Green Cities, Infrastructure & Energy Programme

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Diagnostic Report on TOD Development in Hanoi

Comprehensive Assessment of Opportunities and Barriers to TOD in Hanoi City

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Contents

Acronyms

AAI	Airport Authority of India
AQI	Air Quality Index
AfD	Agence Française de Développement (French Development Agency)
ADB	Asian Development Bank
AVD	Ad Valorem Stamp Duty
BCR	Building Coverage Ratio
BCDA	Bases Conversion and Development Authority
BRS	Business Rate Supplement
BRT	Bus Rapid Transit
BT	Build-Transfer
CA	Competent Authority
CCL	Circle Line
CNG	Compressed Natural Gas
CIL	Community Infrastructure Levy
COE	Certificate of Entitlement
DBFOMT	Design-Build-Finance-Operate-Maintain-Transfer
DDA	Delhi Development Authority
DE	Developer Entity
DfT	Department for Transport
DMRC	Delhi Metro Rail Corporation
DOC	Department of Construction
DOF	Department of Finance
DONRE	Department of Natural Resource and Environment
DOTr	Department of Transportation
DRM	Disaster Risk Management
DRMKC	Disaster Risk Management Knowledge Centre
EIA	Environmental Impact Assessment
EDC	External Development Charges
EPC	Engineering, Procurement, and Construction
ERP	Electronic Road Pricing

ESDPs	Economic and Social Development Plans
EWL	East-West Line
FAR	Floor Area Ratio
FEED	Front End Engineering Design
FDI	Foreign Direct Investment
FSI	Floor Space Index
FYPs	Five-Year Plans
GCIEP	Green Cities, Infrastructure & Energy Programme
GEDSI	Gender Equality, Disability, and Social Inclusion
GFA	Gross Floor Area
GHG	Greenhouse Gas
GLS	Government Land Sales
GMG	Guangzhou Metro Group
GMC	Guangzhou Metro Corporation
GNCTD	Government of National Capital Territory of Delhi
GRDP	Gross Regional Domestic Product
GSO	General Statistics Office
GST	Goods and Services Tax
GTA	Greater Toronto Area
HAIMUD	Hanoi Integrated Urban Mass Rapid Transit and Urban Development
HCMC	Ho Chi Minh City
HDB	Housing Development Board
HSR	High-Speed Rail
ICC	Investment Coordination Committee
INFORM	Index for Risk Management
IO	Infrastructure Ontario
IPN	Income-Population-Needs
IQ Air	Air Quality Monitoring Organisation
IZP	Influence Zone Plan
ITDP	Institute for Transportation and Development Policy
JICA	Japan International Cooperation Agency

KCRC	Kowloon-Canton Railway Corporation
KPI	Key Performance Indicator
LBC	Land Betterment Charge
LDC	Land Development Corporation
LGUs	Local Government Units
LTA	Land Transport Authority
LVC	Land Value Capture
LRT	Light Railways Transit
METI	Ministry of Economy, Trade, and Industry
MND	Ministry of National Development
MMRDA	Mumbai Metropolitan Region Development Authority
MPD	Master Plan of Delhi
MOT	Ministry of Transport
MRT	Mass Rapid Transit
MRTS	Mass Rapid Transit System
MTR	Mass Transit Railway
NAP	National Adaptation Plan
NAV	Net Assessable Value
NEDA	National Economic and Development Authority
NHUDSP	National Housing and Urban Development Sector Plan
NIMBYism	Not In My Back Yard-ism
NMT	Non-Motorised Transport
NRFF	New Rail Financing Framework
NSCR	North-South Commuter Railway
NSL	North-South Line
NTP	National Transport Policy
NTP IRR	National Transport Policy Implementing Rules and Regulations
NUDHF	National Urban Development and Housing Framework
ODA	Official Development Assistance
OSD	Over-Station Development
O&M	Operation & Management

PDF	Preliminary Design Business Case
PDP	Philippine Development Plan
PM2.5	Particulate Matter with a diameter of 2.5 micro-metres or smaller
PPP	Public–Private Partnership
PTAL	Public Transport Accessibility Level
R + P	Rail + Property
RFPs	Request for Proposals
SAR	Special Administrative Regions
SBL	State Budget Law
SBST	SBS Transit
SEA	Strategic Environmental Assessment
SHD	Singapore Height Datum
SMRT	Singapore Mass Rapid Transit
SPV	Special Purpose Vehicle
SZMC	Shenzhen Metro Group
TDSI	Transport Development and Strategy Institute
TDR	Transfer of Development Rights
TEL	Thomson-East Coast Line
TfL	Transport for London
TIF	Tax Increment Financing
TOC	Transit-Oriented Communities
TOD	Transit-Oriented Development
TRAMOC	Hanoi Public Transport Management Centre
UMRT	Urban Mass Rapid Transit
URA	Urban Renewal Authority
UR	Urban Railway
URT	Urban Rail Transit
UTC	University of Transport and Communications
VAT	Value-Added Tax
VCF	Value Capture Finance

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Executive Summary

Current Issues and Challenges for Sustainable Urban Development in Hanoi

Urbanization and Transportation Issues

Hanoi, with a population of approximately 8.7 million[1] (as of 2024) and a rapidly growing population, faces significant pressure on its urban infrastructure. The population density in the central area is very high, around 12,425 people/km² - eight times higher than in suburban areas - highlighting an uneven population distribution. Additionally, between 1990 and 2020, residential land area in Hanoi increased from 2.98% to 16.77%, while agricultural land decreased sharply, reflecting a rapid urbanization process. The concentration of population in the central area and the fast pace of urbanization have led to severe consequences such as traffic congestion, environmental pollution, and infrastructure overload, posing major challenges to ecological balance and future sustainable development.

The daily travel demand in Hanoi increased from 6.3 million trips in 2007 to 18.2 million in 2023. Most residents travel by motorbike, which accounts for about 72% of total trips, while public transport accounts for only 9–10%, and cars about 6–7%. The number of private cars in Hanoi is rising quickly, reaching 140 cars per 1,000 people in 2023, causing serious traffic congestion due to a lack of private vehicle control policies.

Although Hanoi's pedestrian infrastructure has improved somewhat, it is often encroached upon by parked motorbikes and street vendors, making it difficult for pedestrians, especially vulnerable groups. This reduces accessibility to the public transport system. The road network in the central area is relatively narrow, while road density in suburban areas remains low, leading to frequent congestion along major corridors. Grade-separated transport infrastructure remains limited, and incomplete ring roads force vehicles to travel through the city center, increasing traffic pressure.

Although the bus network is dense in central Hanoi, it suffers from route overlap and lacks fast connections to satellite cities. The system is not truly accessible to people with disabilities, and competition from private vehicles and ride-hailing services has caused a drop in ridership - from 450 million in 2014 to just 200 million in 2022. Urban rail lines such as MRT-2A and MRT-3 are beginning to operate and are helping reshape city transport. However, the sustainable use of public transport also requires the development of supporting infrastructure and feeder services.

Population growth, economic expansion, and increasing private motor vehicle ownership have contributed to severe traffic congestion, air, and noise pollution, particularly in the city center. Without adaptive solutions such as flexible traffic management and integrated transport and land use planning to reduce the length and number of daily trips as well as dependence on private vehicles , congestion is likely to worsen, undermining mobility and economic efficiency. Delays in urban rail projects, limited bus capacity, and inadequate pedestrian infrastructure may further exacerbate the situation. Therefore, it could be beneficial to accelerate urban rail projects, restructure and improve bus services, and integrate them with urban rail in terms of infrastructure, fare systems, and smart payment technologies. Demand management strategies, such as limiting the use of motorcycles, cars, and parking in central areas, might be worth considering.

