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RESEARCH ARTICLE

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IMPACT ON TRAFFIC CONGESTION DUE TO METRO IN BENGALURU

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ABSTRACT

The Namma Metro system in Bengaluru has been hailed as a solution to the notorious traffic jams in the city. The purpose of this study is to determine how well the metro reduces traffic flow. Research conducted on particular sections of the metro system, such as the Purple Line, demonstrates a favorable effect, with less traffic during rush hours. Some contend that in order to optimize the metro's benefits, feeder networks and urban planning should be the primary focus, as the system's total impact is negligible. To give a complete picture of the metro's effect on Bengaluru's traffic congestion, this study will examine ridership figures, traffic flow patterns, and professional perspectives. In order to guide future development initiatives for a more effective and sustainable municipal transportation system, it will examine both achievements and possible inadequacies.

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INTRODUCTION

The majority of Asian cities face a variety of issues as a result of growing urbanization. One such issue that plagues Asian conurbations is urban congestion, which has a lot of effects on metropolitan economies. The general definition of urban congestion is when demand for travel exceeds supply. Governments must reevaluate their urban transport policy in light of the expanding traveler population and the dearth of available services. Movement is restricted by congestion. For instance, the International Union of Public Transport (UITP) reports that in 2001, the average speed of cars on Bangkok's streets was 15 km/h, compared to 18 km/h, 19 km/h, and 20 km/h in Manila, Jakarta, and Singapore (BOQUET Yves, 2010). Asian cities are implementing a number of policies and programs to enhance urban transportation, the majority of which are focused on bolstering and enhancing urban infrastructure. A few Asian nations have also implemented laws restricting the ownership of private automobiles and congestion charging. Nonetheless, policy duplication and poor execution are at the core of certain prevalent causes of congestion in developing cities. These include poor driving habits, a lack of traffic planning, a lack of intelligent transport systems, mixed use of various roadways, inexpensive parking techniques, and insufficient and inefficient public transportation. Additionally, the existence of informal operators in the public transportation system has a significant impact on congestion. It follows that improving infrastructure won't be enough to address the issues; other factors also need to be taken into consideration. The first section of this article lists a few of the causes of traffic in Asian cities generally. The issue of traffic in Indian cities is then covered, along with the several steps

In order to better address such important challenges, it addresses the policy gaps that limit the effectiveness of these initiatives and makes the case for a robust institutional system for better decision-making. However, the growing number of engines is not the only cause of traffic congestion. automobiles In cities with a low number of motor vehicles, congestion would not exist. For instance, there are significant traffic jams and slow moving traffic in Bangladesh and India's Dhaka and Varanasi. There are barely 7% of cars in Delhi overall in Varanasi.3. This implies that improper management of the supply and demand for transportation services contributes to congestion as well. Put another way, an imbalance in the factors influencing the supply and demand of transportation services also contributes to traffic congestion. These factors could be both direct and indirect, including the rise in the number of cars on the road and the continuous state of the road infrastructure, the availability of reasonably priced private transportation services, psychological issues, a lack of governmental measures, and other aspects. In this situation, understanding the causes of congestion requires addressing long-standing policy gaps. This may result in a holistic policy that tackles the issue of congestion, encompassing measures like parking regulations, land use planning, and congestion pricing, among others. Mumbai traffic travels at five kilometers per hour during peak hour (Kumar, 2013). There are over 6.8 million cars overall in Bangalore and Hyderabad, with two-wheelers making up about 70% of the total. In contrast, buses make up just 0.7% of the motor vehicles registered in the cities of Hyderabad and Bangalore, while cars and other vehicles like jeeps, cabs, and rickshaws make up roughly 25%. demonstrates the increasing trend of two-wheeler, car, taxi, and other vehicle ownership in Indian cities. Initiatives in Hyderabad, Bengaluru, and other cities have also gotten positive feedback.

