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An Empirical Study on Using Public Transport to Reduce Pollution

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ABSTRACT

This research explores the **attitude of Chennai residents toward using public transport as a strategy to reduce urban pollution**. With Chennai experiencing rapid urbanization, vehicular emissions have emerged as a significant contributor to air pollution and deteriorating public health. Using a mixed-method approach, the study analyzes people's perceptions, awareness levels, and behavioral patterns toward public transport usage. The findings highlight gaps in infrastructure, service quality, and public awareness, while also showcasing the willingness of many citizens to adopt eco-friendly commuting practices if reliable and affordable options are provided.

Keywords:

Public transport, Pollution reduction, Commuter attitude, Sustainable mobility, Chennai

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INTRODUCTION

Over the past few decades, India's cities have undergone major transformations due to urbanization and industrial expansion. Chennai, the capital of Tamil Nadu, stands as a prominent example of this rapid change. The city's population has grown tremendously, accompanied by significant industrial development and increased economic activity. These factors together have caused a sharp increase in vehicular traffic across the city. The growing number of private vehicles—cars, two-wheelers, and taxis—has not only worsened congestion but also become one of the leading contributors to air pollution. Reports from the Tamil Nadu

Pollution Control Board (TNPCB) suggest that nearly 40% of Chennai's air pollution is caused by emissions from vehicles, particularly in the form of particulate matter (PM_{2.5} and PM₁₀), carbon monoxide (CO), and nitrogen oxides (NO_x).

This environmental challenge has far-reaching effects. Deteriorating air quality directly impacts public health, contributing to respiratory disorders, cardiovascular problems, and other pollution-related diseases. Moreover, heavy traffic leads to longer travel times, higher fuel consumption, and a rise in greenhouse gas emissions—factors that collectively hinder sustainable urban growth.

Although the city has made notable progress in improving its public transportation systems—such as the Chennai Metro Rail, the Metropolitan Transport Corporation (MTC) buses, and suburban train services—public usage of these facilities remains below expectations. Many commuters still prefer private modes of transport due to reasons like convenience, flexibility, comfort, perceived safety, and limited last-mile connectivity. This imbalance between public transport availability and actual usage highlights the need to understand how people perceive and evaluate public transport options.

Commuter attitudes play a key role in shaping transportation choices. Factors such as perceived reliability, affordability, comfort, accessibility, and safety heavily influence whether individuals use public or private transport. Additionally, social norms, environmental awareness, and government policies further affect commuting behavior. Hence, studying public attitudes toward sustainable transport is essential for designing strategies that can shift travel patterns toward eco-friendly modes.

The objective of this research is to examine the attitudes of Chennai residents toward public transportation as a potential solution for reducing urban air pollution. The study focuses on understanding people's awareness, behavior, and perceived obstacles related to public transport use. Insights from this analysis can guide policymakers, planners, and transportation authorities in creating effective interventions to promote sustainable mobility, lower vehicle emissions, and enhance the overall quality of life in the city.

Ultimately, the importance of this study lies in its broader environmental and policy implications. It highlights the urgency of transitioning from a car-dependent urban model to a system centered on efficient and accessible public transport. Such a shift is crucial for building a cleaner, healthier, and more sustainable Chennai.

STATEMENT OF THE PROBLEM

Chennai, one of India's leading metropolitan centers, has experienced rapid population growth, urban expansion, and economic development in recent years. Alongside these changes, the city has witnessed a steep rise in private vehicle ownership—an increase that now surpasses the rate of population growth itself. The surge in cars, two-wheelers, and taxis has severely strained Chennai's Road infrastructure, leading to chronic traffic congestion on major roads and arterial routes. Commuters now face longer travel times, higher fuel expenses, and increased daily stress due to overcrowded roads and inefficient traffic movement.

A major consequence of this rise in vehicular activity is the degradation of air quality. Chennai frequently records elevated levels of harmful air pollutants, including particulate matter (PM_{2.5} and PM₁₀), carbon monoxide (CO), nitrogen oxides (NO_x), and hydrocarbons. These pollutants are predominantly emitted by private vehicles and have serious implications for public health. Increasing cases of respiratory conditions such as asthma and bronchitis, as well as cardiovascular diseases and other long-term ailments, have been linked to poor air quality. Additionally, vehicular emissions contribute substantially to greenhouse gases, accelerating climate change and causing further environmental deterioration.

Although Chennai possesses a fairly well-developed public transportation network—comprising Metropolitan Transport Corporation (MTC) buses, suburban railway services, and the expanding Chennai Metro—usage remains relatively low. Many citizens still prefer private modes of travel, largely due to perceptions of greater comfort, convenience, safety, and flexibility. On the other hand, issues such as irregular service schedules, overcrowded buses, inadequate route coverage, and weak last-mile connectivity reduce the appeal of public transportation options.