Climate Change, Greenhouse Gas Emissions and Pollution

Hanoi is facing serious risks due to climate change, including flooding, heatwaves, and air pollution. Seasonal flooding and inadequate drainage systems disrupt daily life and damage infrastructure, while high temperatures significantly affect public health. Hanoi's transport sector is also heavily impacted by climate change: flooding, high temperatures, and storms damage infrastructure, cause traffic disruptions, and increase maintenance costs. Many transport structures are not resilient to extreme weather and require significant upgrades.

The transport sector - especially road transport - accounted for up to 95% of the city's emissions in 2016. Motorized vehicles emitted nearly 4.6 million tons of CO_2 annually. By 2020, emissions from transport had increased by 35%, with motorbikes accounting for 53% of total GHG emissions, 68.3% of PM2.5 emissions,

[1] GSO, Hanoi Statistical Office held a press conference to announce socio-economic statistics of Hanoi in 2024, Accessed 22/05/2025

and 83.5% of NOx emissions. Hanoi is now among the top 10 most polluted cities globally, with an AQI of 141 recorded in 2024. Noise pollution from traffic also exceeds national standards, averaging over 70 dB, highlighting the urgent need to improve Hanoi's urban environment. This underscores the necessity of controlling motorbike emissions and promoting sustainable transport options.

Social Equity Issues

Economic and social inequality has created significant gaps among different demographic groups in Hanoi. Low-income individuals often struggle to access essential services, such as healthcare, education, and employment, due to high living costs and a lack of personal transportation. Additionally, people with limited mobility - such as persons with disabilities, children, the elderly, and pregnant women - frequently face barriers when accessing public spaces and community services. These obstacles increase inequality and limit development opportunities for individuals and communities. The failure to integrate principles of Gender Equality, Disability, and Social Inclusion (GEDSI) into urban and transport planning can exacerbate existing social issues and increase risks across social, economic, and environmental dimensions, thereby undermining sustainable urban development objectives.

Integrated urban and transport development approaches can help to address social inequality issues by ensuring affordable housing, commercial space, and public amenities within the vicinity of public transport stations. By reducing barriers to accessibility and mobility, such strategies offer benefits for low-income groups and those with limited mobility. Moreover, compact and well-connected urban planning fosters community building by minimizing the distance to public spaces and essential services, thereby improving access to community resources for all residents.

Transit-Oriented Development (TOD) Model and International Lessons for Hanoi.

Concept and Benefits of the TOD Model

TOD is a planning strategy that integrates public transport with urban development around urban rail stations, aiming to optimize land use and encourage public transport use. TOD is particularly suitable for densely populated cities such as Hanoi, Hong Kong, Tokyo, and Singapore. Key characteristics of TOD include high accessibility to public and non-motorized transport, mixed land use near transport hubs, high density to optimize space, and sustainability to reduce carbon emissions and enhance climate resilience.

The TOD concept is considered at two levels: the corridor level and the station area level. At the corridor level, TOD principles are applied along mass transit routes, forming clusters of urban areas around stations. At the station level, urban development occurs around the station or depot in three layers: Core layer (0–200 m) - high density of amenities and facilities; Main layer (200–500 m) - concentrates community-support services; Expansion layer (500–800 m) - future urban development potential.

The TOD model provides benefits across multiple key sectors, including mobility, economy, environment, and society:

- **Mobility benefits:** TOD enhances mobility by connecting residential and commercial areas with public transport, reducing reliance on private cars, lowering congestion and pollution, and saving travel time and costs. It also improves traffic safety through safe space design.
- **Economic benefits:** TOD promotes service-based economies near public transport stations, increases property values, and stimulates housing demand. It also reduces infrastructure costs and supports more efficient urban planning.
- **Environmental benefits:** TOD helps reduce pollution and greenhouse gas emissions by decreasing private vehicle use and increasing public transport ridership. It promotes public health, enhances energy efficiency, and contributes to green space creation.
- **Social benefits:** TOD improves access to services, jobs, and affordable housing, promoting social equity. It also fosters inclusive, vibrant communities through shared public spaces that connect different social groups.

Key Principles and Focus Areas on TOD Implementation

TOD implementation aims to facilitate the harmonious integration of core elements of transportation, land use development, commerce, society and environment. Based on a review of international case studies on TOD

implementation, the GCIEP has identified five key principles that are likely to support implementing TOD in Hanoi, along with associated 11 focus areas to guide this. These principles focus on transit-oriented mobility, mixed land use, high-density development, a liveable and resilient society, smart and sustainable urban growth, and the promotion of economic activities while ensuring environmental protection.

