LOGI – Scientific Journal on Transport and Logistics
Vol. 15 No. 1 2024 DOI: 10.2478/logi-2024-0001

Transit-Oriented Development: Learnings from Global Examples

Pushpak Bhagwati[1*] and Manoj Kumar[1]

[1]*National Institute of Technology, Department of Architecture and Planning, Ashok Rajpath, Patna, India; Email: pushpakb.ph21.ar@nitp.ac.in, manoj@nitp.ac.in*

***Corresponding Author:** Pushpak Bhagwati

Received: 25 April 2023; Revised: 13 November 2023; Accepted: 11 December 2023; Published: 2 January 2024

Abstract: Transit-oriented development (TOD) is a method employed in area-based developments to address civic mobility, automation, inequality, community, equality, and climate change in metropolises. This research paper utilizes a comparative analysis of various published papers to create a cohesive analytical study. The main goal is to identify critical parameters that contribute to the success of TOD. It examines highly successful global examples of TOD, including Hong Kong, Singapore, London, Shenzhen, México, and Washington D.C., to understand how the aforementioned parameters impact TOD development and its achievements. Indian cities are making substantial investments in public transportation and transitioning into transit hubs. The success of this progress depends on implementing TOD regulations, such as zoning rules for mixed-land use, density control, limited parking, PPP finance, and fostering collaboration between public and private agencies near transit stations. In conclusion, while planning frameworks have been widely adopted and implemented by various countries, financial frameworks play a more pivotal role in influencing success, making TOD more practically viable worldwide.

Keywords: Transit Oriented Development, public transportation, TOD regulations, PPP finance, financial frameworks

1. Introduction

1.1 Problem Statement

In Asia, few countries are investing in infrastructure projects related to mass transit. As a result, cities are becoming transit-oriented and private vehicle ownership is increasing as well. To make transit-oriented cities having more public transport and lesser use of private vehicles, it is essential that we have growth patterns that are dense and closely knit together, urban regions that are

connected by public transportation networks and easy access to local services and jobs. These measures are crucial to the success of transit-oriented development (TOD) or mass transit.

The aspects of sustainable urban development appear to be perfectly compatible with TOD policies. However, governments have vacillated about whether or not to build urban trains or mass transit, resulting in the formation of large automobile-oriented urban patterns. It becomes extremely difficult to convert a city with mass transit-oriented patterns once an automobile-oriented city shape has emerged.

While many Asian cities are proposing and planning mass transit corridors, it is crucial to comprehend the parameters and significance of TOD in order to develop the strategy of TOD in a more sustainable and successful manner. This paper will attempt to compile all design principles and parameters associated with TOD as well as analyse the world's most successful TOD examples and the related factors that contributed most to their success. Successes and failures of TOD policies are discussed here along with lessons learnt and to be learnt. It will serve as a guide for understanding the importance of financial and planning frameworks for the success of TOD or mass transit.

1.2 General

Congestion on the roads has long been an issue in India. The declining availability of public transport is widely blamed for this problem. Due to the insufficiency of public transit, there has been a surge in the number of people who own cars. This is mostly attributable to the legislative framework and government policies that favour the national automotive industry. The widespread use of personal automobiles has not only increased traffic but also decreased the city's efficiency and productivity (in terms of the monetary cost of wasted time spent idling). The protection of the environment has been called into question as a result of this, especially in light of the fact that automobile emissions contribute significantly to air pollution [1,2].

The rate of car ownership in India is calculated using data from the Department of Road and Highway Transport. Between 2011 and 2020, the number of 4-wheeler vehicles per 1,000 people nearly doubled from 6.59 to 12.68. Concerns about social, economic and environmental sustainability have arisen due to the rapidly increasing rate of vehicle purchases. At the same time, the middle-income group in India had their own future prospects to live more comfortably and participate more in economic and leisure activities, which is generating the above-mentioned growth. Understanding the determinants of consumer behaviour in purchasing personal vehicles and accordingly devising policies for the sustainable development of the transport network is very important for a population (of 1.28 billion) and for developing countries like India [1,2].