between suburbs and key business districts and made visiting crowded areas of cities quite convenient. Real estate has appreciated as a result of this. Cities grew as a result, and tourism rose as well. Both the quantity and scope of incidents have dramatically decreased in the realm of safety. The most effective technique to ease traffic is using the metro rail system. But accurately identifying the existing transportation corridors, planning for future growth, and the availability of land are crucial components of investment costs and maintaining the profitability and popularity of metro operations. Increased knowledge of the advantages and features of metro travel. The reason for the travel and the ownership of the vehicle are crucial factors. These studies only include case studies of particular national transit companies. Case studies look at the various aspects of cities, the MRTS issues they cause, the issues that need to be resolved, and the problems that will arise in the future. They also provided insight into the various issues and difficulties the city faces. Bengaluru is a shining example of a city transformed from a retiree's haven to a Meta city. It has had a significant metamorphosis in an effort to meet the many needs of commercial activity. Development focused on transit Tod (transit-oriented development) appears to be a sensible solution to transportation and traffic issues, leading to towering, mixed-use skyscrapers. Bengaluru began building Namma Metro after Delhi and Hyderabad, and Phases 1 and 2 were followed by Phases 2A and 2B. By connecting and differentiating Bengaluru's conditions and systems through mapping the chosen case studies, we may better address the issue of transit-oriented development, or TOD. Keywords: Metro Rail Public Transportation Case Study Bengaluru's Namma Metro TOD Bengaluru Metro, often known as Namma Metro, is the third-largest metro operator in India. It travels both above and below earth. At its highest speed of 80 km per hour (about 49.71 mph), it travels 56.1 km (about 34.86 mi). The state capital of the Union of India's Karnataka region is Bangalore City. With over 9 million residents as of 2012, it ranks as the 33rd largest city globally (Demographia, 2012). Bangalore, the fifth-largest city in India, is known as the Silicon Valley of India and is home to numerous significant IT companies.

To establish a Mass Rapid System, the Karnataka state government established Bangalore Mass Rapid Transit Limited (BMRTS) in 1994. It located a six-corridor elevated light rail (LRT). There are various reasons why this project was shelved. In order to create a comprehensive report, the Karnataka government conferred with the Delhi Metro Rail Corporation (DMRC), another formed entity, in 2002. Report on the project (DPR). It established two primary routes with 32 stations each, running east-west (18 km) and north-south (14.9 km) as part of Phase I. Only metro rail services are taken into consideration for all analytical reasons in this article. Although it is now in progress, the second phase of the route alignment's details are not yet publicly available. It is anticipated to span a greater distance than Phase I, though. Phase I, which is only roughly 30 km long, is crucial for tying the metropolis and its suburbs to the city center. An estimated 600 million rupees (\$120 million) would be spent. This work seeks to close this knowledge gap. One of the biggest metropolitan areas in the nation, Bengaluru, was selected for this study, and an attempt was made to calculate the productivity loss brought on by traffic congestion. Bengaluru is the second most motorized large city in the country, after New Delhi (2017), and according to a recent study (2018), Bengaluru is the second most congested city in the nation, after Kolkata. These factors are the primary reasons for selecting Bengaluru for this article. An estimated \$5.92 billion was lost in 2018. Furthermore, out of all the cities in the nation, Bengaluru is the only one with the greatest source of automotive emissions-related urban air pollution.

REVIEW OF LITERATURE

Topic—Understanding the impacts and influences of metro rail on urban environment –case studies and the bengaluru scenario

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Introduction

A comprehensive literature evaluation was done because the research for this publication is based on many case studies. Based on the extensive study a similar kind of case study for evaluation of the Impact of Namma Metro on Bengaluru city has been attempted in this paper. This research also takes into account various data collection techniques and even with the help of a questionnaire finds out what do the local commuters or the daily users of the metro think. What are the views of the people who are the nearby residents of these metro stations?

Research Gap

The research article did not talk about many important points

Traffic congestion during construction- the metro construction affects the traffic very much. In compact areas where there is limited space the metro construction there creates lots of problems because of which there are long and endless traffic jams also.

Nearby Residents- the people who have their residences near these metro stations are very much affected by the construction first of all while construction there is a lot of dust arising from that and after construction, all the traffic which gets gathered near the station affects them.

Too much rush- sometimes there is too much rush in the metro stations that it is hard to find a way to get in and out of the station and apart from that there is too much pushing in the metro itself as N number of people try to get in and out of the metro at the same time

Robbery- there have been many cases where some people take advantage of the rush and steal other people's stuff. Robbery in the metro is very common, especially on certain auspicious occasions when so many people travel in the metro at the same time.

Increase use of public transportation- after the construction of the metro people use public transport more instead of personal vehicles which is a very good thing.

Improved air quality- more people choose the metro which helps in less fuel emissions and ultimately helps improve the city's air quality.

RESEARCH METHODOLOGY

Research Objective: Define the specific objective of your study, such as understanding the impact of the Metro system on traffic congestion in Bengaluru and identifying factors contributing to changes in congestion levels.