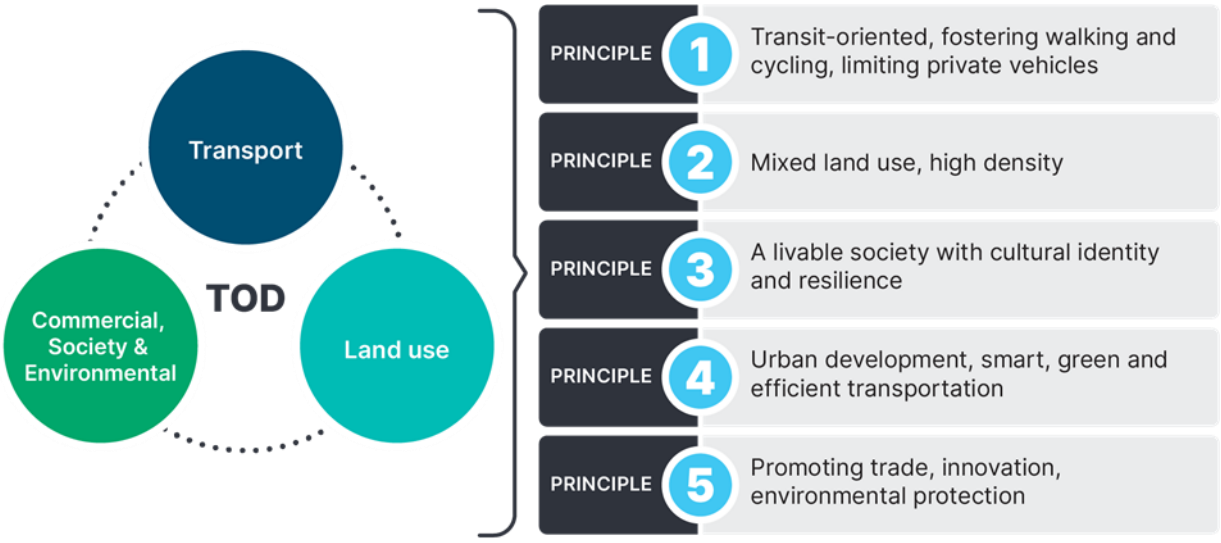


Figure 1: Key principles identified for Implementing TOD for Hanoi

Table 1: Key principles and focus areas for implementing TOD in Hanoi

#	Principles	Focus Areas
1	Transit-oriented, fostering walking and cycling	• In encouraging public transport use, urban design can make non-motorised transport options (such as walking and cycling) more conducive. The safety, comfort, and accessibility of these options for all users would need to be considered. For example, providing dedicated lanes for walking or cycling with priority by area and/or time have been successful elsewhere. • Controlling parking control (restrictions by area, by time, restrictions on the number of parking spaces) and restricting private vehicle circulations (by route, by time, by vehicle type).
2	Mixed land use, high density	• Allocating land area for mixed use, including social housing (horizontally and vertically), fully meeting individual daily travel demand, thereby minimising the number of trips and trip length. • Controlling building density and height (combining FAR + BCR + Land use structure, requiring traffic impact assessment), increasing population density, limiting dispersion, optimising the capacity of public transport system.
3	A liveable society with identity and resilience	• Identifying important landscape and historical and cultural relics in the residential areas that could be preserved under separate provisions of architectural management, construction planning, and detailed urban planning regulations. • Focusing on human-friendly architectural design on the ground floor and lower floors of buildings. • Imposing landscaping requirements to enhance the pedestrian experience, improving station recognition, and complement adjacent structures. • Enhancing urban resilience by integrating climate-adaptive design, flood prevention measures, and sustainable infrastructure into TOD planning regulations to mitigate environmental risks and ensure long-term liveability.
4	Smart, green and efficient development	• Guidance for appropriate building direction and urban space optimisation including parking areas. • Principles of land organisation and regulations and policies to encourage conversion to reduce urban sprawl and protect natural habitats.

		• Integration of technical and social infrastructure systems to create a foundation for sustainable development. • Incorporation of low carbon and climate resilience measures to promote long-term sustainability and safety. • Promotion of green building standards to enhance energy efficiency and reduce carbon footprints.
5	Promoting commercial activities, innovation, environmental protection	• Urban design shall promote trade in addition to transit functions, apply incentives and encourage innovation. • Urban design is expected to minimise environmental impact and aim to enhance nature and biodiversity.

International Lessons Learned in Implementing TOD for Hanoi

To provide a comprehensive support to the regulatory framework of Hanoi TOD, eight cities worldwide were selected and analysed to benchmark key aspects of TOD implementation. The selection is based on criteria reflecting similarities with Hanoi, including a population of over five million, a well-developed or rapidly expanding urban rail network, and development projects integrated with railway lines following the TOD model. The findings focus on the following areas: (i) TOD planning and implementation process; (ii) Regulations on institutions, powers and capacities of TOD implementing agencies; (iii) Role of stakeholders; (iv) Community participation; and (v) Level of success or failure. The following key lessons have been derived from international case studies:

- **Long-term planning with a strong legal and planning framework is essential for TOD success.** Cities like Singapore, Hong Kong, and London have adopted long-term development plans that seamlessly integrate public transport and urban planning. Consistent policies and regulatory frameworks provide stability, ensuring effective TOD implementation in different phases.
- **A specialised agency enhances efficiency and coordination.** Establishing a dedicated TOD agency with clear roles and responsibilities, such as MTRC in Hong Kong, SZMC in Shenzhen, LTA in Singapore and Crossrail Ltd. in London, significantly improves project execution, cross-agency coordination, and stakeholder engagement.
- **PPPs unlock funding and reduce financial risks.** Successful TOD projects in Hong Kong and Shenzhen have leveraged private sector expertise and investment through well-structured PPP programmes, reducing public financial burdens while ensuring high-quality development. Collaboration with the private sector can enable the expansion of various business models beyond railway development, such as real estate, commercial, and service ventures, thereby generating multiple revenue streams to support the construction and operation of the railway system
- **LVC provides sustainable funding for infrastructure.** LVC tools include land sales and leases, sales and leases of development rights for station areas or spaces within stations, betterment levies, infrastructure improvement fees, additional floor area ratio fees, and property taxes have been widely used across case studies to create revenue for reinvesting in transport and urban infrastructure.
- **Community engagement strengthens project sustainability.** TOD projects that actively incorporate community feedback, as seen in Toronto and Shenzhen, are more likely to meet local needs, build public support, and ensure long-term success.
- **Complex institutions and administrative procedures are major barriers to TOD implementation.** In cities like New Delhi and Manila, fragmented governance structures and lengthy approval processes have slowed TOD projects, increased costs and limiting development opportunities. Simplifying administrative procedures and enhancing inter-agency coordination are critical to avoid similar challenges in Hanoi.

Assessment of Existing Regulations and Opportunities for Implementing TOD in Hanoi

Previous Efforts to Implement TOD

The TOD model was first studied in Hanoi in 2009 through the HAIMUD project in cooperation with the Government of Japan. The project aimed to develop an integrated strategy between the urban railway system and urban areas to optimize the benefits of both transportation and urban development. Continuing this effort, the HAIMUD2 Project was implemented to establish a TOD implementation mechanism for Hanoi. However, no further implementation activities occurred after the project ended in 2015. In 2017, Japan's Ministry of

Economy, Trade and Industry (METI) supported a study on TOD development along Hanoi's Metro Line 2. This study integrated urban and metro development planning, forming the basis for conducting a pre-feasibility study. In 2020, JICA continued to fund TOD research in both Hanoi and Ho Chi Minh City, identifying key issues to be addressed, especially regarding legal frameworks and financial strategies. Additionally, the World Bank is supporting research on disaster risk for Metro Line 5 and the technical design for the Ngoc Hoi Station complex, with the final report expected by 2025. Despite these efforts, TOD has yet to be fully implemented in Hanoi due to the lack of appropriate institutional frameworks and regulations.

Previous TOD studies have identified several potential areas for development, mainly in relation to the studied metro lines and the opportunities for urban development around them. However, these areas have not been comprehensively evaluated using the World Bank's 3V framework (Node Value, Place Value, and Market Value). Nevertheless, research findings have provided useful information for identifying suitable pilot TOD project sites. Notable stations surveyed include Ngoc Hoi Station (a connection point between the national railway and Hanoi's urban railway) and four new stations: Gia Lam, South of Long Bien Bridge, Cong Vien, and Xuan Dinh Depot - all located on Metro Lines 1 and 2.

National and Local Policies on TOD Development in Hanoi

TOD development in Vietnam is clearly expressed through key legal documents, including Resolution No. 06-NQ/TW (2022) on urban planning, construction, and sustainable urban development, and Resolution No. 15-NQ/TW (2022) of the Politburo on the development of Hanoi through 2030. Resolutions related to urban transport development, such as Resolution 29-NQ/TW (2022) on high-speed rail and metro systems in Hanoi and Ho Chi Minh City, also emphasize the goal of modern transportation development. Particularly, Conclusion 49-KL/TW (2023) mandates Hanoi to complete 10 urban railway lines by 2035. To support TOD development, the 2024 Capital Law includes provisions under Article 31 on TOD projects. The most recent TOD development plan in Hanoi is outlined in Resolution 188/2025/QH15 dated February 19, 2025, which pilots specific mechanisms and special policies, especially to develop metro networks in Hanoi and Ho Chi Minh City. Both the government and city authorities have issued numerous policies to promote TOD implementation, including general policies and special mechanisms to remove legal barriers and address practical challenges in TOD and metro development.

Legal Framework for Urban Development:

Vietnam's legal framework for urban development includes a system of legal documents issued by the National Assembly and relevant authorities. However, the legal process faces issues of overlap both vertically (among administrative levels) and horizontally (among sectors), resulting in inconsistency and regulatory conflicts. Additionally, the legal system is outdated due to the 10-year legislative amendment cycle and delays in issuing guiding decrees and circulars, complicating urban planning efforts. The constant legal changes also pose difficulties for agencies and units in applying and enforcing regulations.