This growing dependence on private vehicles poses a dual challenge for Chennai: tackling severe traffic congestion and combating the mounting problem of urban air pollution. Solving these problems demands a multifaceted approach that not only upgrades transport infrastructure but also examines the psychological and behavioral aspects influencing commuter choices.

In light of this, the present study aims to explore the question:

“What factors influence Chennai residents' attitudes toward using public transport, and how can these insights guide strategies to reduce urban pollution and traffic congestion?”

By assessing commuter awareness, perceptions, and readiness to adopt eco-friendly travel alternatives, the study seeks to identify the key motivators and barriers affecting public transport use. The findings are expected to offer valuable insights for policymakers, city

planners, and transport authorities. Ultimately, the study aims to support the development of practical, evidence-based interventions that encourage greater public transport adoption—helping to create a cleaner, healthier, and more sustainable urban environment in Chennai.

NEED FOR THE STUDY

The rapid pace of urbanization and motorization in Chennai has created a range of pressing challenges that call for a comprehensive understanding of public attitudes toward the use of public transport. The need for this study arises from several interconnected concerns that affect the city's health, environment, and overall quality of life.

Public Health Concerns:

Chennai often records air pollution levels that exceed the limits recommended by the World Health Organization (WHO). Vehicular emissions are a major contributor to this issue, releasing high levels of particulate matter (PM_{2.5} and PM₁₀), carbon monoxide (CO), and nitrogen oxides (NO_x) into the atmosphere. These pollutants have been closely linked to respiratory diseases such as asthma and bronchitis, as well as cardiovascular problems and other chronic health conditions. The city's growing incidence of pollution-related illnesses highlights the urgent need to encourage sustainable travel behaviors that can help lower pollutant emissions and improve public health outcomes.

Traffic Congestion and Urban Mobility:

The continuous rise in private vehicle ownership has intensified traffic congestion on major routes, leading to slower commutes, fuel wastage, and increased stress for daily travelers. Prolonged traffic jams also elevate greenhouse gas emissions, further deteriorating environmental conditions. Promoting the use of efficient and reliable public transport can significantly reduce the number of vehicles on the road, thereby easing congestion, enhancing mobility, and improving environmental quality.

Underutilized Transport Infrastructure:

Chennai has invested considerably in public transport systems, including the Metropolitan Transport Corporation (MTC) bus network, suburban rail services, and the Chennai Metro. Despite these developments, utilization levels remain below expectations. This indicates a gap between the services provided and the preferences or perceptions of commuters. Investigating the causes of underutilization—such as concerns over convenience, safety, reliability, or accessibility—can help identify ways to improve service delivery and increase ridership. A clear understanding of commuter attitudes is crucial for effective urban transport planning. Insights gained from this research can help policymakers craft targeted awareness campaigns,

incentive programs, and infrastructural improvements that align with public expectations and encourage greater use of public transport. Such informed policymaking is essential for developing sustainable mobility strategies and enhancing the overall live-ability of Chennai.

Environmental Sustainability:

Reducing dependence on private vehicles and promoting public transport are key steps toward achieving environmental sustainability. Encouraging eco-friendly commuting habits not only helps mitigate climate change by lowering carbon emissions but also supports the city's transition toward a greener and more resilient urban ecosystem.

In summary, this study is essential to bridge the gap between the availability of public transport and its actual usage. By examining the behavioral and attitudinal factors that influence transport choices, the research aims to provide practical recommendations for policymakers and planners. These insights will help address critical challenges related to air pollution, traffic congestion, and sustainable urban development in Chennai.

Objectives

The main goal of this study is to understand how people in Chennai feel and behave toward using public transport to reduce pollution. It looks at their attitudes about comfort, cost, safety, and convenience when choosing between buses, trains, metro, and private vehicles. The study also examines how aware people are of the pollution caused by private vehicles and its impact on health. It identifies the main problems that stop people from using public transport, such as poor service, safety issues, and lack of proper connections. Based on these findings, the research suggests ways to improve public transport use through better services, safety, and awareness programs. Overall, the study supports sustainable urban development by promoting public transport as a cleaner and more eco-friendly way to travel in Chennai.

Review Of the Literature

A review of existing literature provides valuable insights into commuter behavior, the use of public transport, and its impact on reducing urban air pollution. Multiple studies have analyzed the determinants influencing public transport adoption, the effects of vehicular emissions on air quality, and the effectiveness of policy interventions promoting sustainable mobility.

Kumar & Mehta (2020):

This study highlighted that the reliability, comfort, and accessibility of public transport are major factors shaping commuter satisfaction and acceptance. Frequent delays, overcrowding,

and poor maintenance were identified as key reasons people avoided public transit. The researchers concluded that enhancing punctuality, seating comfort, and cleanliness can substantially increase commuter satisfaction, leading to higher ridership. Their findings underline the direct relationship between service quality improvements and public transport usage.