2. Data and Methods

The principal objective is to ascertain the critical elements impacting the effectiveness of Transit-Oriented Development (TOD) by examining international experiences.

2.1 TOD Essentials

Many definitions and theories of TOD are part of the New Urban concept. According to the current discourse in urban planning, the solution to the suburbs' problems lies in developing denser mixed-land use settlements. Certain academia has shifted to a new model based on their own interpretations of this strategy. Architect and urban planner Peter Calthorpe provided one of the first and most widely used descriptions and understanding of the transit-oriented concept.

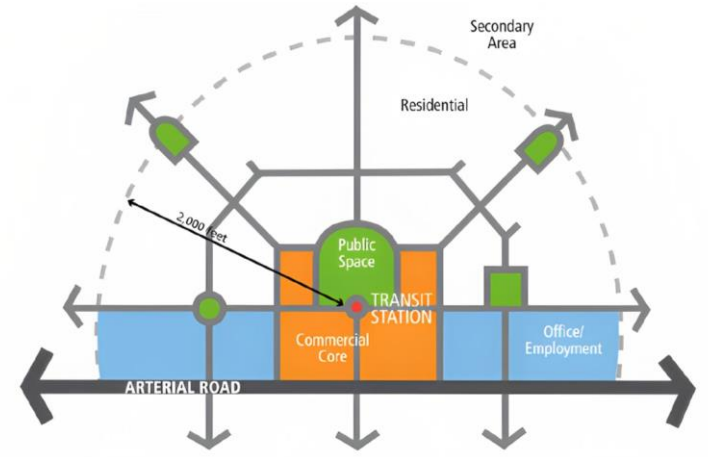

Fig. 1 TOD Graphics by Calthorpe. Source: [3]

Settlements with a variety of uses that are less than a two minutes' walk from both public transportation and major retail nodes are considered to be in the "walkable" category. TOD creates an environment where residents and workers can easily access various modes of transportation, including public transit, bicycles, foot, and cars to transit to their workplace, home, commercial activity, recreational activity etc [3].

Moreover, the transport hub must be conveniently accessible within a 10-minute walk or within a 400-meter radius for neighbourhood residents. This strategic location reflects the significance of public transport in enhancing the local economy. TOD encompasses a mix of commercial, residential, and institutional buildings centred around an intermodal terminal, promoting alternative transportation modes like cycling and pedestrian pathways. The distance between the hub and the centre of the transit-oriented development (TOD) area typically ranges from half a mile to one mile. Ensuring the traffic hub's geographic centre lies within 400 meters or a 10-minute walk from the nearest household underscores the importance of its central positioning for the entire region's development and transportation convenience. (Fig. 1) [4-8].

There are three factors that are crucial for planning and presenting any new transit infrastructure: 1. The planning framework 2. The financial framework 3. The political framework.

The benefits of TOD policies have been outlined in a plethora of studies and policy documents. The factors summarised below present the most pressing issues with TOD policies: 1. Planning: A unified set of recommendations for land use and transportation to promote growth and mixed-use destinations near public transit. 2. Financial: Monetizing development rights on privately held land to generate revenue and emphasis on property development to fund mass transit systems. 3. Political: Facilitating decentralisation and coordination and creating mechanisms for fostering cooperation between various organisations and governmental bodies [5-8].

This paper selects cases from around the world, focusing on the most successful and extensively studied examples of TOD. Research papers are chosen based on the previously discussed parameters. The primary objective of this study is to construct a comprehensive paper incorporating a comparative analysis of these selected cases.

2.2 Case Studies

Following an examination of the most prominent and fruitful case studies of transit-oriented development (more precisely MRT and Metro), a select group of case studies has been chosen for further evaluation and analysis. The approach used to study these cases focuses on analysing the aspects of the planning framework which are Mixed use, High density, Accessibility, Pedestrian, Equitable, Ecology, Energy conservation, and Place making, and on analysing the aspect of the financial framework, which is Economy.