Planning, Design, Financing, and Operation of Urban Development Projects:

The process of planning and implementing urban development projects in Vietnam is highly complex, involving many stages and stakeholders. Projects could align with principles such as consistency with master plans, integrated technical and social infrastructure development, environmental protection, and climate change response. They could also strive to ensure good living environments and preserve cultural and historical values. Urban planning formulation, appraisal, and approval are carried out under the Construction Law and Urban Planning Law, with authority delegated to local People's Committees. Planning is divided into types such as general planning, zoning planning, and detailed planning - each with its own content and criteria. The planning process includes tasks from defining objectives, conducting field surveys, preparing plans, to appraisal and approval. Each urban development project could include detailed plans for project lists, investment sequencing, relocation, resettlement, financing models, and implementation management.

Urban Development Areas:

Urban development areas in Vietnam are categorized into five types: new urban areas, expanded urban areas, renovated and preserved areas, urban redevelopment areas, and areas with special functions. Each area may include one or more urban development projects, potentially spanning multiple provinces or cities. Project types include new urban area construction, urban redevelopment, urban renovation and upgrading,

urban preservation and enhancement, and mixed-use urban development. However, implementation processes remain unclear and face difficulties due to frequently changing laws and regulations.

Role of Regulatory Agencies and Developers in Urban Development Projects:

Stakeholders in Vietnam's urban development include the central government, the Ministry of Construction, and provincial and district People's Committees. The development process starts with the recognition and announcement of urban development areas by provincial People's Committees. These agencies also appraise and approve urban plans to ensure alignment with approved master plans. Regulations on landscape management, architecture, and land preparation for urban development emphasize inter-agency coordination to ensure project success.

Under the Construction Law and Housing Law, developer groups include government agencies, enterprises, and socio-political-professional organizations - ach required to meet specific criteria. Developers have varying responsibilities across levels, including primary and secondary developers, each with distinct roles in planning, infrastructure development, and project management, defining their contributions to urban development projects.

Greenfield vs. Brownfield Development:

Greenfield projects involve converting agricultural or undeveloped land, while brownfield projects redevelop previously built-up areas such as old industrial zones or degraded urban zones. For brownfield sites owned by organizations, land acquisition is generally less complicated than for residential land. In Vietnam, compulsory land acquisition for residential use can take over 180 days. Redeveloping built-up areas like metro station sites requires detailed zoning assessments. These areas could be divided into three zones: core, primary, and impact zones - each with specific land acquisition and urban design requirements. This process may involve thorough evaluation for project feasibility and effectiveness. In contrast, greenfield projects are generally simpler. For large TOD stations, planning and approval may take six months, and core zone land acquisition could exceed 200 days. Public consultation in redevelopment areas is often more complex, requiring broad stakeholder participation. Greenfield projects, on the other hand, typically do not require detailed zoning or area-specific regulations. Consultations are generally conducted via media and local authority feedback. Although greenfield sites are already designated for urban use, they would still need to comply with the Urban Planning Law. Developers would need to obtain construction permits unless exempt or meeting specific conditions.

Taxes and Fees for Urban Development Projects:

In Vietnam, urban development projects are typically required to pay various taxes and fees to support infrastructure and public services. These could include land use fees for land conversion, land use tax based on property value, construction permit fees, environmental impact assessment costs, corporate income tax, utility service fees (such as water supply and drainage), and infrastructure development charges. Special projects like social housing might receive VAT and corporate tax reductions. These taxes and fees are designed to help fund urban infrastructure and services, supporting sustainable growth. The State Budget Law sets out regulations for centralized tax collection, with the government being responsible for tax and fee collection. Revenue-sharing formulas between central and local governments are determined by expenditure and income gaps. The tax department is tasked with collecting taxes and land use fees, while local authorities handle service-related and infrastructure fees.

Vietnam currently lacks regulations to delineate TOD zones in urban planning and development management, making it difficult to define the boundaries of areas adjacent to railway stations. Although the government has regulations for compulsory land acquisition, these are only implemented after detailed plans are approved, usually linked to a development project. Public investment projects in areas outside rail infrastructure remain limited, so no land acquisition proposals have been made in TOD areas. Additionally, land valuation faces challenges due to a lack of skilled professionals and complex appraisal methods - especially surplus-based valuation for development projects—leading to disputes and delays in land acquisition.

To improve the situation, a comprehensive TOD planning framework is needed, including regulations on urban areas and urban design, to enhance the feasibility of development plans. Vietnam still applies an outdated planning approach focused on land use rather than adopting Smart Urban Standards to manage

high-density areas effectively. Coordination between transport infrastructure and urban development agencies remains weak, making public investment project coordination difficult. Current tools to capture land value primarily rely on land use fees, which are insufficient for capturing value in upgraded or redeveloped urban areas.

Assessment of Barriers and Challenges in Implementing TOD in Hanoi

The barriers and challenges to TOD development in Hanoi have been assessed across various aspects, with the key findings as follows:

Governance and Institutional Coordination Barriers:

Currently, policies and regulations in Hanoi do not sufficiently facilitate close coordination between urban development and transportation activities, contributing to worsening traffic conditions. The inefficiency in integrating transport and urban planning, along with weak collaboration among local agencies, is a key factor behind delays in implementing TOD projects. Although some efforts have been made to establish institutional structures for TOD, these remain limited, mostly project-level initiatives, without consistency in the existing management system. To address this, an effective institutional body, such as a Special Purpose Vehicle (SPV), could be established to improve coordination among stakeholders in implementing TOD. The management and implementation of TOD projects often face significant challenges due to unclear divisions of responsibility between district and city-level agencies. Project approvals and design processes are delayed by complex legal requirements, lengthy procedures, and issues related to land, finance, and land use purposes, which create major obstacles for developers. Moreover, TOD planning and regulatory processes are hindered by the lack of planning indicators specific to TOD areas, making plan formulation, appraisal, and approval difficult. The current structure of relevant authorities is still weak and fragmented, leading to delays in processing large and complex projects.

Planning and Project Implementation Barriers:

TOD development in Vietnam faces challenges due to a complex legal framework, with overlapping and sometimes contradictory regulations that hinder implementation. Inconsistencies between central and local legal documents, as well as across planning disciplines, further complicate urban development projects. The urban planning approval process often suffers from delays due to limited resources and the time required to complete procedures, which results in non-compliance with the timelines set out in the Planning Law. Consequently, legal regulations quickly become outdated and misaligned with current development needs. Additionally, the TOD planning concept is not yet integrated into the current urban planning system, making implementation more challenging. While TOD requires close coordination between transport and urban planning, traditional procedures still fall short of supporting sustainable development goals and enhanced public transport use. The lack of a unified legal framework and frequent regulatory changes discourage investors and planners, increasing costs and delaying implementation. These obstacles hinder innovation and investment in TOD initiatives.

Financial Mechanism and Investment Barriers:

Securing financial resources for TOD projects in Hanoi is challenging, especially in areas with limited resources and high land demand. Local budgets often prioritize civil works and basic infrastructure, leaving long-term initiatives like TOD underfunded. TOD projects require high capital investment with slow revenue generation, which makes them unattractive to both public and private sectors. Furthermore, the absence of specialized financial mechanisms, such as green bonds or dedicated TOD funds, hampers the establishment of a stable financial framework. Charges and fees related to land value capture are also difficult to implement due to weak land valuation data management. The lack of stable and transparent financial mechanisms reduces private sector participation, especially under PPP models. Current financial models are underdeveloped, and the absence of instruments like green bonds or TOD funds increases cost burdens for developers. Additionally, land value capture tools require high administrative capacity, while financing upstream activities poses financial risks. Although Official Development Assistance (ODA) remains a key source of TOD funding, it also faces challenges such as rising interest rates, complex administrative procedures, and poor coordination with other funding sources.