Tamil Nadu Pollution Control Board (TNPCB, 2021):

The TNPCB reported that approximately 40% of Chennai's urban air pollution originates from vehicular emissions. The data revealed high concentrations of particulate matter (PM_{2.5} and PM₁₀), carbon monoxide (CO), and nitrogen oxides (NO_x), primarily from private vehicles. These pollutants contribute to severe respiratory and cardiovascular diseases among city residents. The report emphasized the importance of enforcing stricter emission norms, expanding public transport infrastructure, and promoting public awareness campaigns to curb private vehicle dependence.

Gandhi & Suresh (2022):

This study explored commuter psychology and behavior, noting that awareness alone does not lead to behavioral change. Gandhi and Suresh found that behavioral nudges and tangible incentives—such as fare discounts, dedicated lanes, and rewards programs—can effectively encourage public transport usage. Their research demonstrated that combining awareness with practical incentives leads to more sustainable travel habits among urban commuters.

World Bank (2022):

A report by the World Bank emphasized the substantial environmental benefits that could result from widespread adoption of public transport in Indian cities. It estimated that shifting a large portion of commuters from private vehicles to public modes could reduce urban air pollution by 25–30%. This transition would also lower greenhouse gas emissions and improve public health outcomes. The report recommended integrating transport planning with environmental policy frameworks to foster sustainable and inclusive mobility solutions.

Bharathi (2023):

Bharathi's study examined the primary determinants influencing commuter preferences for public transport. Safety, punctuality, cleanliness, and last-mile connectivity were identified as crucial factors affecting travel choices. The research found that safety concerns, overcrowding,

and difficulties in reaching final destinations discourage potential users. Bharathi recommended addressing these issues through infrastructural upgrades, digital tracking tools, and improved service management to boost commuter confidence and ridership.

Synthesis of Literature:

The reviewed literature collectively suggests that while environmental awareness among urban residents is growing, it does not automatically translate into public transport adoption. Both infrastructural quality and behavioral motivations play critical roles in shaping commuter attitudes. Factors such as reliability, comfort, safety, and convenience—along with effective incentives and awareness measures—are central to promoting sustainable travel. Reports from TNPCB and the World Bank further highlight the environmental and health benefits of enhancing public transport use.

Overall, the literature underscores the importance of investigating commuter attitudes in Chennai to identify barriers, enhance service quality, and design evidence-based policies that foster sustainable urban mobility and cleaner air.

Area of the study

Selection Of Sample

The study employed a **purposive sampling technique** to select respondents representing diverse demographic and socio-economic groups within Chennai. A total of **100 respondents** participated in the survey, ensuring inclusion from various regions and backgrounds to capture a wide range of perspectives on public transport usage and attitudes toward sustainable mobility.

Geographic Coverage:

- **High-Traffic Commercial Areas:** Respondents from T. Nagar, Velachery, and Guindy were included to understand commuting behavior and perceptions in zones characterized by dense traffic and high private vehicle ownership.
- **Residential Suburbs:** Participants from Tambaram, Kattankulathur and Perungudi provided insights into attitudes in suburban localities, where the availability and quality of public transport and last-mile connectivity vary considerably.
- **Metro-Connected Zones:** Respondents living or working near metro corridors were surveyed to compare travel behavior in areas with access to modern, reliable public transport

against those relying mainly on buses or suburban trains.

Demographic Diversity:

- **Age Groups:** 18–25 years, 26–40 years, 41–60 years, and above 60 years.
- **Occupational Categories:** Students, working professionals, business owners, and retired individuals.
- **Income Levels:** Low (<₹20,000/month), Medium (₹20,000–₹50,000/month), and High (>₹50,000/month).

This diverse sampling approach ensures that the research reflects the varied commuting experiences and perspectives of Chennai's residents. It allows for an in-depth understanding of differences in awareness, behavior, and attitudes toward public transport across age, income, and occupational segments. Consequently, the findings provide a comprehensive foundation for developing targeted interventions to enhance public transport adoption and reduce urban pollution.

Methodology

The study adopted descriptive research design using a mixed-method approach to comprehensively evaluate commuter attitudes toward public transport in Chennai . This combination of quantitative and qualitative techniques allowed for a well-rounded analysis of both measurable trends and deeper behavioral insights.

Research Approach:

- **Quantitative Methods:** Structured questionnaires were administered to gather quantifiable data on commuter awareness, preferences, and perceived barriers to using public transport.
- **Qualitative Methods:** Semi-structured interviews and focus group discussions were conducted with commuters, transport officials, and planners to obtain detailed perspectives on commuting behaviors, service gaps, and challenges faced by users.

Sources of Data:

- **Primary Data:**
 - **Questionnaires:** Distributed both online (via Google Forms) and through in-person surveys conducted in high-traffic commercial zones and residential areas across

Chennai.

