

# **Transit-Oriented Development and Sustainable Urban Growth: A Review of Key Influencing Factors**

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## **Abstract**

Transit-Oriented Development (TOD) is a strategic urban planning approach aimed at creating high-density, mixed-use communities anchored by public transit systems. TOD seeks to reduce car dependency, improve urban livability, and promote sustainable growth. This paper reviews existing literature to identify critical factors that influence TOD success, including land use planning, accessibility, walkability, governance, and social equity. The paper incorporates international case studies from **Indonesia, Dubai, United States, Japan, the Netherlands, Brazil, and India** to analyze how different cities have applied TOD principles. The study finds that successful TOD requires a context-sensitive, integrated planning approach supported by proactive governance, community engagement, and inclusive policies.

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*Keywords:* Strategic Urban Planning, Sustainable Urban Growth, Transit-Oriented Development

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## **Introduction**

The 21st century has brought rapid urbanization, posing challenges such as traffic congestion, environmental degradation, and urban sprawl. In response, Transit-Oriented Development (TOD) offers a sustainable framework that integrates transportation and land use to create walkable, transit-accessible, and mixed-use neighborhoods. While TOD has gained traction globally, its implementation varies significantly across regions due to differences in policy, culture, governance, and infrastructure. There are lot of definitions for the TOD described as follows.

**UN-Habitat (2013)** announced that, "Transit-oriented development is a compact, mixed-use urban form that focuses development around transit stations to promote walkability, reduce car dependency, and enhance access to jobs and services."

According to the **Calthorpe (1993)** definition, "Transit-Oriented Development is a mixed-use community within an average 2,000-foot walking distance of a transit stop and core commercial area. TODs mix residential, retail, office, and open space within a neighborhood-scale development."

Under the **World Bank (2017)** publication, "TOD described as a strategy for integrating land use and transport that concentrates housing, jobs, services, and amenities around high-capacity transitstations in a way that maximizes access and promotes sustainable urban development."

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This paper explores the key factors shaping TOD and draws on global case studies to identify lessons and best practices.

## **Objectives**

The objectives of this literature review are:

1. To identify critical factors that determine TOD success.

## **Literature Review**

**Jakarta** Metropolitan Area faces severe urban challenges, including traffic congestion, environmental degradation, and uncontrolled urban sprawl. Transit-Oriented Development (TOD) offers a strategic solution by integrating land use and public transport to promote compact, walkable, and sustainable communities. This paper explores the potential of TOD in reshaping Jakarta's urban landscape through enhanced connectivity, reduced car dependency, and improved access to public transport. It examines current policies, case studies, and institutional frameworks, identifying barriers such as fragmented planning, governance issues, and limited public participation. The study concludes that successful TOD implementation in Jakarta requires a coordinated approach involving multi-level governance, supportive regulatory frameworks, and inclusive urban planning practices to realize a more sustainable and livable metropolitan region. (*Hasibuan H.S, Mulyani M. Transit-Oriented Development: Towards Achieving Sustainable Transport and Urban Development in Jakarta Metropolitan, Indonesia, 2022, 4-26.*)

As urbanization accelerates, achieving sustainable urban mobility becomes a critical challenge, particularly in rapidly developing cities like **Dubai**. This paper presents a systematic review of Transit-Oriented Development (TOD) principles as applied to the appraisal of Dubai Metro stations. By analyzing land use patterns, accessibility, pedestrian infrastructure, and integration of public transport, the study assesses the extent to which TOD is being implemented around key metro hubs. The findings highlight significant progress in improving connectivity and reducing car dependency, yet reveal gaps in last-mile connectivity, mixed-use development, and urban design quality. The review underscores the importance of aligning urban planning policies with TOD frameworks to enhance livability and support a transition toward a more sustainable, transit-oriented urban future in Dubai. (*Yahia O, Chohan A.H & Awad J, Toward Sustainable Urban Mobility: A Systematic Review of Transit-Oriented Development for the Appraisal of Dubai Metro Stations, 2025, 1-30*)

