



Transit Oriented Development (TOD)

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Abstract : Transit oriented development (TOD) is an effective urban planning technique that addresses the present-day concerns of sustainability. It relies on integrating land use and transport network systems. It is the concept with utmost effective solution for accommodating a better and controlled urban growth. Although, National TOD policy is already been published by the Indian Government and it has envisaged a substantial optimistic influence in eradicating problems. India is one of the fastest growing economies of the world and is also the second most populous nation, furthermore it has a rapidly growing urban population owing to which the cities are facing severe problems and challenges related to mobility, congestion and subsequently pollution. Even though, a diversity of criteria and indicators are listed by various authors that impacts the use of TOD techniques. Nonetheless, every country has its own challenges and problems for applicability and effective implementation of TOD. This paper attempts to identify those challenges pertaining to adoption and implementation at the urban body level. The study mainly adopts primary means of data collection. It reviews policies and case studies and captures the stakeholder's perception on the identified concerns from the secondary study.

Keywords – Transit, Amendment, buzzword, motorization,

I. INTRODUCTION

Transit Oriented Development (TOD) has been the buzzword in planning circles internationally since the nineties. Calthorpe (Calthorpe 1993) and Cervero (Cervero and Kockelman 1997) were able to capture American policymakers' attention through their writings and advocated the adoption along transit of a model of development that was already prevalent in the inner cities. In the Indian context, some of our cities already had the features which came to be associated with TOD at a later stage. It is only much later in the early 2000s when cities started investing in big budget projects like metro-rail that TOD started to be imposed on cities demanding transit. While progress has been patchy, efforts have involved adopting TOD concepts and replicating them in the Indian context. In 2017, as the Delhi Metro completes fifteen years of operations and other cities like Bangalore have one or more phases of their metro-rail commencing operations, there is a need to address the attempts made by Indian cities at achieving TOD.

This project is a response to the need for an evaluation of Indian attempts at producing TOD. It traces the advent of TOD in India and its progress over the years. It evaluates TOD plans, either standalone or as part of the development plan, focusing on the case cities of Delhi, Ahmadabad and Bangalore. The framework developed for evaluating these TOD plans is developed after a comprehensive literature review, drawing especially on the work

of Singh et al. (2015). The first section consists of a comprehensive review of literature on TOD from global experiences with identification of indicators on which the TODs can be evaluated on their TOD necessity and the current debates of urban planning on land use and transport integration. We consequently evaluate the 3 Indian case studies with respect to the identified indicators to understand the current scenario of TOD necessity in India. India is urbanizing at a rapid pace with urban population rising much faster than its total population. Level of urbanization has increased from 17.29% in 1951 to 31.6 % in 2011. India is competing with the fastest growing countries in the world. The urban population in India, which is nearly 377 million is poised to grow to 600 million by 2030. The urban population of India contributes 65% of country's Gross Domestic Product (GDP), which is expected to grow to 75% in the next 15 years. With India witnessing a high economic growth, Indian cities are growing at a rate faster than other cities in the world.

Urbanization has led to horizontal growth of the cities thus creating problems of urban sprawl. This has resulted in increase of trip lengths and higher usage of private vehicles, problems of pollution and increased demand of infrastructure. To address these issues, many cities have strengthened their public transport by developing mass rapid transit systems (MRTS) such as metro rails and Bus Rapid Transit Systems (BRTS). It is however, important to efficiently use these systems by integrating the land use with the transport infrastructure to make the cities livable, healthy and smart.

II Principles of TOD:

TOD focuses on compact mixed use development around transit corridor such as metro rail, BRTS etc. International examples have demonstrated that though transit system facilitates transit oriented development, improving accessibility and creating walkable communities is equally important. Based on the objectives of National Urban Transport Policy, this TOD policy defines 12 Guiding Principles and 9 Supportive tools, as shown in Figure 2 and 3, for realizing the objectives of TOD.