- Interviews: Conducted with transport department officials, urban planners, and frequent commuters to gain expert and experiential insights.
- Observations: Direct field observations were made to assess traffic density, bus occupancy rates, and metro ridership patterns, providing context to the survey findings.
- Secondary Data:
 - Government and transport department reports
 - Tamil Nadu Pollution Control Board (TNPCB) pollution statistics
 - Academic studies, journal articles, and reports from international organizations such as the World Bank

This methodological framework ensured that the study captured both numerical and narrative dimensions of commuter behavior. The triangulation of multiple data sources strengthened the reliability and validity of the findings, enabling a holistic understanding of public attitudes toward sustainable urban transport in Chennai.

Tools Of Data Collection

To obtain comprehensive insights into the attitudes of Chennai residents toward public transport, the study utilized a combination of quantitative and qualitative data collection tools. This mixed approach ensured a balanced understanding of both measurable patterns and contextual factors influencing commuter behavior.

Structured Questionnaires:

- Purpose: To gather quantitative data on commuter perceptions, awareness of air pollution, travel routines, and factors affecting the choice of transport mode.
- Design: The questionnaire featured both closed-ended and Likert-scale questions designed to measure attitudes, satisfaction levels, and preferences related to public transport.
- Distribution: Questionnaires were circulated online through Google Forms for wider reach and also administered in person at strategic locations, including bus stops, metro stations, and commercial centers.
- Advantages: This tool allowed for the rapid collection of large-scale data, ensured consistency across responses, and enabled statistical analysis to identify key trends and correlations.

Interviews with Transport Officials and Urban Planners:

- **Purpose:** To obtain qualitative insights into policy frameworks, operational challenges, and infrastructure management within Chennai's public transport system.
- **Method:** Semi-structured interviews were conducted with representatives from the Metropolitan Transport Corporation (MTC), Chennai Metro Rail Limited, and various urban planning departments.
- **Focus Areas:** Discussions centered on service reliability, safety, last-mile connectivity, ridership challenges, and policy measures to reduce vehicular pollution.
- **Advantages:** These interviews provided expert viewpoints, contextual depth, and explanations that complemented the quantitative data gathered from commuters.

Observations of Traffic and Commuter Behavior Patterns

- **Purpose:** To validate survey findings and capture authentic commuter behaviors in real-world settings.
- **Method:** Field observations were conducted at selected traffic-heavy areas, metro and bus stations, and residential suburbs. Observers noted factors such as vehicle density, passenger occupancy, waiting times, and public transport usage patterns.
- **Advantages:** Observation offered objective, first-hand data, revealing discrepancies between stated and actual behaviors, and provided tangible evidence to support analytical conclusions.

Summary:

By integrating questionnaires, interviews, and observational studies, the research ensured data triangulation—strengthening both the validity and reliability of the results. This multi-tool approach provided a comprehensive understanding of commuter attitudes, enabling more accurate identification of factors influencing public transport adoption and guiding policy recommendations for sustainable urban mobility in Chennai.

Sources Of the Study

The study on attitudes toward using public transport in Chennai relied on a combination of primary and secondary data sources to provide a thorough and evidence-based understanding of commuter behavior and urban pollution dynamics.

Primary Sources:

These offered firsthand insights directly from participants and stakeholders involved in Chennai's transport ecosystem.

- **Structured Questionnaires:** Data were collected from 100 Chennai residents of diverse age groups, occupations, and income levels through both online platforms (Google Forms) and in-person surveys.
- **Interviews:** Conducted with transport officials, urban planners, and policymakers to gather expert opinions on service management, infrastructure, and transport policy.
- **Observations:** Field monitoring at major traffic junctions, metro stations, and residential areas helped capture real-time commuter behaviors, public transport occupancy, and vehicle flow patterns.

Secondary Sources:

These provided contextual data, statistical support, and comparative insights to strengthen the study's analytical framework.

- **Government Reports:** Official publications from the Tamil Nadu Pollution Control Board (TNPCB), Chennai Transport Department, and the Ministry of Urban Development.
- **Academic Research:** Scholarly papers and journal articles addressing public transport usage, urban air pollution, and sustainable mobility practices.
- **International Reports:** Studies and frameworks by global organizations such as the World Bank, offering best practices in eco-friendly transport systems.
- **Online Databases and Websites:** Reliable digital resources, news portals, and official government websites presenting updated data on traffic, air quality, and policy interventions.

Summary:

By merging primary data (from surveys, interviews, and observations) with secondary data (from official statistics and scholarly research), the study achieves methodological rigor and reliability. This dual-source approach ensures a comprehensive analysis of the factors influencing public transport adoption and contributes valuable insights toward improving Chennai's sustainable mobility strategies.

Definitions Of the Concept Used for the Study

Definitions of Key Concepts

Public Transport:

Public transport refers to shared transportation systems available for use by the general public for commuting within and across city limits. In Chennai, this includes:

- **Buses:** Operated by the Metropolitan Transport Corporation (MTC) across major city routes.
- **Suburban Trains:** Connecting Chennai with its peripheral suburbs.
- **Metro Rail Services:** Rapid transit services operated by Chennai Metro, covering key urban

corridors.