Infrastructure and Service Integration Barriers:

Multimodal connectivity and access to the public transport system in Hanoi are currently limited, particularly for pedestrians and the coverage of feeder bus services. While the bus system spans nearly 4,000 km across the city, restructuring the network to support the metro system presents challenges and requires significant financial resources. Hanoi also faces urban structure constraints, including narrow roads and low road density, which can lead to time-consuming and costly public transport travel. The feeder bus network and pedestrian accessibility are still developing, especially in suburban areas, and the construction of sidewalks and pedestrian infrastructure takes time. Feeder bus services are primarily publicly funded or subsidized by private actors like Vinbus, but their slower development could slow down the integration of transport modes. Additionally, the construction of park-and-ride facilities in suburban areas faces several challenges, which may increase travel costs and time, thereby affecting the progress of TOD projects.

Land Management Barriers:

Land acquisition in Hanoi is difficult, especially in densely populated areas. Inefficient land parcel consolidation complicates land assembly for large-scale TOD projects. Potential TOD locations are often selected based on cost rather than strategic value, weakening integration in development. A key issue is the absence of a comprehensive legal framework and a lack of intermediary experts to facilitate local consultations, which hinders the use of land readjustment tools and reduces the effectiveness of land redevelopment. Vietnam also lacks a comprehensive land-use database, including data on development structures and vacant land, making policy decisions and project implementation more difficult. Poor coordination among land management authorities and outdated land valuation practices further exacerbate the issue. Speculation and illegal land-use conversions add complexity to land management. Land clearance and compensation face many obstacles, with several projects unable to disburse funds fully, indicating a significant barrier to TOD. Disputes over compensation valuations and a lack of standardized resettlement procedures also add difficulty to relocation and implementation efforts.

Social Barriers, Community Opposition, and GEDSI Integration:

Community resistance and the integration of GEDSI principles into TOD development face several challenges in Vietnam. Despite policy emphasis on social equity, enforcement mechanisms are weak and lack coordination among authorities, resulting in uneven GEDSI application. Developers often fail to recognize the long-term benefits of integrating GEDSI, overlooking accessibility requirements and thereby reducing the social and financial effectiveness of TOD systems. In addition, weak technical capacity to comply with GEDSI standards and insensitivity to diverse community needs - especially for persons with disabilities and women - lead to design deficiencies. Public consultations, particularly with vulnerable groups, are often inadequate, resulting in projects that do not reflect their actual needs and reducing TOD sustainability. A major reason for these barriers is the lack of disaggregated data on gender, disability, and income disparities. Many cities do not track how women, persons with disabilities, or disadvantaged groups use public transport, limiting the design of inclusive solutions. Furthermore, the absence of GEDSI outcome metrics (e.g., transport use by gender or disability status) and accessibility or gender audits for TOD projects worsens the issue. This knowledge gap prevents policymakers from understanding the real challenges faced by disadvantaged groups, leading to solutions that are either inadequate or misaligned with their needs.

Key Insights

The analysis and assessment of the current situation, development potential, barriers, and challenges resulted in the identification of eleven key areas which, if put in place, would likely increase the chances of successful TOD model development in Hanoi:

Consistent TOD Policies, Legal and Regulatory Frameworks:

To successfully implement TOD, it is important to clearly define objectives and develop consistent TOD policies. Policies on redevelopment and supportive measures could be considered to enable transport authorities to engage in land use. TOD policies could focus on core regulations to safeguard development goals while considering infrastructure capacity and implementation capabilities. Early consultation with investors and communities could help inform this, with priority given to community participation in planning to address local needs. In addition, developing transparent legal and regulatory frameworks for integrated planning, land acquisition, land value capture, financing, and operational management of TOD is essential to enable multi-level TOD planning to integrate transit infrastructure with urban development. These frameworks

should simplify procedures, enhance stakeholder confidence, and be flexible and adaptable to the specific context of each TOD area, rather than applying a one-size-fits-all approach.

Flexible TOD Planning Practice:

TOD planning could be designed to be adaptable and responsive to the evolving needs of urban areas, including field surveys, infrastructure assessments, and phased development. Supervision and detailed financial planning are essential to ensure feasibility. Planning ought to prioritize high-density, mixed-use development near public transport hubs and avoid financial or business strategy shortcomings. To maintain continuity across political terms, a governance framework involving both public and private stakeholders could be beneficial. A balance needs to be struck between rapid and sustainable development, with adequate support mechanisms for long-term TOD viability. TOD plans could be integrated into overall urban planning, avoiding building standards that do not align with TOD principles.

Legal Definition of TOD Zones or Areas:

TOD areas could be identified and legalized by simplifying and integrating the four main approval processes: planning approval, land acquisition, project approval, and construction permitting. Defining TOD boundaries early helps guide area development through land value capture (LVC) tools such as FAR sales, land auctions, and utility improvement fees. These tools promote sustainable development, job creation, and accessibility while encouraging green area development and greater accountability.

Community Engagement and Social Safeguards:

Digitizing land and building data can help improve land valuation and planning. Flexible land reorganization that allows for changes in land use, along with sound utility and infrastructure management, is essential. A legal framework may be needed to support land adjustment tools like FAR sales and limit speculation through taxation. Combining land management tools such as purchase rights, and expropriation can enhance land use efficiency. To minimize compensation disputes, clear criteria and fair valuation methods ought to be established, along with temporary compensation mechanisms. Risk management related to contractor compensation could be monitored closely, with contractual provisions encouraged to require contractors to bear responsibility, which may help reduce conflict and project delays.

Community Engagement and Social Safeguards:

Community engagement strategies can play a key role in building trust and reducing opposition to TOD projects. Transparent systems for estimating project value and clarifying stakeholder responsibilities and benefits through specific policies are important. Clear communication about TOD's benefits and risks can help foster community support. Policies could prioritize affordable housing and limit displacement to ensure social inclusivity. Communities could be involved in planning, land reorganization, and urban design through public hearings. Additionally, safeguards for low-income residents, control of affordable housing prices near stations, and enhanced mediation capacity are valuable. Another suggestion is to introduce tools to support collaboration and consensus building. Encourage innovation and flexibility in planning, land (re)organisation, and land use adjustments to ensure efficient use of urban spaces.

GEDSI Integration:

Accessibility for people with disabilities, the elderly, and caregivers ought to be integrated into transport infrastructure. Policies could aim to support affordable housing, minimize displacement, and create economic opportunities for vulnerable groups. Expanding free public transport passes can help remove financial barriers. Hanoi may consider strengthening institutional capacity to integrate GEDSI into TOD implementation and enhance community consultation capacity. Governments could incentivize developers to adopt GEDSI through financial policies and PPP models.

Infrastructure and Service Improvements:

Infrastructure upgrades could be essential for sustainable TOD area development, especially in high-population zones. Infrastructure improvement plans might cover both TOD corridors and citywide needs, prioritizing pedestrian-friendly streets, feeder bus networks, and multimodal connectivity. High-quality public services and utilities could be integrated, and investment in high-quality public transport infrastructure may be

needed to attract users and promote sustainability. Emphasis could be placed on infrastructure that supports green transport.

