



REDEFINING URBAN MOBILITY THROUGH TRANSIT-ORIENTED DEVELOPMENT: ANALYSIS OF EMERGING INDIAN CITIES

Harsh Bhadauriya, Ashish Kumar Singh

Student, Mentor

Master of Urban and Regional Planning

Sunder Deep College of Architecture and Planning, Ghaziabad & AKTU, Lucknow, UP, India

Abstract

Rapid urbanization in India, particularly across emerging Tier-2 cities, has intensified transportation and infrastructure pressures. Increasing population density and the growing number of private vehicles have contributed to challenges such as road congestion, environmental degradation, poor public transport integration, and unplanned land consumption. In response to these concerns, Transit-Oriented Development (TOD) is being recognized as an effective urban planning strategy that supports sustainable and integrated city growth through development concentrated around mass transit corridors.

This study explores the significance of Transit-Oriented Development in enhancing urban mobility in Tier-2 Indian cities. It analyses the impact of TOD concepts including compact urban form, mixed-use land patterns, pedestrian-friendly environments, and improved accessibility to public transportation systems. The study focuses on how these measures can minimize reliance on personal vehicles while strengthening the efficiency and sustainability of urban transport networks. The research methodology is based on secondary sources such as planning policies, government publications, academic studies, metro rail documentation, and urban development reports.

The analysis reveals that TOD has considerable potential to increase public transport usage, promote non-motorized transportation such as walking and cycling, decrease traffic-related problems, and encourage environmentally responsible urban expansion. However, several barriers continue to hinder its effective implementation, including limited inter-agency coordination, insufficient pedestrian and cycling infrastructure, financial constraints, and challenges related to land administration and regulation. The paper concludes that coordinated integration between transportation systems and land use planning is necessary for the successful adoption of Transit-Oriented Development in Indian cities.

Keywords: Transit-Oriented Development, Urban Mobility, Sustainable Planning, Public Transport, Tier-2 Cities, Urban Development.

1. INTRODUCTION

India is undergoing a phase of accelerated urban transformation driven by industrial growth, rural–urban migration and expanding economic opportunities. As urban areas grow and complexity, existing transport systems are coming under significant strain. Medium-sized cities like Lucknow, Indore, Kanpur, Jaipur, and Bhopal are increasingly facing issues such as traffic congestion, unplanned outward expansion, and rising levels of pollution.

Historically, urban planning efforts in India have largely prioritized road expansion and the accommodation of private vehicles. While such interventions provided short-term relief in easing traffic movement, they also led to a surge in the use of personal cars and two-wheelers. Consequently, cities are now dealing with prolonged travel durations, deteriorating air quality, insufficient parking space, and inefficient patterns of land utilization.

In this context, Transit-Oriented Development (TOD) has gained attention as a more sustainable and integrated planning strategy. It emphasizes the coordination of land use and transportation by promoting dense, mixed-use, and walkable neighbourhoods centered around public transit systems such as metro networks and Bus Rapid Transit (BRT) corridors. The approach aims to shift travel behaviour toward public transport and reduce reliance on private modes.

Recognizing the need for sustainable mobility, the Government of India has introduced initiatives like the Smart Cities Mission and the National Transit-Oriented Development Policy to support such approaches. Several cities have begun implementing TOD-based planning, particularly in areas surrounding major transit corridors and stations.

This research examines the influence of Transit-Oriented Development on mobility patterns in Tier-2 cities of India and explores both the potential benefits and the key challenges involved in its implementation.

2. OBJECTIVES OF THE STUDY

The major objectives of this research are:

1. To study the concept and principles of Transit-Oriented Development.
2. TOD impact examination on urban mobility in Tier-2 Indian cities.
3. To identify the benefits and challenges associated with TOD implementation.
4. To suggest planning measures for improving TOD practices in India.

3. RESEARCH METHODOLOGY

The study is primarily founded on a review of existing literature and analysis of secondary data. Relevant information and supporting materials have been gathered from the following sources:

- Government policies and planning guidelines.
- Research papers and academic journals.
- Metro rail and urban transport reports.
- Smart Cities Mission documents.
- Existing studies related to urban mobility and TOD.

4. CONCEPT OF TRANSIT-ORIENTED DEVELOPMENT

The main objective of TOD is to create urban environments where people can access housing, employment, shopping, education, and recreation through efficient public transportation systems instead of relying heavily on private vehicles.

The key principles of Transit-Oriented Development include:

- Compact and high-density urban infra development.
- Mixed-land use patterns.
- Walkable street networks.
- Safe pedestrian and cycling infrastructure.
- Efficient public transport connectivity.
- Reduced parking dependency.
- Sustainable urban growth.

TOD encourages balanced urban development by integrating transportation systems with surrounding land uses.

5. NEED FOR TOD IN INDIAN CITIES

Indian cities are currently facing several transportation and planning-related issues, including:

- Increasing ownership of private vehicles.
- Frequent traffic congestion.
- Air and noise pollution.
- Poor pedestrian infrastructure.
- Urban sprawl and inefficient land use.
- Rising fuel consumption.