- **Shared Mobility Services:** App-based shuttles, ride-sharing, and shared auto-rickshaws that supplement formal transit systems.

Public transport is defined by its accessibility, affordability, and ability to transport large numbers of people efficiently—reducing dependence on private vehicles and contributing to environmental sustainability.

Pollution Reduction:

Pollution reduction encompasses strategies and actions aimed at minimizing emissions of harmful pollutants into the environment. Within the study's scope, this includes:

- **Air Pollution Reduction:** Decreasing levels of particulate matter (PM_{2.5}, PM₁₀), carbon monoxide (CO), nitrogen oxides (NO_x), and other vehicle-related pollutants.
- **Environmental Impact:** Lowering greenhouse gas emissions to mitigate the effects of climate change.

Encouraging public transport usage is a central approach to reducing vehicular emissions and improving Chennai's air quality.

Commuter Attitude:

Commuter attitude refers to the collective perceptions, opinions, and behavioral tendencies of individuals concerning their transportation choices. It involves

- **Perceived Convenience:** The ease or difficulty of using public transport compared with private modes.
- **Satisfaction Levels:** Commuter experiences related to comfort, safety, punctuality, and cleanliness.
- **Willingness to Change Behavior:** The openness of commuters to adopt public transport as a sustainable mode of travel.

Understanding commuter attitudes helps identify barriers and motivations influencing public transport adoption.

Sustainable Mobility:

Sustainable mobility emphasizes transport systems that meet present commuting needs without compromising environmental, social, or economic stability. Its key components include:

- **Eco-Friendly Practices:** Promoting low-emission and energy-efficient modes of transportation.

- **Accessibility and Equity:** Ensuring mobility options are inclusive and available to all socio-economic groups.
- **Integrated Urban Planning:** Coordinating different transport networks to reduce congestion and pollution while improving connectivity.

Last-Mile Connectivity:

Last-mile connectivity refers to the final segment of a commuter's journey—from a public transport hub (bus stop, train, or metro station) to the destination. Efficient last-mile solutions, such as shared autos, bicycles, and shuttle services, play a crucial role in improving accessibility and overall public transport usage.

Scope of the Study

This study focuses on understanding the challenges faced by Chennai City in adapting to climate change and examines how public transport and urban mobility contribute to environmental resilience. The research investigates both the physical and socio-economic impacts of climate change, as well as governance and policy-related challenges affecting adaptation strategies.

Key Areas of Focus:

- **Climate Risks and Vulnerabilities:** Analysis of region-specific climate threats, including flooding, coastal erosion, and heatwaves, particularly in vulnerable areas such as low-lying coastal zones and informal settlements.
- **Public Awareness and Perception:** Assessment of Chennai residents' awareness regarding climate change, its effects, and their perceptions of government adaptation and mitigation initiatives.
- **Adaptation and Resilience Strategies:** Evaluation of existing measures such as flood management systems, sustainable infrastructure, and public health preparedness to gauge their effectiveness in mitigating climate-related impacts.
- **Socio-Economic Impact:** Examination of how climate change affects various socio-economic groups, with emphasis on low-income and marginalized communities that face heightened vulnerability.

- **Policy and Governance:** Review of governmental efforts, climate action plans, and legal frameworks addressing urban climate challenges, alongside the identification of gaps in policy implementation and enforcement.

Overall, the study seeks to provide a holistic understanding of Chennai's public transport dynamics and its interconnection with climate adaptation, aiming to contribute actionable insights toward sustainable urban development.

Limitations of the Study

While this research offers significant insights into the attitudes of Chennai residents toward public transport usage and its potential for pollution reduction, several limitations should be acknowledged to ensure a balanced interpretation of the findings.

Sample Size and Representation:

The study included 100 respondents, which may not comprehensively represent Chennai's diverse population. Certain demographic or geographic groups—such as residents from peripheral suburbs, lower-income households, or individuals with limited access to public transport—might be underrepresented. As a result, the generalizability of the findings across the entire city may be limited.

Response Bias:

Participants may have provided responses that align with socially acceptable views, particularly concerning environmental awareness or willingness to use public transport. Such tendencies toward socially desirable answers could affect the objectivity and accuracy of the data collected.

Time Constraints:

The research was conducted over a relatively short duration, which did not allow for consideration of seasonal or temporal variations in commuter behavior. Factors such as monsoon conditions, festival traffic, or summer heat can significantly influence transport choices and usage patterns, but these were not captured within the study period.

Data Accessibility:

Obtaining up-to-date and detailed data on transport ridership, traffic density, and air quality proved challenging due to limited public access to certain government databases and reports. This constraint restricted the depth of secondary data analysis and the precision of comparisons between primary and secondary data.