Financial Strategies and Public-Private Collaboration:

Innovative financial mechanisms such as LVC, PPPs, green bonds, crowdfunding, and staged financing could be considered to help address financial barriers to TOD development. In this, leverage LVC as a sustainable financing tool by using mechanisms such as granting development rights, development fees, land freezing/acquisition, collecting land improvement charges, and increasing FAR to generate revenue for funding TOD projects. These approaches help minimize reliance on public funding while promoting more efficient and equitable urban development. Selection of TOD areas could ideally be based on three values: transport hub value, locational value, and market value, which can help identify suitable LVC tools. In addition, a transparent and flexible TOD fund ought to be established to ensure financing. Moreover, Hanoi may benefit from developing a sound PPP mechanism that balances risk between the government and investors, while strengthening the PPP legal framework to better support transport authorities. It is also important to foster government partnerships with private developers through transparent bidding processes, joint ventures and partnership agreements in order to attract private investment, leverage private sector expertise, share risks and accelerate project delivery. The approval process might be expedited, and land valuation could be improved through BIM and advanced data management, facilitating urban redevelopment and sustainable TOD growth.

Institutional Arrangements:

A dedicated TOD development agency is essential to accelerate the implementation of the TOD model, with an organizational model that optimizes public-private collaboration. Other countries offer different models - from fully state-run to PPPs - for developing both rail and real estate. This agency could be state-owned or involve private partnerships to leverage finance and expertise. In the short term, an option that could be taken into account for Hanoi is setting up an interdisciplinary TOD Council - a coordinating body under the People's Committee (PC), chaired by the PC Chairman (or Executive Deputy Chairman), with key members from all departments and senior professionals, to ensure close coordination among agencies in implementing TOD projects, appraising master plans and projects, and proposing policies and technical standards or guidelines for TOD implementation. In parallel, a TOD office - a new agency could be established or an existing one assigned to assist this coordinating body (or TOD Council) in the oversight of TOD implementation. This agency is responsible for day-to-day activities in order to streamline procedures, strengthen stakeholder coordination, avoid process delays, and maintain focus on TOD key principles and strategies. In a long term, a public-private joint venture model like Hong Kong's MTRC, which combines rail and real estate development, is a sustainable option for Hanoi's second phase when initial rail projects gain experience.

In addition, institutional restructuring is needed to improve coordination among authorities. Advisory bodies and delegation to lower-level agencies might speed up decision-making. Local-level agencies could handle "green" projects, allowing a focus on larger ones. Capacity building for TOD implementation teams is also necessary to enhance project management and reduce delays, creating an enabling environment for TOD areas.

Project Development and Management:

Integrating planning and project approval procedures into the TOD agency is essential to support investors. This includes establishing a "green" channel for common issues and a "gold" channel for complex decisions. Delegation and standardized templates can speed up routine project processing, while coordination with city-level agencies is essential for custom projects. These improvements could reduce delays, enhance efficiency, and support sustainable development in TOD areas. In addition, it is important to prioritize sustainability by incorporating energy-efficient building designs, reducing transport-related emissions, and promoting eco-friendly modes of mobility. These efforts can contribute to achieving global sustainability goals, enhancing urban quality of life, and ensuring the long-term success of TOD initiatives.

Development Control:

Effective development control guidelines are needed, combining tools like zoning plans, urban design, and district-level regulations with flexible control instruments to meet TOD requirements. Integrating these tools with TOD plans and applying smart planning standards could increase flexibility and effectiveness. These improvements streamline the planning process and enhance the efficiency of TOD systems, creating more accessible, efficient, and liveable TOD areas. Last but not least, developing a system for continuous monitoring and evaluation of TOD projects is essential. This enables timely adjustments; tracks progress toward goals and promotes transparency throughout the implementation process.

1. Introduction

1.1. Objectives

The rapid increase in population and dynamic economic activities have nearly doubled the total daily travel demand in Hanoi over the past decade. However, while private vehicle usage dominates, the limited capacity of the public transport system has led to severe traffic congestion, air and noise pollution, increased travel time and costs, and negative impacts on public health. This situation has also contributed to urban sprawl, making urban infrastructure management and investment more challenging. Currently, Hanoi is implementing several measures to improve transport infrastructure, manage travel demand, and specifically control the use of private vehicles. However, the slow progress of mass transit projects (MRT) due to high construction costs, the limited capacity of the bus network, and the lack of pedestrian and non-motorised transport infrastructure have made it difficult to enforce restrictions on private vehicle usage, as the public transport system remains insufficient to serve city travel demand. Without a suitable strategy, Hanoi risks continuing its uncontrolled urban expansion, increasing pressure on transportation, urban housing, and the environment.

For megacities like Hanoi, a strategic solution could focus on integrating transportation and land use development through a TOD model. This approach aims to reduce total daily travel demand (by decreasing both the number and length of trips), encourage the use of sustainable transportation modes (public transport and non-motorised transport), and promote mixed-use development (integrating residential, work, education, and commercial areas) around urban rail stations. This method not only improves accessibility and connectivity, making commuting more convenient and reducing dependence on private vehicles that cause congestion and pollution, but also encourages the development of compact urban areas, enabling more efficient and sustainable urban infrastructure investments. Furthermore, integrating urban and transport development following the TOD model creates opportunities for public–private investment partnerships in constructing and operating urban rail projects and developing areas around transit stations. This approach helps diversify investment sources for urban rail projects, which currently rely heavily on public funding and concessional loans from international donors.

While the benefits of TOD are widely recognised and many cities around the world have been deploying TOD as a strategy for urban sustainability, TOD has not been practiced in Hanoi. It is foreseen that TOD implementation in the local context will encounter obstacles and challenges spanning across regulatory, institutional, financial, and societal domains, impeding progress, and necessitating comprehensive interventions. The GCIEP Team in Vietnam has systematically assessed issues and challenges to urban sustainability, roles and benefits of TOD, opportunities, and barriers to TOD implementation in the context of Hanoi City. The results form a foundation for further analyses and the development of strategic frameworks and guidelines for TOD projects in Vietnam.

This report presents a diagnostic of the current situation as follows:

- Understanding of the issues and challenges to sustainable urban development.
- Literature review of TOD as a strategic solution to the identified issues and challenges.
- Overview of Vietnam’s existing laws and regulations for urban development projects and identification of regulatory gaps critical for successful TOD development in Vietnam.
- Examination and discussion of barriers to TOD, fragmented governance structure, lack of integrated planning, limited financing mechanisms, and sociocultural challenges of transition to a TOD-focused urban planning and development frameworks.
- Suggestion of actionable insights to overcome the hurdles, paving the way for realising the full potential of TOD.

1.2. Methodology

A combination of methods is used to achieve the objectives and support the conduct of necessary activities.

- **Literature review** for understanding the linkages between TOD and inclusive, low-carbon, climate-responsive spatial planning and public transport (metro) development, and compilation of best practices in TOD implementation.
- **Stakeholder engagement**[2] through workshops and **desk review** for examining relevant aspects (including regulatory/legislative framework, urban planning policy, and strategy, national and sub-national government decision-making dynamics and processes, land ownership dynamics, past and ongoing attempts to implement TOD, etc.).
- **Based on key findings**, a set of robust and context-specific insights are provided to support the crafting of a TOD enabling environment and practically guiding TOD development in Hanoi.