2.2.1 Delhi - Capital City of India

The components recommended for TOD architectural design, as outlined in the TOD Policy Manual, are now integrated into the Delhi Master Plan's Development. For properties larger than one hectare, increased density is permitted, with minimum FAR for low-income housing. Land pooling supports TOD-influenced zone redevelopment. The Delhi Development Authority is empowered to allocate larger plots for parks and transportation connections, promoting sustainable urban development.

The Master Plan requires 30% residential, 10% commercial, and 10% public facilities on all land parcels. Smaller dwelling units fulfil the MPD’s minimum requirement for residential land use. To diversify public transportation-served economies, buyers can accommodate single people to huge extended families with smaller units. Since it considerably increases development density, this has been the hardest criterion to meet. This necessitates more infrastructure and parking for development [9].

Green is in accordance with the principles of inclusivity: a minimum of twenty percent of the total land area must be designated as open green areas for public use and an additional 10% must be set aside for private usage. For properties that are less than 1 hectare in size, we have to allocate space to the community green zones like community terraces, podiums etc [10].

Social infrastructure, such as schools and hospitals, are examples of public institutions that must be included in any new construction.

In terms of a financial model, it is not possible to identify a single system in Delhi. The anticipated revenue streams are improvement charges, EDC, and the sale of FSI. In order to make future FSI adjustment easier, the Master Plan sets all additional FSI costs at the same standard rates, regardless of land use or use of premises [11,12].

Result: In the Delhi case, DDA has proposed mixed-use and high-density areas, but further details are needed regarding their proximity to the station. Accessibility, equitable pedestrian, ecological aspects, and energy conservation are well-planned. However, the financial framework is a critical aspect that has been overlooked, beyond the distribution of FAR (Floor Area Ratio).

2.2.2 Hong Kong - Special Administrative Region of China

Hong Kong's TOD policy, under the "Railway Property Development" scheme, encourages vibrant, sustainable developments near rail stations, optimizing land usage and transit access. Initiatives like "Walk in HK" and Railway Property Development promote pedestrian infrastructure around transport hubs, emphasising walkability. TOD project development adheres to the "Hong Kong Planning Standards and Guidelines."

The strategy for transit-oriented development (TOD) used by MTR is based on the urban planning concept known as the "network of pearls." This model defines widely separated transportation hubs that are linked together by a rapid transit network [13].

The Rail plus Property projects are distinguished by doing planning of the area in and around the mass rapid station that has been meticulously developed to provide "seamless integration" with the places that are located in their immediate vicinity. Because of the contextual relationship each station area has with the properties that surround it, each station area may be identified as separate and unique from the others [13].

Hong Kong's government, as the sole landowner, has a 50-year lease with the private sector, renewable once. MTR receives government land grants and development rights, sustaining its operations, maintenance, and infrastructure projects. Since the late 1970s, MTR has integrated real estate above transport stations to generate revenue, enhancing residential and employment densities and improving the city's urban transit system.

Result: The Hong Kong MTR case stands as an excellent model for studying TOD due to its comprehensive approach encompassing mixed use, high density, accessibility, equity, ecology, energy conservation, pedestrian-friendliness, place-making, and economic factors. The successful financial framework is a valuable lesson for other cases.

2.2.3 London - The Capital of England and The United Kingdom

Urban and rural planning in the UK boasts a storied past. The "Green Belt" initiative curbed suburban sprawl and boosted city density, while stringent development controls preserved historical sites and public spaces. Joint ventures streamlined service delivery. London's urban development benefits from the vitality of the public sphere, urbanisation, and diverse land uses.

This urban neighbourhood has a porous ground plane that makes it easy for pedestrians and bikes to get around as well as modest block footprints, active frontages, and good connectivity. It does this by creating a central courtyard that serves as a visible and physical connector throughout the entire site [14].