Subjectivity in Qualitative Data:

While interviews and observations added valuable qualitative insights, they also carry the potential for researcher bias or subjective interpretation. The tone, setting, or wording of interview questions might have influenced participant responses, impacting data neutrality.

External Factors Not Controlled:

Unanticipated factors such as fluctuations in fuel prices, temporary road closures, infrastructure

developments, or major city events could have influenced commuter decisions during the study period. These contextual variables were beyond the control of the researcher.

Summary:

Despite these limitations, the study remains a credible exploration of commuter attitudes, awareness, and behavioral patterns concerning public transport in Chennai. Recognizing these constraints ensures that the conclusions are interpreted cautiously and underscores the need for further research involving larger samples, longer timeframes, and more comprehensive data access to build on the current findings.

DATA INTERPRETATIONS AND ANALYSIS

TABLE 1: Public Transport Usage Frequency

Usage Frequency	Number of Respondents	Percentage
Daily Users	45	45
Occasional Users	30	30
Rare/non-users	25	25
Total	100	100

Sources: Primary data

A survey on frequency of public transport usage revealed that 45% of respondents used public transport daily, showing reliance on buses, metro, and suburban trains for commuting. About 30% were occasional users, mainly depending on public transport when convenient. The remaining 25% rarely used or avoided it altogether, preferring private vehicles. It concludes that a significant 45% are dependent on public transport daily, while resistance remains among private vehicle users.

TABLE 2: Awareness of Pollution Caused by Private Vehicles

Awareness Level	Number of Respondents	Percentage
Highly Aware	40	40
Moderately Aware	35	35
Little/No Awareness	25	25
Total	100	100

Sources: Primary data

The survey revealed that 40% of respondents were highly aware that private vehicle emissions are a major source of pollution, while 35% were moderately aware but lacked deeper knowledge. 25% admitted little or no awareness of this link.

It concludes that although awareness is rising, a quarter of the population still lacks understanding, limiting behavioral change.

TABLE 3: Factors Influencing Public Transport Usage

Factor Influence	Number of Respondents	Percentage
Strong Influence	50	50
Moderate Influence	30	30
Little/No Influence	20	20
Total	100	100

Sources: Primary data

Out of 100 participants, 50% reported strong influence of factors such as cost-effectiveness, reduced pollution, and traffic relief in their decision to use public transport. 30% felt moderate influence, while 20% indicated little or no influence.

It concludes that half of respondents strongly recognize the importance of external factors in choosing public transport.

TABLE 4: Satisfaction with Public Transport Services in Chennai

Service Satisfaction	Number of Respondents	Percentage
Very Satisfied	20	20
Somewhat Satisfied	35	35
Not Satisfied	45	45
Total	100	100

Sources: Primary data

This survey on service satisfaction found that only 20% were very satisfied with Chennai's public transport facilities. 35% were somewhat satisfied, pointing to affordability and availability. However, 45% were not satisfied, citing delays, overcrowding, and lack of last-mile connectivity.

It reveals that nearly half of the respondents are dissatisfied, signaling the need for better service quality.

TABLE 5: Effectiveness of Public Transport in Reducing Pollution

Effectiveness Level	Number of Respondents	Percentage
Very Effective	30	30
Somewhat Effective	40	40
Not Effective	30	30
Total	100	100

Sources: Primary data

A survey on whether public transport can effectively reduce pollution revealed that 30% believed it was very effective, 40% thought it was somewhat effective, while 30% felt it was not effective due to ongoing dependence on private vehicles. It concludes that the majority acknowledge public transport's role in pollution reduction, though scepticism exists.

TABLE 6: Health Benefits Perceived from Reduced Pollution

Health Impact Awareness	Number of Respondents	Percentage
Significant Benefits	45	45
Moderate Benefits	30	30
No Benefits	25	25
Total	100	100

Sources: Primary data

The study revealed that 45% of respondents strongly felt that reduced pollution from increased public transport usage would improve respiratory and cardiovascular health. 30% believed in moderate benefits, while 25% denied any health improvement.

It reveals that nearly half of Chennai commuters recognize the health importance of reduced vehicular pollution.

TABLE 7: Mental Stress Reduction Due to Less Traffic

Stress Impact	Number of Respondents	Percentage
Severe Reduction	35	35
Moderate Reduction	40	40
Little to No Reduction	25	25
Total	100	100

Sources: Primary data

Respondents were asked about traffic-related stress. 35% believed public transport reduces stress significantly by avoiding driving in traffic. 40% said it moderately reduces stress, while 25% felt no difference.

It concludes that 75% acknowledge some level of stress reduction with public transport usage.

TABLE 8: Economic Savings from Public Transport Usage

Savings Level	Number of Respondents	Percentage
Significant Savings	50	50
Moderate Savings	30	30
No Savings	20	20
Total	100	100

Sources: Primary data

Half of the respondents (50%) reported significant financial savings through using buses or metro over fuel and parking costs. 30% saw moderate savings, while 20% felt no real difference.