1.3. Structure of Report

This report is structured as follows:

- Chapter 1 introduces the objectives and methodology of the assessment of opportunities and barriers.
- Chapter 2 overviews current issues and challenges of urban sustainability in Hanoi City (urbanisation, urban transport, climate vulnerability and risks, climate protection, and transport emissions).
- Chapter 3 presents TOD as a fundamental solution for sustainable urban development of Hanoi. The literature review postulates the concept, principles, and benefits of TOD. Case studies demonstrate key aspects of TOD implementation and lessons are drawn for Vietnam.
- Chapter 4 summarises opportunities for TOD implementation in Hanoi, including past attempts to implement TOD, national and sub-national policy initiatives for urban railway and TOD development, and identification of specific, existing, and planned transit arteries and station hubs.
- Chapter 5 systematically analyses barriers and challenges to TOD implementation in the city. It comprises a list of general barriers to TOD, an assessment of existing laws and regulations for urban development projects, and key barriers to TOD in the local context.
- Chapter 6 concludes by drawing together all analysis and insights and summarising lessons from elsewhere as suggested recommendations for Hanoi.

2 Including Hanoi Metropolitan Railway Management Board (MRB), British Embassy and experts from the Green Cities, Infrastructure & Energy Programme (GCIEP); Advisory Group for Drafting the Capital Law, Hanoi Central Government; HCMC Management Authority for Urban Railways (MAUR); Transport operators, urban, planning developers, social organisations; International development partners; Universities and research institutes

2. Current Issues and Challenges to Urban Sustainability

This chapter delves into the multifaceted urbanisation challenges that Hanoi encounters, highlighting key issues such as uneven population distribution and the rapid motorisation dominated by motorcycles, which contribute to traffic congestion and environmental degradation. The city's urban transport faces challenges with high travel demand, where private motorcycle usage overshadows the public transport share, affecting connectivity and pedestrian mobility due to obstructed sidewalks. The lack of grade-separated facilities and bypass routes around the city centre further aggravates congestion, while the bus network struggles with overlapping routes and declining ridership, despite new urban rail lines slowly reshaping mobility patterns.

Additionally, climate vulnerability poses significant risks, as Vietnam's medium-risk status underscores its high exposure to natural disasters such as typhoons and storms, and high and increasing greenhouse gas (GHG) emissions, with motorcycles alone emitting 53% of total GHG emissions[3] in Hanoi. Social equity issues also persist, with significant disparities in access to resources, which could be addressed through TOD which integrates high-density housing and public facilities with efficient transport systems. These issues set the stage for a detailed exploration of Hanoi's urbanisation dynamics, with a focus on sustainable development with TOD and social equity improvements.

2.1. Urbanisation Issues

This section offers an in-depth examination of the key urbanisation challenges in Hanoi, focusing on the rapid increase in urban population, uneven distribution of population density, changes in spatial development, transformation of land use from agricultural to urban areas, and vision for urban development approved in the city's master plan. The key findings are as follows:

- Rapid urbanisation in Hanoi has led to significant environmental and nature and biodiversity challenges, exacerbating climate change impacts: The city’s expansion has increased the severity of flood impacts due to inadequate drainage systems and rising sea levels, disrupting transportation and damaging infrastructure. Urban heat islands are becoming more prevalent, with higher temperatures and heatwaves affecting the durability of roads and rail tracks. The surge in vehicle ownership has exacerbated air pollution, impacted public health and reduced transport efficiency. Additionally, urban sprawl threatens biodiversity, as natural habitats are replaced by concrete structures. Addressing these issues requires substantial investment in climate-resilient infrastructure, improved public transport, and stricter environmental regulations, which a TOD approach can help to address.
- **Despite zero poor household, number of near-poor household still requires reduction.** By 2024, Hanoi has eliminated poverty according to the National Multidimensional Poverty Standards for the 2022-2025 period[4], demonstrating the effectiveness of its socio-economic development policies. However, there are still 890 near-poor households with over 2,100 people, primarily concentrated in rural areas, accounting for 0.04% of total households. In contrast, urban areas have only 15 near-poor households, highlighting a significant disparity between these two regions. To address this issue and continue improving the quality of life, the planning and implementation of TOD systems and mixed-use urban development need to be conducted in a coordinated and sustainable manner. This ensures that the benefits from development policies are equitably distributed among different areas and social groups, contributing to poverty reduction and improved living conditions for all residents of Hanoi.
- **Significant population growth in Hanoi in the last decade.** As of 2023, Hanoi has a total population of 8,6 million people, with a density of 2,556 people/km^2. Since 2019, the population has grown by around 500,000 residents, annually growing at 1.49%[5]. Despite the growth, population density per square kilometre has remained relatively stable. The stable density does not fully capture the uneven distribution of population, as urban areas such as Dong Da and Thanh Xuan exhibit significantly higher densities

3 Ngoc, A.M., Nishiuchi, H., Van Truong, N. et al. A comparative study on travel mode share, emission, and safety in five Vietnamese Cities. Int. J. ITS Res. 20, 157–169 (2022).
4 Hanoi announces results in reviewing poor and near-poor households for 2024, Accessed 27/02/2025
5 Hanoi Statistical Yearbook 2023, General Statistics Office

compared to rural districts like Ba Vi and My Duc[6]. This indicates a continued influx of people into urban centres, attracted by economic opportunities and amenities.

Table 2: Population statistics in Hanoi City 2019, 2023

Features	2019[7]	2023[8]
Area (km^2)	3,358.6	3,359.8
Total population (million people)	8,1	8,6
Population density (people/km^2)	2,410	2,556
Urban population rate	49.42	49.06

- **Significant concentration of population in the inner-city areas.** With a population of 3.8 million, the population density in the inner city reaches 12,425 persons/km², which is eight times higher than that of the suburbs. Although the population in the suburbs is higher, at 4.76 million people, the larger area of 3,052 km² results in a population density of only 1,560 persons/km². This indicates that the population is primarily concentrated in the inner-city districts, where the population density is substantially higher than in suburban areas. The high population density in Hanoi's urban core creates significant pressure on infrastructure, leading to increased demand for transportation, utilities, and housing. Meanwhile, the growth of the urban fringe and rural areas necessitates balanced infrastructure development to prevent congestion and ensure sustainable urbanisation across the city.

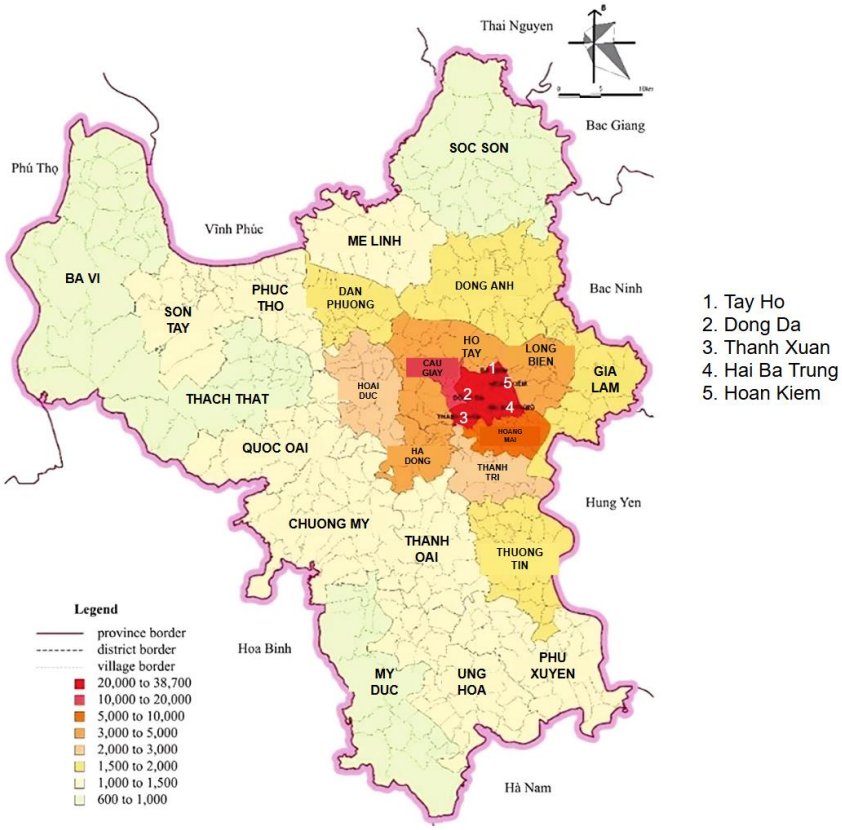


Figure 2: Population density in Hanoi[9]