FIG.1: Transit oriented development principle

The TOD design principles must be incorporated as appropriate to the transit station area to provide some or all of the following for achieving the above goals:

1. *Pedestrian and non-motorized transport (bicycle) friendly environment for multimodal interchange and street connectivity*
2. *Efficient Public and Para-transport System*
 - a. *(motorized and non-motorized) supporting the transit system*
3. *Place making and Parking Management*
4. *Traffic Management*
5. *Land use and appropriate land use intensities*
6. *Block size, street grid, density etc. suitable to the transit station area and surrounding areas*
7. *Walkability and Para transit influence zones suitable to the transit station area and surrounding areas*
8. *Phasing plan for new development.*
9. *Incentives for parcel assembly.*
10. *Retaining existing uses.*
11. *Enhancing the use of the limited roads for walkability.*
12. *Promoting public transit ridership for the existing uses.*

II.I Aim:

1. **Enable Transformation:** *to assist in transformation of cities from private vehicle dependent city to public transport oriented development,*
2. **Accessible Public Transport:** *to promote the usage of public transport by making it accessible, encourage green mobility by encouraging people to walk and cycle and at the same time curb pollution and other negative impacts of motorization.*
3. **Compact Walkable Communities:** *to create livable and affordable communities, which are compact and walkable.*

II.II Objectives:

1. *TOD integrates land use and transport planning to develop compact growth centers within the influence zone of 500-800 m on either side of the transit stations i.e. areas within walking distance, to achieve the following objectives:*
2. *To promote the use of public transport by developing high density zones in the influence area, which would increase the share of transit and walk trips made by the residents/ workers to meet the daily needs and also result in reduction in pollution and congestion in the influence area.*
3. *To provide all the basic needs of work/ job, shopping, public amenities, entertainment in the influence zone with mixed land-use development which would reduce the need for travel.*
4. *To establish a dense road network within the development area for safe and easy movement and connectivity of NMT and pedestrians between various uses as well as to transit stations.*
5. *To achieve reduction in the private vehicle ownership, traffic and associated parking demand.*
6. *To develop inclusive habitat in the influence area so that the people dependent on public transport can live in the livable communities within the walkable distance of transit stations.*
7. *To integrate the Economically Weaker Sections (EWS) and affordable housing in the influence zone by allocating a prescribed proportion of built-up area for them in the total housing supply.*

8. *To provide all kinds of recreational/entertainment/ open spaces, required for a good quality of life in the influence area.*
9. *To ensure development of safe society with special attention to safety of women, children, senior citizen and differently abled by making necessary amendments to the building bye laws.*

III. METHODOLOGY

III.I Land-Use Planning & Design

It includes land-use master plan, overlay plans, influence zone plans, comprehensive mobility plan and other planning and visioning documents which outline a city or region's plan for growth in the future. The significance of these documents is three fold. First, they present a city's vision for long term growth and development, second, they outline the land-use and mobility structure of the city and third, they are legally binding in nature and they regulate development. Through a land-use document, a city can establish a statutory framework for the implementation of a development project. This also means that the projects are developed, allowing room for necessary adjustments across the city.

A Master Plan is critical in implementation of a Zonal plan or other mechanisms including Land Assembly under Town Planning Scheme. An example would be the Master Plan of Delhi 2021. Its language enables the preparation of a comprehensive redevelopment scheme for the influence area of an MRTS stations. Initially, the draft MPD-2021 proposed that the influence zones of MRTS stations be further classified into three zone categories with certain location thresholds (Hiroaki Suzuki, 2015). But this structure of the influence zone has been changed to into a continuous area within 500 m depth on either side from the center line of MRTS in MPD 2021 TOD Gazette Notification in July 2015.

III.II Process Mechanisms

They are mostly command and control tools and economic instruments which mobilize the projects of all sizes and shapes. These mechanisms include land assembly, transfer of development, establishment of partnerships between local jurisdiction, transit and other regional agencies along with the private sector. Land assembly is among the most complex of processes and a critical step in the densification of a neighborhood. For the most part, land assembly in India has been conducted through two methods – land acquisition (based on the principle of Eminent Domain) and land pooling and readjustment. Eminent Domain refers to the power of the state or public planning authorities and development agencies to acquire land (with appropriate compensation) for the purpose of public use.

III.III Urban Growth Boundary

Urban Growth Boundary, as in case of Portland, is a mechanism for managing growth. The Metro Council in 1995 suggested “concentrating development in urban growth boundaries, with some extent of satellite development”. On its basis, Portland prepared its growth management strategy called “2040 Growth Plan” which features a tight Urban Growth Boundary focusing growth in transit centers and corridors, and asks local governments to limit parking, and adopt zoning and comprehensive plan changes to be consistent with the plan.