It shows that economic advantage is a strong motivator for many users.

TABLE 9: Preferred Strategies to Promote Public Transport

Strategy Preference	Number of Respondents	Percentage
Improved Infrastructure	40	40
Government Incentives	35	35
Individual Lifestyle Changes	25	25
Total	100	100

Sources: Primary data

The study revealed that 40% of respondents supported infrastructure improvements such as better buses, metro expansion, and last-mile connectivity. 35% preferred government incentives like subsidies or tax benefits. 25% highlighted personal lifestyle changes such as carpooling and cycling.

It concludes that structural improvements and government support are seen as the strongest ways to promote public transport usage.

Findings

Observations and Impacts of the Study

The research on public transport attitudes and awareness among Chennai residents yielded several key findings and corresponding impacts, highlighting both behavioral patterns and systemic challenges that influence transport choices.

1. High Dependence on Private Vehicles

- **Observation:** A significant proportion of Chennai residents continue to rely heavily on private vehicles such as two-wheelers and cars for their daily commute.
- **Impact:** This dependency contributes to escalating air pollution, frequent traffic congestion, and increased fuel consumption, thereby intensifying the city's environmental and infrastructural strain.

2. Growing Awareness of Pollution

- **Observation:** Many respondents displayed awareness of the harmful effects of vehicular emissions on air quality and public health.
- **Impact:** This heightened environmental consciousness provides a foundation for behavioral change—if supported by better public transport infrastructure and service quality.

3. Public Transport Usage Patterns

- **Observation:** Approximately half of the respondents use public transport regularly, while others depend on it occasionally.
- **Impact:** The finding indicates that public transport plays a central role in Chennai's mobility system, though reliability and convenience issues limit its broader appeal.

4. Service Quality Concerns

- **Observation:** Common complaints included overcrowding, delays, poor last-mile connectivity, and safety-related apprehensions.
- **Impact:** Such deficiencies reduce commuter satisfaction and discourage a full shift from private to public modes of transport.

5. Economic Considerations

- **Observation:** Most respondents agreed that using public transport is more economical than maintaining private vehicles.
- **Impact:** The cost advantage serves as a powerful motivator, suggesting that further incentives or fare rationalization could increase ridership and support sustainability goals.

6. Health and Environmental Benefits

- **Observation:** Commuters recognized that greater use of public transport could lower air pollution levels and improve overall health.

- Impact: Reduced emissions would lead to fewer respiratory illnesses, less urban heat, and improved environmental conditions across the city.

7. Stress Reduction through Shared Mobility

- Observation: Users of metro and bus services reported lower stress compared to driving through congested roads.
- Impact: Enhanced mental well-being and reduced road-related stress highlight an often-overlooked social benefit of sustainable commuting.

8. Barriers to Adoption

- Observation: Inadequate infrastructure, limited metro reach, lack of cleanliness, and weak connectivity between modes hinder widespread adoption.
- Impact: Unless these operational and infrastructural gaps are addressed, the public transport network will remain underutilized despite growing awareness.

9. Role of Government Initiatives

- Observation: Respondents emphasized the need for more proactive government involvement through improved policies, subsidies, and awareness programs.
- Impact: Effective and consistent policy interventions are essential to build trust, improve services, and drive large-scale behavioral change toward sustainable mobility.

10. Need for Behavioral Change

- Observation: Some individuals remain hesitant to shift from private vehicles due to comfort preferences and perceived social prestige.
- Impact: Infrastructure improvements alone are insufficient; promoting cultural and behavioral transformation through education and awareness campaigns is vital to fostering long-term public transport adoption.

Summary:

Overall, the findings reveal a complex interplay between awareness, economic considerations, service quality, and behavioral attitudes. While Chennai residents acknowledge the benefits of public transport, practical constraints and psychological factors continue to hinder widespread adoption. Addressing these through integrated policies, improved services, and targeted awareness campaigns can significantly enhance sustainable urban mobility and environmental outcomes.

SUGGESTIONS

Suggestions and Policy Recommendations

To overcome the challenges of low public transport usage and its contribution to urban

pollution in Chennai, a comprehensive, multi-stakeholder approach is required. The following recommendations outline strategies that can guide policymakers, transport authorities, and citizens in building a cleaner, more efficient, and sustainable transport ecosystem.

1. Strengthening Public Transport Infrastructure

- Expand Chennai Metro coverage to link all major residential, industrial, and commercial zones, improving accessibility for a wider population.
- Modernize the Metropolitan Transport Corporation (MTC) fleet by introducing electric and hybrid buses to minimize vehicular emissions.
- Enhance suburban rail services by increasing frequency, adding coaches, and maintaining punctuality.
- Upgrade terminals, stations, and bus stops with better seating, lighting, digital display systems, and security features such as CCTV cameras.