Transit-Oriented Development (TOD) has emerged as a critical tool for addressing urban mobility, economic growth, and land use challenges in rapidly developing cities. This study evaluates the socio-economic benefits of TOD along the Thika Road Corridor in **Nairobi**, Kenya. By examining changes in land value, employment opportunities, access to services, and transport efficiency, the research highlights the positive impacts TOD can have on urban development. Findings indicate that TOD along Thika Road has led to increased commercial activity, improved public transport access, and rising property values. However, the study also identifies issues of affordability and informal settlement displacement. The paper concludes that for TOD to be truly inclusive and sustainable in Nairobi, integrated planning, affordable housing strategies, and equitable access to transit must be prioritized. (*Kasuku S, Evaluating the Socio-Economic Benefits of Transit-Oriented Development (TOD) along Thika Road Corridor, Nairobi, University of Nairobi, Vol 19 No 2 (2024)*)

**Portland** is one of the most studied TOD examples in the United States. The city integrated land use and transportation planning through policies such as the Urban Growth Boundary, mixed-use zoning, and extensive light rail investment. The Pearl District, a former warehouse area, transformed into a vibrant TOD zone with housing, retail, and green space. Public involvement, flexible zoning, and affordable housing initiatives contributed to its success. Main Key Takeaways are, Public-private partnerships, Strong regional planning body (Metro) and Integration of light rail with redevelopment. (Cervero, R., Ferrell, C., & Murphy, S. (2002). *Transit-Oriented Development and Joint Development in the United States: A Literature Review. TCRP Research Results Digest.*)

**Tokyo** exemplifies rail-centric TOD, with private railway companies playing a central role in both transit and land development. Rail operators such as Tokyu Corporation build residential and commercial facilities around their stations, ensuring high ridership and profitability. The city's high density, strong pedestrian infrastructure, and efficient rail network make TOD seamless. Key Takeaways are, Private-sector leadership in TOD, High transit frequency and reliability and Cultural emphasis on transit and walkability. (Calimente, John. "Rail Integrated Communities in Tokyo." *Journal of Transport and Land Use* 5, no. 1 (2012): 19–32)

**Amsterdam** employs a “compact city” approach that aligns with TOD principles. The city's spatial strategy emphasizes densification along transit corridors and investment in public transport, cycling, and walking infrastructure. The Zuidas business district, developed around a major rail hub, reflects coordinated TOD planning involving multiple levels of government. Key Takeaways are, Strong coordination between national and local governments, Emphasis on non-motorized transport and Integration of housing and employment centers near transit. (Van Eesteren, C. (1935). *General Expansion Plan of Amsterdam (AUP).*)

**Curitiba's** Bus Rapid Transit (BRT) based TOD is a globally renowned model of low-cost, high-efficiency urban planning. The city's master plan integrates high-density development along dedicated BRT corridors. Land use zoning encourages commercial and residential development in parallel with transit lines. Key Takeaways are Affordable and scalable TOD, Integration of zoning with bus corridors and Early planning and political continuity. (Cervero, Robert. *The Transit Metropolis: A Global Inquiry.* Washington, D.C.: Island Press, 1998.)

**Nagpur** is a growing Indian city attempting to incorporate TOD principles into metro development. Supported by the Asian Development Bank, Nagpur is creating TOD zones with mixed-use developments, reduced parking ratios, and walkable neighborhoods. Implementation challenges include land acquisition, informal settlements, and institutional capacity. Key Takeaways are, TOD in a developing country context, Role of international financing and capacity building and Balancing modernization with informal urban fabric. (Chaudhari, A. (2025). *Integrating Transit-Oriented Development in Nagpur's Metro Expansion: Challenges and Opportunities.* Asian Development Bank)

## **Methods**

A systematic search was carried out to review of literature related to the Transit-Oriented Development and Considered factors in this development has been carryout both Developing and Developed countries in the world through online e journals. Reviewed of journals, planning documents, scholarly articles, conference papers, published documents and case study reports prepared by developed countries and published in different e plat forms (Web of Science, Google Scholar, ERIC) are used and Case studies were selected from five countries such as **Indonesia, Dubai, United States, Japan, the Netherlands, Brazil,** and **India**. Keywords used in the search included, Transit-Oriented Development, strategic urban planning. Data were extracted from the selected articles and critically evaluated to get proper understanding about TOD.

