Problem

According to S. K. Rahane *et al.* [4] congestion involves queuing, slower speeds and increased travel times, which impose costs on the economy and generate multiple impacts on urban regions and their inhabitants. It has many indirect impacts such as environmental and resource impacts due to congestion, impacts on quality of life, stress caused due to congestion, safety as well as impacts on

non-vehicular road space users such as the users of sidewalks and road frontage properties.

S Sarda *et al.* [5] in their study also highlighted that Traffic congestion not only causes pollution, but also wastes time and energy. A. M. Rao *et al.* [6] in their research paper stated that traffic congestion is a major problem for transportation professionals in India. Most of the cities are suffering from medium to high level of traffic congestion.

3.4. The Factors Causing the Traffic Congestion

The factors causing the Traffic congestion can be divided into 3 broad categories Figure 8 & Figure 9.

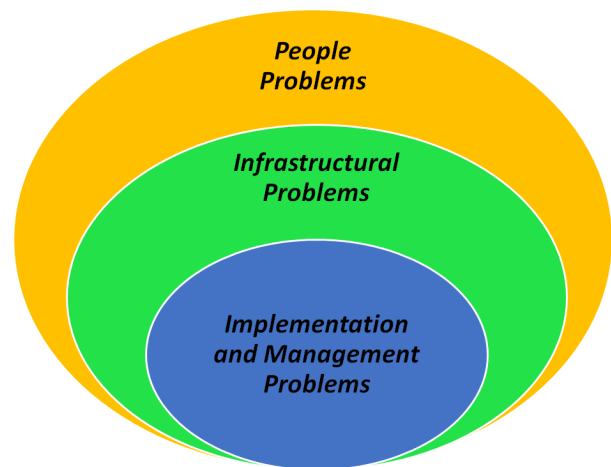


Figure 8. The factors causing the Traffic Congestion

3.4.1. People Problems

Increase in population

The population of Pune was 3.8 million in 2000, which

has almost doubled to 6,807,984 (Figure 3) in 2021 [3] and represents a 2.69% annual change. This influx of people to Pune is creating a huge gap between the available and required infrastructure for sustaining the city.

Steep rise in the Population density

Pune city is a popular educational, IT and manufacturing hub and its proximity to Mumbai makes it a favorite destination for students and working professionals to migrate to the city. Musmade [8] studied the Population Density of Pune district which also included Pune city. In his study, the researcher stated that Pune City with an area of 184 sq. km had a population density of 14643 people per sq. km in 2001 compared to 27488 people per sq. km in 2011, making Pune city one of the most densely populated cities and is growing at a faster rate. This rise in population density and increasing number of commuters is also adding to the problems of traffic congestion.

Increase in private vehicles (cars and two-wheelers)

Business Today [9] reported that Mumbai tops the chart with 510 cars per km to become the most car-congested city in India followed by Pune with 359 cars per km holding the second spot as the density of private cars soared. A similar report was published in The Times of India [10] stated that Pune city has 24.96 lakh two-wheelers till March 2017. Another article published in India Today [11] reported that Regional Transport Office (RTO) chief Mr. B. Ajri stated that till the end of March 2018, there was an increase of over 280,000 vehicles, which takes the figure of registered vehicles in the Pune city in the year 2017-2018 to 36.27 lakh, from 33.37 lakh the 2016-2017. Compared with 2017, the number of four-wheelers registered increased from 5.89 lakh to 6.45 lakh in 2018 and the number of registered two-wheelers shot up from 24.97 lakh to 27.03 lakh. The sheer number of private vehicles has added to the problem of traffic congestion.

Increase in private commercial vehicles (Ola / Uber/ auto rickshaws)

According to Pune's regional transport office (RTO) as reported by The Times of India [12], there were as many as

7,000 to 8,000 app-based cabs plying in the city. Pune city also has a lot of three-wheelers (auto rickshaws) that run on the roads. The increase in the private vehicles is another contributor to the ever increasing traffic which has also attributed to the poor public transport system.

Accidents /Poorly maintained vehicles leading to breakdown on the road

One of the factors leading to road congestion is accidents and vehicle breakdown. The vehicles often break down in traffic due to poor maintenance, which causes a lot of inconvenience. Typically, congestion is seen when a large public transport bus or goods transport truck breaks down, which creates a bottleneck situation leading to congestion. Similar congestion is seen when accidents occur and the bottle neck situation is created. The congestion stays until the vehicle is tolled and the road is cleared which might take a few hours.

Increase in purchasing power

Shivatre *et al.* [13] stated that due to the higher purchasing power of the citizens of Pune city, the numbers of vehicles being purchased annually is increasing every year, resulting in the increased rate of traffic jams.

Lack of self-discipline to follow the traffic norms

Another important reason for the traffic congestion is that people lack self-discipline when on roads and have a very casual attitude towards the traffic rules. This casual attitude is also due to the lack of strict monitoring & penalizing for breaking the traffic rules by police/ traffic authorities.