2. Improving Service Quality

- Ensure consistent punctuality and shorter waiting intervals for all public transport services.
- Maintain high standards of cleanliness and hygiene in vehicles and at stations.
- Provide air-conditioned buses and metro coaches to improve commuter comfort during Chennai's hot climate.
- Introduce safety enhancements such as women-only coaches, trained staff, and emergency helplines to build commuter confidence.

3. Enhancing Last-Mile Connectivity

- Launch feeder services and shared auto systems to connect metro and bus hubs with residential neighborhoods.
- Construct dedicated bicycle lanes and offer rental bicycles near major stations to promote sustainable short-distance travel.
- Improve pedestrian pathways, signage, and lighting to encourage safe and convenient walking to and from transit points.

4. Affordable and Incentivized Pricing

- Provide subsidized passes for students, senior citizens, and low-income commuters.
- Introduce monthly and yearly travel cards at discounted rates for frequent travelers.
- Offer tax incentives or employer-based allowances for individuals using public transport.
- Implement family travel discounts to promote collective adoption of sustainable travel modes.

5. Awareness and Behavior Change Campaigns

- Conduct public awareness drives emphasizing the health and environmental consequences of excessive private vehicle use.

- Organize workshops in schools, colleges, and workplaces promoting eco-friendly commuting habits.
- Utilize social media and digital platforms for campaigns on air quality, sustainability, and the benefits of public transport.
- Recognize and reward communities or institutions that actively promote public transport usage.

6. Promoting Eco-Friendly Transport Alternatives

- Expand electric and CNG bus fleets to gradually phase out diesel-run vehicles.
- Encourage carpooling and ridesharing platforms to reduce congestion.
- Develop cycling tracks, e-bike sharing systems, and green corridors in central urban areas.
- Enforce regular vehicle emission testing and impose stricter penalties for high-polluting private vehicles.

7. Government Policy and Regulation

- Introduce congestion pricing and toll systems in high-traffic areas to discourage private vehicle entry.
- Establish exclusive bus lanes to ensure uninterrupted transit movement.
- Encourage companies to provide employee shuttle services as part of corporate sustainability programs.
- Increase parking fees and limit parking zones in city centers to curb excessive private vehicle usage.

8. Community Engagement and Participation

- Involve Resident Welfare Associations (RWAs) in promoting neighborhood-level bus and metro use.
- Collaborate with NGOs, universities, and local organizations to conduct awareness and volunteer campaigns.
- Implement feedback systems through digital apps and helplines for passengers to report service quality issues.

9. Integration of Transport Modes

- Develop a unified ticketing system enabling commuters to use buses, metro, and trains with a single card or app.
- Synchronize schedules between MTC buses, metro trains, and suburban rail for smoother transitions.
- Create multimodal hubs combining different transport systems for convenient transfers within one location.

10. Collaboration with Academic and Research Institutions

- Partner with academic institutions to conduct periodic commuter satisfaction and behavioral studies.
- Promote research on air quality monitoring and pollution impact assessments.
- Utilize data analytics and evidence-based policymaking to ensure transport reforms align with sustainability goals.

Conclusion

In conclusion, effectively addressing the challenges of pollution in Chennai city requires a comprehensive and integrated approach that combines infrastructure development, commuter-friendly policies, and behavioral change. By expanding metro networks, modernizing bus services, and ensuring seamless last-mile connectivity, the city can make public transport a reliable and attractive alternative to private vehicles.

Improving service quality through punctuality, safety, and affordability will encourage more commuters to shift, thereby reducing traffic congestion and lowering air pollution. At the same time, adopting eco-friendly options like electric buses and non-motorized transport systems will further reduce carbon emissions.

Community engagement and awareness campaigns are equally important to reshape commuter attitudes, emphasizing the health, environmental, and economic benefits of public transport. Government interventions in the form of incentives, congestion charges, and strict emission norms will reinforce this transition.

Policymakers must design data-driven urban mobility plans supported by continuous research, technology adoption, and citizen participation. With collective efforts, Chennai can transform its transportation system into one that ensures sustainable mobility, cleaner air, reduced stress, and improved quality of life for its residents.

Research Questionnaire

1. How frequently do you use public transport in Chennai?
2. Are you aware that private vehicle usage contributes to higher levels of air pollution?
3. Do you believe public transport can play a major role in reducing pollution?
4. What factors influence your decision to use public transport (cost, convenience, safety, punctuality)?
5. Are you satisfied with the current public transport facilities in Chennai (bus, metro, suburban trains)?
6. Do you feel that using public transport reduces traffic-related stress compared to driving?
7. What health benefits do you associate with reduced vehicular pollution?
8. What barriers discourage you from using public transport more frequently?
9. Which strategies would motivate you to shift from private vehicles to public transport (infrastructure upgrades, subsidies, last-mile connectivity, awareness campaigns)?
10. Do you think government policies and regulations are sufficient to promote sustainable public transport in Chennai?

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