Literature Review: Conduct a comprehensive review of existing literature on similar studies conducted in other cities. This will help in understanding the methodologies used, key findings, and potential gaps in the current knowledge.

Data Collection: a. Traffic Data:

- Obtain historical traffic data (e.g., traffic volume, speed, congestion levels) for the preMetro and post-Metro phases in Bengaluru.

Surveys and Questionnaires

- Conduct surveys among commuters to gauge their mode of transportation before and after the Metro's introduction.

- Collect feedback on travel time, comfort, and overall satisfaction with the Metro system.

Data Analysis: a. Traffic Congestion Metrics:

- Analyze traffic congestion metrics such as traffic volume, travel time, and congestion indexes before and after Metro operation.
- Use statistical tools to identify significant differences.

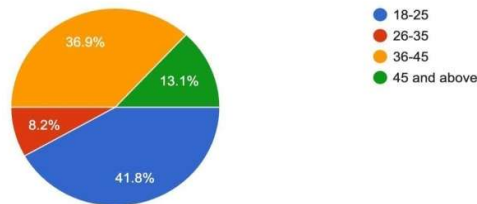
Comparative Analysis: a. Compare Bengaluru's Metro system's impact with similar cities in India or internationally that have implemented Metro systems.

1. **Policy Analysis:** a. Evaluate the policies and strategies implemented by local authorities to mitigate traffic congestion and promote Metro ridership.
2. **Recommendations:** a. Based on the findings, provide recommendations for improving Metro services, infrastructure, and traffic management in Bengaluru. b. Suggest potential strategies for addressing any negative impacts identified.
3. **Conclusion:** Summarize the key findings and their implications for traffic congestion and urban transportation in Bengaluru.
4. **Report Writing:** Prepare a comprehensive research report that includes an executive summary, methodology, findings, analysis, recommendations, and references.
5. **Peer Review:** Seek feedback and review from experts in the field to ensure the validity and reliability of your research.
6. **Dissemination:** Share your research findings through conferences, seminars, academic publications, and policy briefs to reach a wider audience and influence transportation policies.
7. **Continuous Monitoring:** Consider the potential for long-term monitoring of traffic congestion and Metro ridership to track changes over time and assess the effectiveness of any recommendations implemented.

DATA ANALYSIS

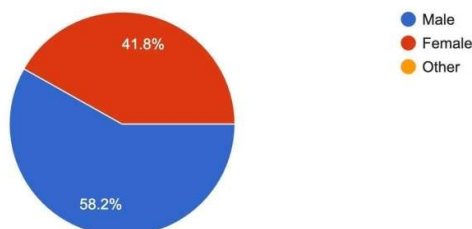
What is your Age?

122 responses



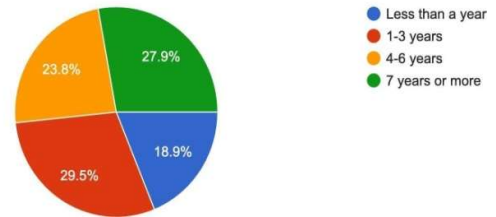
What is your Gender?

122 responses



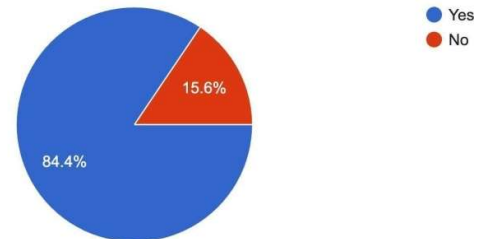
How long have you been residing in Bangalore?

122 responses



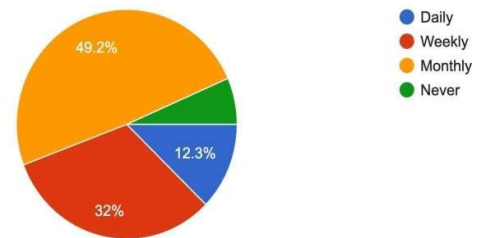
Have you ever used the Bangalore Metro?

122 responses



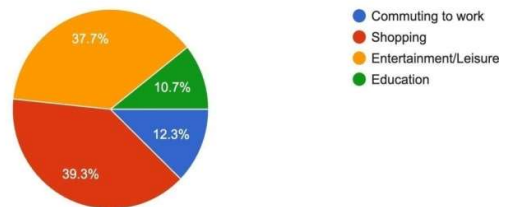
How frequently do you use the Bangalore Metro for commuting?