Crossrail presented a difficult financial problem for state and municipal governments. London's commercial and population boom necessitated investment in new infrastructure, but not one source of funding presented itself. The answer lies in a combination of financial sources, including federal, state and municipal governments as well as new taxes and business contributions. The Mayor of London has instituted a Community Infrastructure Levy (CIL) to redirect a portion of this value to local infrastructure upgrades by charging developers a fee as part of the construction process. The CIL is determined by the rise in property value caused by the new facilities [14].

Result: England's TOD policies have evolved, focusing on mixed use, high-density, accessibility, equity, ecology, energy conservation, pedestrian-friendliness, place-making, and economic factors. The newly integrated financial framework appears promising.

2.2.4 Shenzhen - Modern Metropolis Linking Hong Kong and China

Shenzhen, a fast-growing southern Chinese city also uses transit-oriented development (TOD) in its urban design. Sustainable and compact development around public transportation is the city's TOD strategy.

The "Transit-Oriented Development Guidelines" and "Shenzhen Metro Property Development Plan" execute the city's TOD policy. The property development plan encourages mixed-use developments near metro stations, while the rules set design standards for transit node complexes.

TOD in Shenzhen was successful due to a mix of strong government support, a good urban & town planning (a well-connected transit network, high population density, market demand for urban living and a commitment to sustainable development). Shenzhen used Hong Kong SAR, China's

experience to simplify its rail transport plans and planning process. These changes enabled TOD by promoting synergies between rail transportation plans and urban planning [15].

The city is encouraging new construction and redevelopment projects to be located in close proximity to public transportation stations in an effort to concentrate development around transit hubs. Residents will have an easier time utilising public transit which will result in less of a demand for travel by own vehicle.

Mixed-use development is being encouraged by the city which means that new communities will be built with a variety of uses such as residential, commercial and retail, in addition to other types of amenities. Residents won't have to travel as far to get to the services they require because of this, which will make it easier for them to obtain those services [15].

As new metro lines are routed through local neighbourhoods, independent market assessments and land-use studies may find unoccupied properties with enormous unrealized development potential. After that, the planning institute will be able to work in conjunction with the metropolitan businesses and other government organisations to select which property parcels should be given priority for cooperative development [15].

Rail plus Property finance creatively navigates land-use rights to work around existing land leasing restrictions. This enables a smooth transition of ownership from government to public and private subway businesses. Shenzhen stands as a prime example of comprehensive urban planning, integrating various elements, from compact layouts to finance. The R+P concept in Shenzhen has led to successful high-density, mixed-use developments around transit stations. These projects, offering a range of amenities and accessible locations, have become popular among residents and visitors. Furthermore, the R+P model has generated substantial government revenue, reinvested in supporting the city's growth and development.

Result: Shenzhen adhered to the Hong Kong MTR TOD guidelines, emphasizing mixed use, high density, accessibility, equity, ecology, energy conservation, pedestrian-friendliness, place-making, and economic factors. Their successful financial framework complements an efficient transportation system.

2.2.5 Washington, DC - Capital of The United States of America

TOD that contributes to the urban planning framework that WMATA uses to foster dense, dynamic, connected neighbourhoods is the Joint Development initiative, which is implemented on Metro-owned land. These factors are essential for increasing the number of people who use public transportation and decreasing their reliance on cars. Moreover, TOD aids in accomplishing various long-term objectives, including but not limited to:

- Getting people out of their cars & reducing carbon output

- Improving local communities & making more homes available at reasonable prices
- Promoting economic development & generating revenue from fares and taxes [16-18]

Optimizing The Station Design: Getting the station layout right is one of the most crucial first steps that will lock in desirable or undesirable patterns and determine many factors, such as the number of pedestrians and cyclists using the station, the volume of traffic in the surrounding area, the standard of development in the station area, placement of cafes and retail and the overall success of the rail system [18,19].

Corridor of Mixed Uses: There is not one focal point for the commercial and social life that occurs along a mixed-use corridor. These thoroughfares often feature a variety of buildings with a moderate density that serve a variety of purposes, including service, retail, workplace and culture. Newer, higher-density residential development is typical along the corridor, with older, lower-density housing stock found close off the main strip [19].