Violations of the traffic rules and signals

Another important reason for the traffic congestion is that people often violate the traffic rules : such as wrong side entry or wrong/ unauthorized turn and people often jump signals. It is also seen that people do not follow a proper lane management system. This casual attitude is also due to the lack of strict monitoring & penalizing for violating the traffic rules by police / traffic authorities. There is also a lack of proper lane management system.

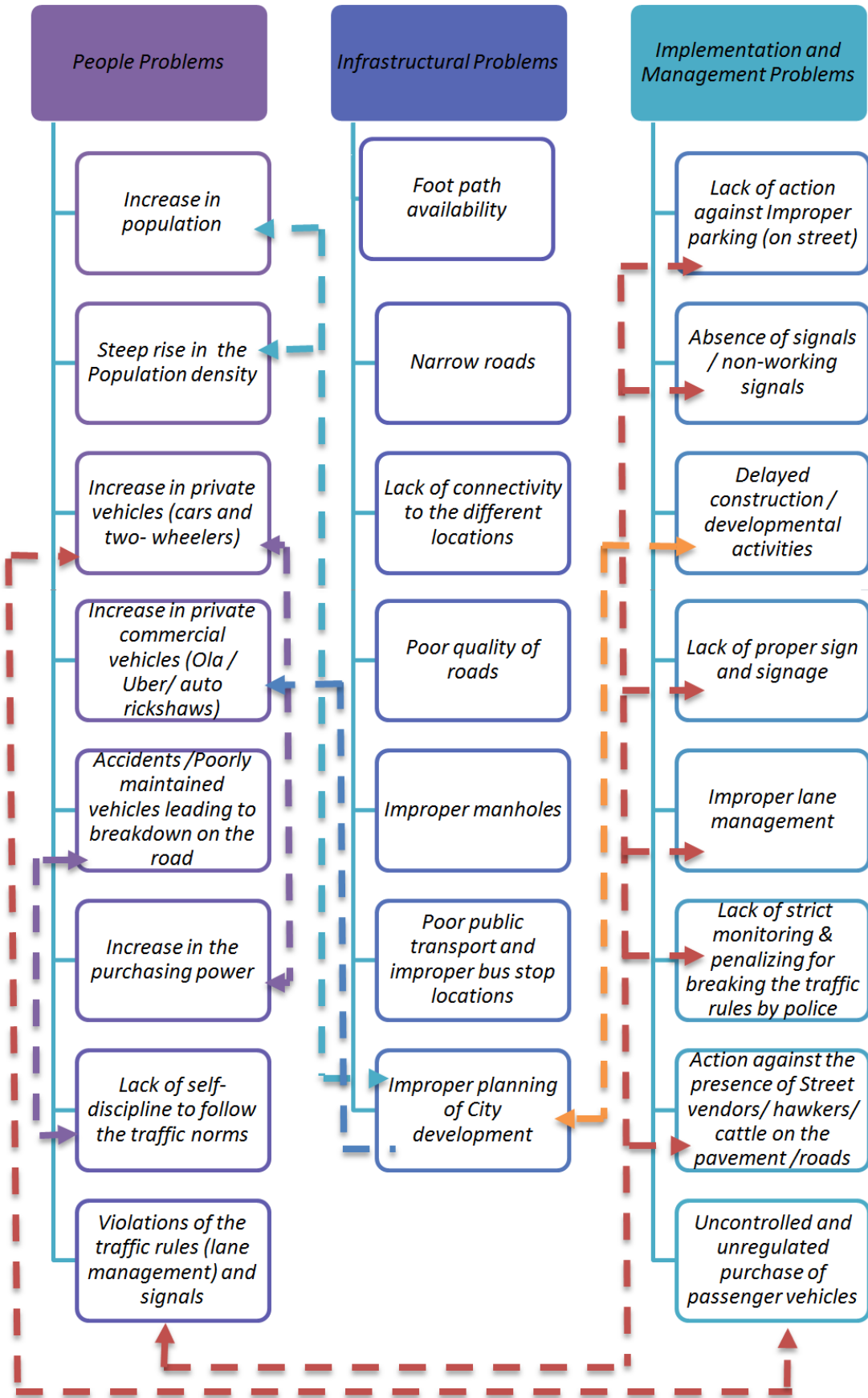


Figure 9. Relationship between factors causing the Traffic Congestion

3.4.2. Infrastructural Problems

Foot path/Pavements availability

In many instances, it is found that the roads are too narrow and are occupied by a large pavement/ foot path leading to traffic congestion.

Narrow roads

Shivatre *et al.* [13] and S Sarda *et al.* [5] have mentioned in their study that the major routes connecting the various parts of the city are not wide enough for a free flow of traffic, leading to traffic congestion. They also further state that though most of the roads have undergone road-widening, but the illegal encroachment of hawkers still creates bottlenecks at various intersections.