122 responses



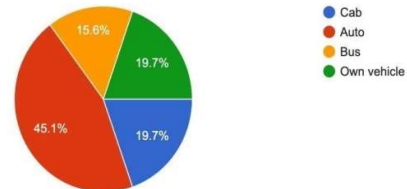
What is the primary purpose of your metro travel?

122 responses



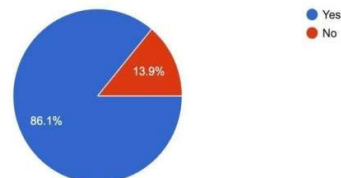
Before the introduction of Bangalore Metro, how did you primarily commute within the city?

122 responses

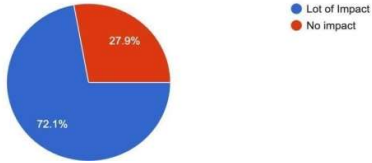


Have you observed any changes in traffic congestion in areas served by the Bangalore Metro?

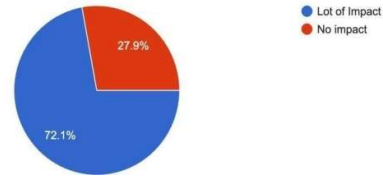
122 responses



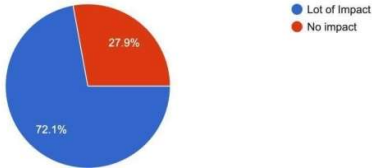
How much impact do you think the Bangalore Metro has had on reducing traffic congestion in the city?
122 responses



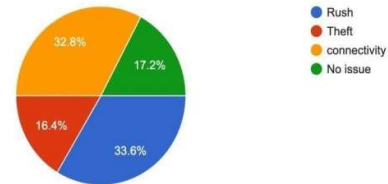
How much impact do you think the Bangalore Metro has had on reducing traffic congestion in the city?
122 responses



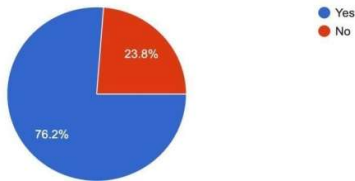
How much impact do you think the Bangalore Metro has had on reducing traffic congestion in the city?
122 responses



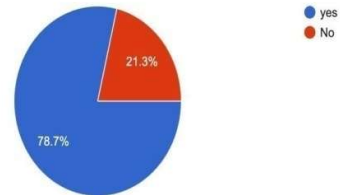
What challenges or issues, if any, have you faced while using the Bangalore Metro for your daily commute?
122 responses



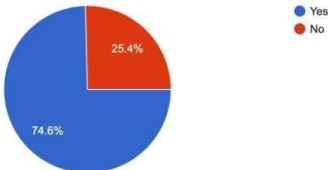
Are there specific routes or areas where you have noticed a significant reduction in traffic congestion due to the Metro?
122 responses



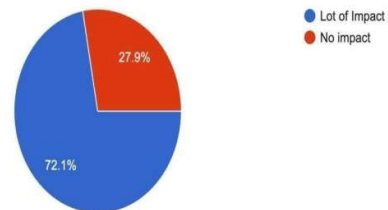
Has the introduction of the Bangalore Metro influenced land-use patterns and development in the city?
122 responses



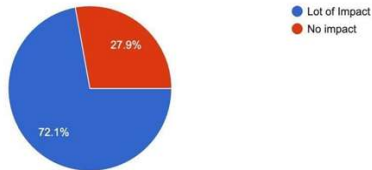
Have you observed any increase in traffic congestion in certain areas as a result of the Bangalore Metro construction or operations?
122 responses



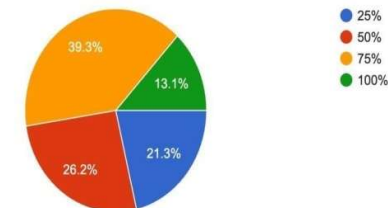
How much impact do you think the Bangalore Metro has had on reducing traffic congestion in the city?
122 responses



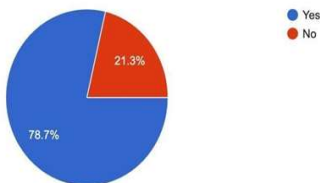
How much impact do you think the Bangalore Metro has had on reducing traffic congestion in the city?
122 responses