In Washington, transit-oriented development projects have been financed through development-based land value capture, in which an increase in the regional light rail system's funding comes from a mix of sales tax, property tax and motor vehicle excise tax hikes [21].

Land value capture has been utilised to fund TOD initiatives in Seattle. To increase its development capacity, the city has implemented a policy called Mandatory Housing Affordability (MHA), which mandates that all new complexes include a certain percentage of low-income housing. Affordable housing and other community advantages are paid for with the money collected from the extra value provided by the expanded development potential [21].

Result: Washington's TOD policies emphasize mixed use, high density, accessibility, equity, ecology, energy conservation, pedestrian-friendliness, place-making, and economic factors. Their unique financial framework not only bolsters transit infrastructure but also enhances housing for low-income groups, making it a compelling case for study.

2.2.6 Singapore – An Island Country

Integrated Transport Hubs are large-scale transit facilities in Singapore that incorporate numerous modes of transportation, including MRT, bus and taxi services. These facilities are referred to as ITHs. These hubs are built with the intention of encouraging passengers to transition between various forms of transportation in an easy and convenient manner. Mixed-use communities that are built in close proximity to transit nodes. These kinds of developments often consist of a variety of different types of real estate, including residential, commercial, and office space, in addition to public areas and amenities [22].

Singapore’s policy for transit-oriented development (TOD) places a strong emphasis on the importance of developing pedestrian-friendly environments around transport hubs. This includes

pedestrian crossings that prioritise the safety and comfort of pedestrians, as well as large sidewalks, covered walkways, and other similar features [22].

Singapore is also making investments in cycling infrastructure in order to encourage more people to pedal as an alternative method of transportation. This includes separate lanes for cyclists and programmes that allow people to share bikes [22].

Singapore invests heavily in MRT stations and bus interchanges, which anchor TOD projects. Community and TOD parks are government-funded. The government buys land near transit hubs and sells or leases it to private developers at a premium through land value capture. Land sales and leases fund public infrastructure. Private developers must pay for public infrastructure like roads, parks, and community amenities in TOD areas. Public-Private Partnerships Singapore develops TODs with private developers. The government supplies land and finances for public infrastructure, while private developers build and operate TOD project components [22].

Result: Singapore's TOD policies encompass mixed use, high density, accessibility, equity, ecology, energy conservation, pedestrian-friendliness, place-making, and economic factors. Their exceptional support for cycling and pedestrian infrastructure sets a prime example. While their financial framework mainly relies on the PPP model, there is room for improvement by incorporating valuable insights from global examples.

2.2.7 Mexico City - Densely Populated, High-Altitude Capital of Mexico

Inclusionary Progress Identify regulatory agency for affordable housing. Establish unambiguous affordability standards as a baseline, based on a market analysis. Parking, density, time and expense to obtain a permit. Public Land for the Common Good Delegate authority to establish a strategy to capture the value of public land, taking into account compromises, to achieve city objectives. Establish minimum 30% greater affordability standards in exchange for land subsidies. Establish a transparent incentive structure to promote affordability [23-25].

Location-efficient mortgages (LEM) are mortgages provided to households in central neighbourhoods that account for money saved on household transportation costs, allowing families to afford a more expensive home. People residing five kilometres from the Zocalo spend fifteen pesos less per day on transportation [24].

Community Land Trusts (CLT) A non-profit organisation that accepts public and private funding to create permanently affordable housing for low-income families. CLT decreases the expense of homeownership by selling individual houses while preserving ownership of the land underneath and by limiting the resale price of buildings. Establish a City-CLT relationship to seek land donations, government funds and charitable sources for affordable housing; can also assist developers in managing their inclusionary-required affordable units [24].

Rental Vouchers A direct rental subsidy for low-income individuals that can be applied to a unit of their choosing. A rental voucher scheme could be administered by a city agency, one of the federal government agencies, or a collaboration between the two [23].