III.IV Land Acquisition barriers

Land Acquisition faces multiple barriers as listed below:

- *Land title disputes*
- *Proving legitimacy of public use*
- *Displacement of land owners and loss of livelihood*
- *Compensation delays and disputes*
- *Development and redistribution of land*
- *Hold outs for speculation*
- *Poor capture of the appraisal of land value by the land owners after development*
- *Low participation of land owners in the decision making process, particularly when public use has been legitimately established.*

III.V. Financial Planning

They are of two kinds: the first involves mobilization of financial resources (which includes capture of land value) and the second involves use of financial tools to enhance quality of life within a TOD through behavior change. Traditionally, financial resources come from either the central or state government sponsored schemes, such as JnNURM, through land monetization driven EPC or PPP or through land value capture. EPC and PPP are driven through debt servicing or partnership equity. Land is also a major financial resource which can fund development. Its value can be captured in two ways- monetization through sale or land and/or air rights or by capture of financial value accrued by the improvement of transit, quality of life and comfort. Any improvement to a transit system leads to a direct increase in the value of the land due to improved accessibility, infrastructure, service delivery and quality of life.

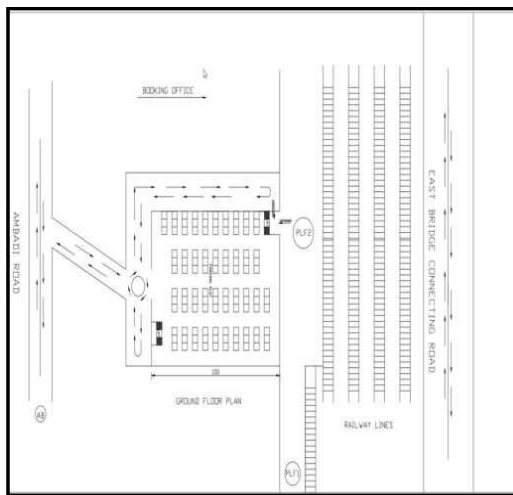


Fig.2 Ground Floor Plan

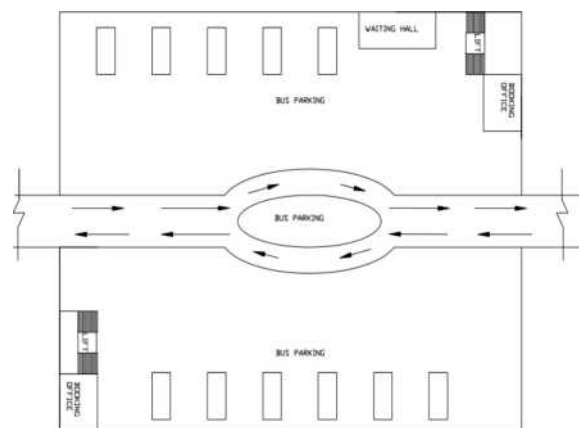


Fig 3: First Floor Plan

II. FIGURES AND TABLES

FIGURES	NAME
1	TRANSIT ORIENTED DEVELOPMENT PRINCIPLE
2	GROUND FLOOR PLAN
3	FIRST FLOOR PLAN

III. CONCLUSION

The main reason to construct transit oriented building at Vasai Station is to beat the heavy traffic of vehicles which leads in consumption of time as well as fuel.

Our project is that we have planned to construct transit oriented building at bus depot of Vasai station west, which has the area of 1200 square meters.

In which on the ground floor we are planning to give parking space for 4-wheeled private vehicles as well as 2 wheeled private vehicles and entry and exit of vehicles as well as public plying to railway station.

One entry and exit is from platform number 2, where public who are travelling from train can enter or exit, and other is from existing plan of bus depot where private vehicles enters, and provision for pedestrians is also planned.

On the first floor, we have planned to build bus depot and a bridge passing through 1st floor from Vasai west to Vasai east connecting bus depot.

In west, bridge is connected to the Ambadi road near Manikpur chowk.

In east bridge has gone above the western railway line and connected to the Vasai east road connecting towards western express highway.

On the bridge which is constructed on first floor, where only public busses are allowed to utilize the route. First floor plan in consisted of bus parking, two booking offices, one waiting hall and entry and exit of buses.

We have planned to construct this Transit oriented building as we all know that Vasai road is going to become a junction in next few years and more traffic will increase.

It will cut down approximately 15 to 20 minutes of time as well as consumption of petrol around 1 liter approximately. Traffic near the Vasai station will also cut down by constructing this building

There is no parking space for the private vehicles which comes near the Vasai Station, so it lead to heavy traffic near the station.

On the second floor we have planned to build a proposed metro station, parallel to western railways because in future we can easily give way to the metro station.

From above 2nd floor we have planned to construct the building for commercial purpose, from which we can recover our investments by selling or by giving it on rental basis.

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