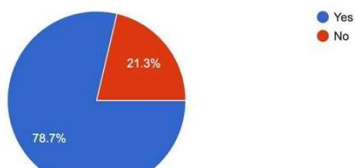
How effective do you think the integration of Bangalore Metro with other modes of public transportation (buses, cabs, etc.) has been in reducing traffic congestion?
122 responses



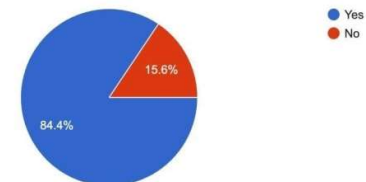
Have you experienced any changes in travel time since the introduction of the Bangalore Metro?
122 responses



Do you believe the Bangalore Metro has effectively served as a solution to alleviate traffic congestion in the city?
122 responses

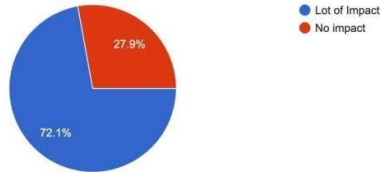


Do you believe that the Bangalore Metro has led to a change in the overall traffic culture and behaviour of commuters in the city?
122 responses



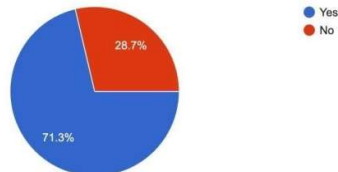
How much impact do you think the Bangalore Metro has had on reducing traffic congestion in the city?

122 responses



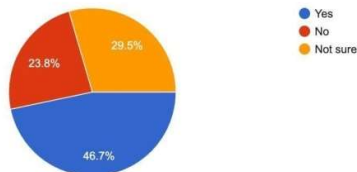
Has Bangalore Metro played a role in future urban planning to further mitigate traffic congestion issues?

122 responses



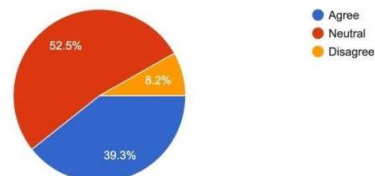
Do you think the metro system needs to be expanded to cover more areas in Bangalore to further reduce traffic congestion?

122 responses



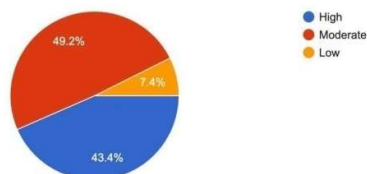
In your opinion, has the introduction of the Bangalore Metro had a positive impact on reducing traffic congestion in the city?

122 responses



How would you describe the traffic congestion in Bangalore before the introduction of the metro system?

122 responses



FINDINGS

Based on the data analysis report we found out that

- The major age group that uses the metro is between 18-25 which is around 41.8%.
- From our total responses around 84% use the metro for their commuting purposes.

- Around 86% of the people believe that the metro has reduced traffic congestion in many areas.
- Around 78% of the people believe that they have witnessed a reduction in travel time in their daily schedule.
- People say that the land prices in the metro adjacent areas have rapidly increased.
- They also believe it has played a major role in Changing the overall traffic structure
- Has encouraged a shift towards eco-friendly and sustainable modes of transportation
- Has influenced land use patterns and has led to development
- Has played a major role in decreasing air pollution and improving AQI

CONCLUSION

In Bengaluru, the installation of the metro system has had a major positive influence on traffic congestion. The metro has shown itself to be a competitive and effective substitute for more conventional forms of transportation, providing city dwellers with a quick and dependable way to get about. There has been a discernible decline in the number of private automobiles on the road as more people choose to use the metro, which has reduced traffic congestion overall. In addition to improving accessibility, the metro's ability to link important parts of the city has prompted a change in commuter behavior. More people are opting to leave their automobiles at home because of the metro's ease and time efficiency, which helps to reduce traffic congestion. The advantages of less automotive traffic for the environment, including lower carbon emissions and air pollution, highlight the metro's beneficial effects on the entire metropolitan environment. Even if there may still be obstacles to overcome in terms of last-mile connection and metro network expansion, the current success story offers a promising blueprint for environmentally friendly urban transportation. With its ongoing development and expansion, Bengaluru's metro system is well-positioned to significantly reduce traffic and promote an eco-friendly, more efficient urban mobility environment.

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