Lack of connectivity to the different locations

Shivatre *et al.* [13] stated in their research that though Pune traffic has increased by more 105 times since 1960, the road network has grown merely by 6 times, leading to huge traffic load as the road network is insufficient and causing traffic congestion. They further stated that the existing road network is 7% while the requirement is more than double, i.e. 15%. This gap of 8% between the actuals and required leads to traffic congestion in different parts of the city.

Poor quality of roads

Pune city also struggles with bad quality roads. Large potholes, uneven roads and innumerable speed breakers slow the traffic down. The problem is even severe during monsoon due to poor drainage system; the potholes get filled with rain water, making it impossible for drivers to drive properly. It slows down the traffic as well as at times leads to accidents which add to the further congestion.

Improper manholes

At times, the roads have improper and uncovered manholes creating bottleneck and the drivers have to navigate carefully.

Poor public transport and improper bus stop locations

S Sarda *et al.* [5] and Shivatre *et al.* [13] have mentioned in their studies that another problem is redundant public transport facilities due to which commuters have to wait long hours, which leads to them opting for private transport facilities and some also opt for self-owned vehicles.

Improper planning of City development

S. K. Rahane *et al.* [4], in their research have highlighted the problem of improper planning of City development. This improper planning also is one of the reasons for traffic congestion.

3.4.3. Implementation & Management Problems

Lack of action against improper parking (on road)

On-road / illegal parking of vehicles according to S. K. Rahane *et al.* [4] and S Sarda *et al.* [5] is one of the main reason behind serious traffic congestion in different parts of the city. This is contributed by the lack of action taken on the law breakers / perpetrators by the traffic police authorities.

Absence of signals / non-working signals

Another factor that contributes to traffic congestion is the absence of traffic signals. The absence of traffic signals on key junction leads to congestion as everybody is in a hurry to reach their destination. In some places, either the signals are malfunctioning or not functioning at all, which leads to a situation of confusion and chaos.

Delayed construction / developmental activities

Pune city being a metropolitan city, is developing at an exponential rate. Many roads, under passes, flyovers, buildings and developmental projects are coming up. Currently, the Metro project is also taken up by the government in Pune city. Some of them are completed in time and some of them get delayed. These developmental/ construction activities also create bottle neck and cause traffic congestion.

Lack of proper sign and signage

A. Jadhav *et al.* [14] studied the factors of lack of proper sign and signage and their impact on the traffic congestion. They also recommended the Installation of adequate signage consistent with IRC 67-2012 for better traffic management.

Improper Lane management

S Sarda *et al.* [5] and C. Shivatre *et al.* [13] have highlighted that the presence of lane management in any city is an important factor in managing the traffic and lack of proper lane management system in Pune city is an important factor leading to traffic congestion.

Lack of strict monitoring & lack of penalizing for breaking the traffic rules by police

The lack of strict monitoring and penalizing for breaking the traffic rules by the police/ law enforcers leads to the divers taking the traffic laws very lightly. People are found jumping signals and breaking traffic rules, which leads to traffic congestion. Monitoring and penalizing for breaking traffic rules acts as a deterrent for the commuters and instills respect in their minds for the traffic rules.

Action against the presence of Street vendors/ hawkers/ cattle on the pavement /roads

Another reason for traffic congestion is the presence of street vendors/ hawkers/ cattle on the pavement and roads. This leads to congestion and bottle neck situation at key

junctions. The lack of action against hawkers on the road / pavements leads to them using the roads and pavements for selling their products.

Uncontrolled and unregulated purchase of passenger vehicles

There are no restrictions on the total number of vehicles that are purchased every year. The uncontrolled and unregulated purchase of passenger vehicles leads to unregulated amount of vehicles running on the roads.

4. Conclusion and Future Steps

Traffic and congestion has become a major problem in many major cities in India. Pune, being the 2nd largest city in Maharashtra after Mumbai, has been grappling with the problem for many years now. This research tries to not only identify the factors responsible for the traffic and congestion problems in Pune, but also tries to establish a relationship between these factors. Once the problems and their interrelationships are established, higher are the chances to find solutions to those problems. There are a lot of policy decisions that need to be taken by the government in terms of infrastructural development and law and order to curb this problem. The researcher, in this paper has tried to identify the factors causing the traffic congestion in Pune. The factors identified are categorized in three broad areas namely; People Problems, Infrastructural Problems and Implementation & Management Problems. The researcher has also established relationships between the factors of the three broad categories and how one factor influences the other factors negatively, there by aggravating the overall Traffic Congestion. Since there is interrelationship among the factors, right policies from the Govt., better planning and implementations on the ground and over all better discipline by the citizen can improve the state of affairs, leading to a better traffic and infrastructure management.

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