It was possible for Mexico City to finance a capital-intensive infrastructure project through PPP and environmental mitigation. Not only did private companies in Mexico City take part in the effort, but they also welcomed a wide spectrum of investors.

Result: In the Mexion TOD case, policies cover mixed use, high density, accessibility, equity, ecology, energy conservation, pedestrian-friendliness, place-making, and economics. Their financial approach values public land, balancing city goals. It mandates a 30% higher affordability standard for land subsidies and introduces a transparent incentive system. Moreover, they provide location-efficient mortgages, helping households in central areas afford pricier homes by considering transportation savings.

3. Discussion

By analysing examples of transit-oriented development around the world, it becomes clear that planning parameters are not only implemented but also accepted. However, it is also evident that financial parameters are a crucial component of the success of any TOD. Many countries that have implemented or are in the process of implementing TODs are experiencing positive outcomes.

4. Conclusion

This paper analyzes the effectiveness of efforts to promote transit-oriented development (TOD) and presents international best practices for implementing TOD policies. It explores the historical evolution of TOD in various parts of the world and provides a comprehensive review of previous research on the subject, with a focus on successful methods. Despite the widespread use of appropriate terminology in TOD plans, little is actually done to ensure a balanced distribution of land uses and building types.

In conclusion, this paper highlights the importance of various parameters in determining the success or failure of any mass transit system. Through research on successful TOD examples and effective planning and financial procedures, it becomes evident that planning parameters such as high density, placemaking, non-motorized public transportation, and pedestrian-friendly environments are consistently important. However, the financial framework, particularly land value capture, is critical to the success of any TOD and has a significant impact on both users and the city as a whole.

In the context of Indian cities, it is recognized that the financial framework is a significant missing component, and future research should focus on how it can be implemented and its potential impact on current mass transit.

References

[1] Bansal, P. & Kockelman, K.M. (2017). Indian vehicle ownership: insights from literature review, expert interviews, and state-level model. Journal of the transportation research forum 56(2), 45–59. DOI: 10.5399/osu/jtrf.56.2.4432.

[2] Kidokoro, T. (2019). Transit-Oriented Development Policies and Station Area Development in Asian Cities. DOI: 10.2139/ssrn.3470063.

[3] Carlton, I. (2009, September 2). Histories of Transit-Oriented Development: Perspectives on the Development of the TOD Concept. Retrieved February 12, 2023, from https://escholarship.org/uc/item/7wm9t8r6

[4] Calthorpe, P. (1993). The Next American Metropolis. New York: Princeton Architectural Press.

[5] Bernick, M. & Cervero, R. (1997). Transit Villages in the 21st Century. New York: McGraw-Hill Inc., US.

[6] Carpentieri, G., Papa, R. & Guida, C. (2021). Urban Planning for Transit-Oriented Development: An Application in the Naples Metropolitan Area. European Transport - Trasporti Europei 85, 1–15. DOI: 10.48295/ET.2021.85.6.

[7] Jain, D., Singh, E. & Ashtt, R. (2020). A systematic literature on application of Transit oriented development. International journal of engineering and advanced technology 9(3), 2542–52. DOI: 10.35940/ijeat.c5415.029320.

[8] Lin, J.J. & C.C. Gau. (2006). A TOD Planning Model to Review the Regulation of Allowable Development Densities around Subway Stations. Land Use Policy 23(3), 353–60. DOI: 10.1016/j.landusepol.2004.11.003.

[9] Authority, Development Delhi. (2021). About MPD-2041.New Delhi: Government of Delhi.

[10] Mehta, P., Mungekar, N. & Mathew, M. (2016) Transit Oriented Development Manual: Delhi TOD Policy & Regulations Interpretation. Retrieved February 12, 2023, from https://smartnet.niua.org/sites/default/files/resources/delhi_tod_policy_manual_0.pdf

[11] Uttarwar, P.S. & Roy, P. (2015). Transit Oriented Development (TOD) Policy. In 8th Urban Mobility India Conference & Expo 2015, 24-27 November 2015. New Delhi, India: Ministry of housing and Urban Affairs.