Traditional city expansion patterns have often resulted in low-density development located far away from employment centers and public transport facilities. This has increased travel distances and dependence on personal vehicles.

Transit-Oriented Development can help address these problems by encouraging compact urban growth around transit corridors. When residential, commercial, and institutional activities are located close to public transport systems, travel becomes more efficient and accessible.

Cities such as Lucknow and Jaipur have already started experiencing the benefits of metro-based development. TOD can further improve accessibility and economic activity around transit stations while reducing traffic pressure on urban roads.

6. IMPACT OF TOD ON URBAN MOBILITY

6.1 Reduction in Traffic Congestion

One of the major advantages of TOD is the reduction of dependency on private vehicles. When people live and work near public transport facilities, they are more likely to use metro rail, buses, and other shared transport systems.

This shift decreases the number of private vehicles on roads and helps in reducing traffic congestion, fuel consumption, and travel delays. Areas developed under TOD principles generally experience lower vehicle trip generation compared to conventional urban layouts.

6.2 Improvement in Public Transport Usage

Transit-Oriented Development improves accessibility to public transport by ensuring that transit stations are easily reachable through walking and cycling networks.

High-density development around metro stations and BRT corridors increases passenger ridership and strengthens the operational efficiency of public transport systems. Improved public transport usage also supports long-term economic sustainability of urban transit infrastructure.

6.3 Promotion of Walking and Cycling

TOD places strong emphasis on pedestrian-friendly urban design. Footpaths, cycle tracks, street lighting, and safe crossings encourage people to choose non-motorized transport for short-distance trips.

Walking and cycling not only reduce congestion but also contribute to better public health and improved urban environmental quality.

6.4 Environmental Sustainability

Compact development patterns associated with TOD help reduce urban sprawl and unnecessary land consumption. Reduced dependence on automobiles lowers greenhouse gas emissions and improves air quality.

TOD also supports sustainable urban development by encouraging energy-efficient transportation systems and minimizing fuel usage.

6.5 Economic Benefits

Transit corridors often attract commercial investments and increase land values around stations. Improved accessibility supports business activities, employment generation, and real estate development.

Mixed-use development patterns also ensure more efficient use of urban infrastructure and public services.

7. CHALLENGES IN TOD IMPLEMENTATION

Despite its advantages, implementation of TOD in Indian cities faces several practical challenges.

7.1 Inadequate Urban Infrastructure

Many cities still lack proper pedestrian pathways, cycling tracks, parking management systems, and integrated public transport facilities. Weak infrastructure reduces the effectiveness of TOD-based planning.

7.2 Institutional Coordination Issues

TOD requires coordination among development authorities, transport departments, urban local bodies, and planning agencies. Delays often occur because of poor communication and fragmented decision-making.

7.3 Land Acquisition and Redevelopment Problems

Land acquisition near transit corridors is often difficult due to ownership disputes, legal complications, and high land prices. Redevelopment of existing urban areas also requires careful planning and rehabilitation.

7.4 Financial Limitations

Developing transit infrastructure and associated urban facilities requires significant investment. Many urban local bodies in India face financial constraints and limited technical capacity.

7.5 Public Acceptance

In many Indian cities, people still prefer private vehicles because of convenience, flexibility, and overcrowded public transport systems. Public awareness regarding sustainable mobility practices remains limited.

8. CASE REVIEW: LUCKNOW METRO CORRIDOR

Lucknow has experienced rapid urban expansion during the past decade. The introduction of the Lucknow Metro has improved urban connectivity and reduced travel time across important city corridors.

Areas surrounding metro stations such as Hazratganj, Charbagh, and Indira Nagar have witnessed increased commercial activities and improved accessibility. The metro system has encouraged greater use of public transportation and reduced dependence on private vehicles for daily commuting.

However, several challenges still remain. Inadequate pedestrian infrastructure, weak last-mile connectivity, traffic management issues, and limited mixed-use redevelopment continue to affect the overall effectiveness of TOD implementation.

9. PLANNING RECOMMENDATIONS

The following planning measures can improve the Development of Indian cities:

1. Preparation of integrated land use and transportation plans.
2. Development of pedestrian-friendly streets and cycling infrastructure.
3. Promotion of mixed-use zoning regulations near transit corridors.
4. Improvement of public transport connectivity and last-mile access.
5. Encouragement of public-private partnerships for infrastructure financing.
6. Public awareness programs related to sustainable transportation.
7. Use of GIS and smart technologies for urban mobility management.
8. Revision of development control regulations to support compact urban growth.

10. CONCLUSION

Transit-Oriented Development has strong potential to improve urban mobility and sustainability in Indian cities. By integrating transportation systems with land use planning, TOD can reduce traffic congestion, improve public transport accessibility, encourage walking and cycling, and support environmentally responsible urban development.

The study highlights that Tier-2 cities in India can significantly benefit from TOD-based planning approaches, particularly around metro rail and Bus Rapid Transit corridors. However, successful implementation requires strong policy support, coordinated institutional efforts, infrastructure investment, and active public participation.

As urbanization continues to increase in India, TOD can become an important strategy.

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