## **Result and Discussion**

The data collected through the qualitative literature review can be presented in a tabulation method in Table 1, to identify that the scholars mostly highlighted the factors that Considered in Transit-Oriented Development.

**Table 1**

<b>Reference</b>	<b>Factors considered</b>
(Cervero et al., 2002).	<p><b>Land Use and Mixed-Use Development</b></p> <p>Effective TOD incorporates a blend of residential, commercial, recreational, and institutional land uses. This mix reduces the need for long-distance commuting and supports vibrant, 24-hour neighborhoods (Cervero et al., 2002). Zoning regulations must support density and flexible land use to achieve this integration.</p>
(Bertolini & Spit, 1998).	<p><b>Density and Urban Form</b></p> <p>TOD typically supports higher population and employment densities within a 400–800 Meter radius around transit stations. Compact development supports frequent transit service and promotes walkability. However, density must be well-managed to avoid overcrowding and ensure adequate public amenities (Bertolini &amp; Spit, 1998).</p>
(Duncan, 2011).	<p><b>Transit Accessibility and Multi-Modal Integration</b></p> <p>TOD success hinges on physical access to transit, frequency of service, and integration with other transport modes. Studies show that people are more likely to use transit if stations are accessible by foot or bicycle, and if transfers are minimal and seamless (Duncan, 2011).</p>
(Jacobs, 1993).	<p><b>Walkability and Urban Design</b></p> <p>Urban design that prioritizes pedestrians, cyclists, and public spaces over automobiles is central to TOD. Elements such as wide sidewalks, pedestrian</p>

	crossings, trees, benches, and mixed-use frontages enhance the street experience and encourage walking (Jacobs, 1993).
(Renne & Wells, 2005).	<p><b>Governance and Policy Frameworks</b></p> <p>Policy support and inter-agency coordination are essential for TOD. Successful cases often involve integrated planning authorities, government incentives, and public-private partnerships (Renne &amp; Wells, 2005).</p>
(Belzer & Autler, 2002).	<p><b>Economic Feasibility and Affordability</b></p> <p>Without affordability mechanisms, TOD can contribute to gentrification. Strategies such as inclusionary zoning, rental subsidies, and affordable housing mandates are critical to ensure equitable access (Belzer &amp; Autler, 2002).</p>

The case studies reveal that successful TODs are context-sensitive but share common elements:

- Strong institutional coordination
- Integrated transport and land use policies
- Community engagement and equity considerations
- Investment in high-quality, multimodal infrastructure

Challenges include affordability, displacement risks, and political resistance. Importantly, TOD should not be imported wholesale but adapted to local socio-economic and spatial realities.

## **Conclusion**

This systematic literature review has identified and analyzed how factors affecting and what factors affecting to the TOD. Transit-Oriented Development offers a promising path toward more sustainable, equitable, and livable cities. However, its success depends on aligning land use, infrastructure, design, and governance in a coherent and inclusive manner. Case studies from around the world demonstrate that while TOD principles are universal, implementation must be tailored to local needs and capacities. Policymakers must prioritize affordability, public participation, and integrated planning to ensure TOD benefits all residents. The study contributes to professionals who are planning to implement TOD's in a better way with available infrastructure. However, the scope of this review is limited by the number of sources analysed. Future researchers are encouraged to expand upon this work by including a broader and more diverse set of academic publications to enhance and deep depth of insights of TOD's.

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