[12] Murty, M.N., Dhavala, K., Ghosh, M. & Singh, R. (2006). Social Cost-Benefit Analysis of Delhi Metro. Retrieved March 13, 2023, from https://www.researchgate.net/publication/24112701_Social_Cost-Benefit_Analysis_of_Delhi_Metro

[13] Verougstraete, M., Zeng, H. & UN.ESCAP (2014). Land value capture mechanism: the case of the Hong Kong MTR. Retrieved February 12, 2023, from: https://hdl.handle.net/20.500.12870/3895

[14] Papa, E. (2019). Implementing Transit Oriented Development in Greater London. In Knowles, R.D. and Ferbrache, F. (Eds.), Transit Oriented Development and Sustainable Cities- Economics, Community and Methods, 186–97.UK: Edward Elgar publishing.

[15] Lin, X. (2014). Transit-Oriented Development (TOD) for Megacities: Is TOD an Effective Solution for a Megacity's Traffic Congestion? Case Study of Shenzhen, China. In L. Born (Ed.), Young Research Forum: Research Papers for Future Megacities on Governance, Water, Planning, and Mobility, 157-177. Berlin, Boston: JOVIS Verlag GmbH. DOI: 10.1515/9783868598858-014.

[16] Bansal, P. & Kockelman, K.M. (2017). Forecasting Americans' Long-Term Adoption of Connected and Autonomous Vehicle Technologies. Transportation Research Part A: Policy and Practice 95, 49–63. DOI: 10.1016/j.tra.2016.10.013.

[17] Lierop, D.V., Maat, K. & Geneidy, A.E. (2017). Talking TOD: Learning about Transit-Oriented Development in the United States, Canada, and the Netherlands. Journal of Urbanism: International Research on Placemaking and Urban Sustainability 10(1), 49-62. DOI: 10.1080/17549175.2016.1192558.

[18] Reconnecting America's Centre for transit-Oriented Developemnt. (2008). TOD 202: Station Area Planning - How to Make Great Transit-Oriented Places. Retrieved March 13, 2023, from http://www.reconnectingamerica.org/assets/Uploads/tod202.pdf

[19] Board, Transportation Research. (2004). Transit-Oriented Development in the United States: Experiences, Challenges, and Prospects. The National Academies Press. DOI: 10.17226/23360.

[20] AECOM. (2017). Station Area Planning Guide. Retrieved March 13, 2023, from https://www.wmata.com/business/real-estate/upload/Station-Area-Planning-Guide-October-2017.pdf

[21] Cervero, R., Ferrell, C. & Murphy, S. (2002). Transit-Oriented Development and Joint Development in the United States: A Literature Review. Retrieved March 13, 2023, from https://onlinepubs.trb.org/onlinepubs/tcrp/tcrp_rrd_52.pdf

[22] Chin, H.C. & Foong K.W. (2005). Issues in Transportation Planning–the Singapore Experience. In S. Basbas (Eds.), Advances in City Transport: Case Studies, 127-158. Singapore: WIT Press.

[23] Aguilera, G.C. (2012). Best Practice: Metrobus Bus Rapid Transit System City: Mexico City Best Practice: Metrobus Bus Rapid Transit System. Retrieved February 13, 2023, from https://www.nyc.gov/html/ia/gprb/downloads/pdf/Mexico%20City_Metrobus.pdf

[24] Dewey, O.F. & Zegras C. (2016). Transit-Oriented Development in Mexico City. Retrieved July 1, 2022, from http://web.mit.edu/czegras/www/MCMA_TOD_Final%20Presentation_V2-Compressed.pdf

[25] Ližbetin, J., Kampf, R., Jeřábek, K. & Caha, Z. (2016). Practical Application of the Comparative Analysis of Direct Road Freight Transport and Combined Transport. Transport Means – Proceedings of the International Conference (pp. 1083 – 1087). Kaunas Technology, Latvia.