[6] Hanoi Map and New Hanoi District Map 2025: Updated Guide, Accessed 11/02/2025
[7] Statistical Yearbook of Vietnam, 2019, page 97, 106/1034
[8] Statistical Yearbook of Vietnam, 2023, page 103, 112/1259
[9] A study case of urban heat island intensity based on urban geometry, 2019

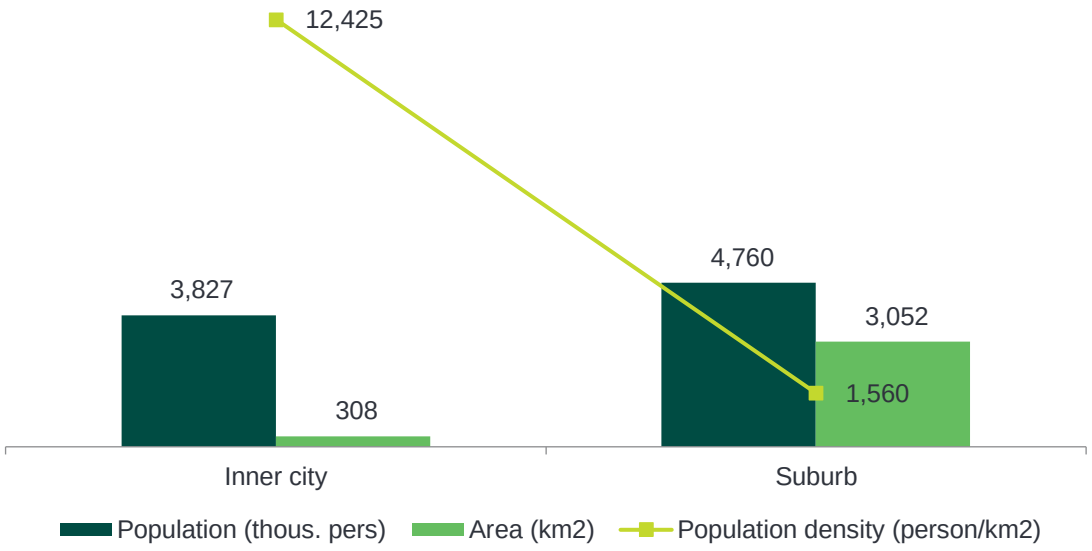


Figure 3: High concentration of population in central districts in Hanoi City, 2023[10]

- Hanoi has a moderate per capita built-up land area, indicating a relatively dispersed urban development pattern while also presenting opportunities for TOD implementation. With 146 m² of built-up land per person, Hanoi falls behind Ho Chi Minh City (229 m²/person) and Kuala Lumpur (230 m²/person) but remains ahead of Jakarta (110 m²/person), Singapore (88 m²/person), and Hong Kong (45 m²/person). This suggests that Hanoi's urban form is still moderately dispersed, though it ranks just behind highly compact cities like Hong Kong and Singapore, which have fully embraced the TOD model. While there is still room for densification, limited land availability necessitates a well-regulated development strategy; otherwise, unplanned urban expansion could reduce the efficiency and effectiveness of TOD initiatives.

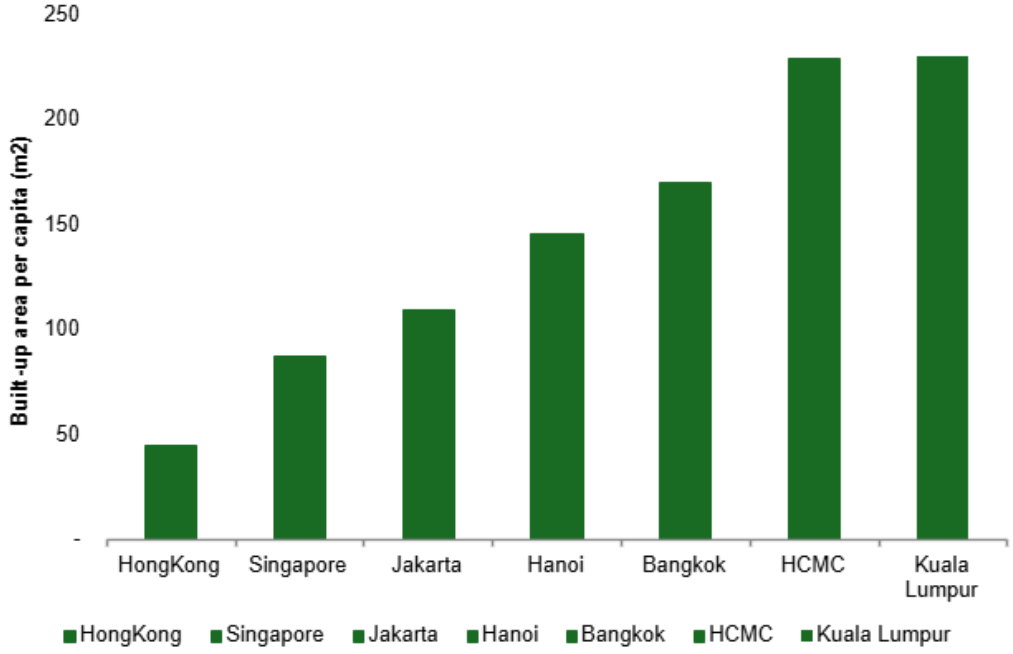


Figure 4: Built-up area per capital of Hanoi compared to other cities in region[11]

[10] Hanoi Statistical Yearbook 2023, General Statistics Office, page 91-92/752
[11] Source: Dermographia World Urban Areas, 19th Annual, 2023

- **Rapid urbanisation over the past 30 years**. The trend of land use conversion is inconsistent across planning periods, with a shift from agricultural land to urban land extending from the centre to the periphery. This transformation was most noticeable in the northern and eastern districts; from 2000-2010 (Figure 4), the trend appeared more in the Southeast and Southwest, and in the most recent period, it seemed more in the North and South directions.
- **Over the 30 years from 1990 to 2020, the area designated for residential land has surged remarkably from 2.98% to 16.77%, underscoring a significant shift towards urban development (Table 3)**. This transformation is a testament to the city's rapid expansion and the increasing demand for urban space. In stark contrast, the area of rice paddies has sharply declined from 52.96% to 29.55%, highlighting the conversion of agricultural land to accommodate urban growth. While there is some growth in forests and aquaculture, their increase is minimal compared to the dramatic rise in residential areas. This rapid urbanisation presents both opportunities and challenges for Hanoi, necessitating sustainable planning to balance development with environmental preservation and infrastructure needs.

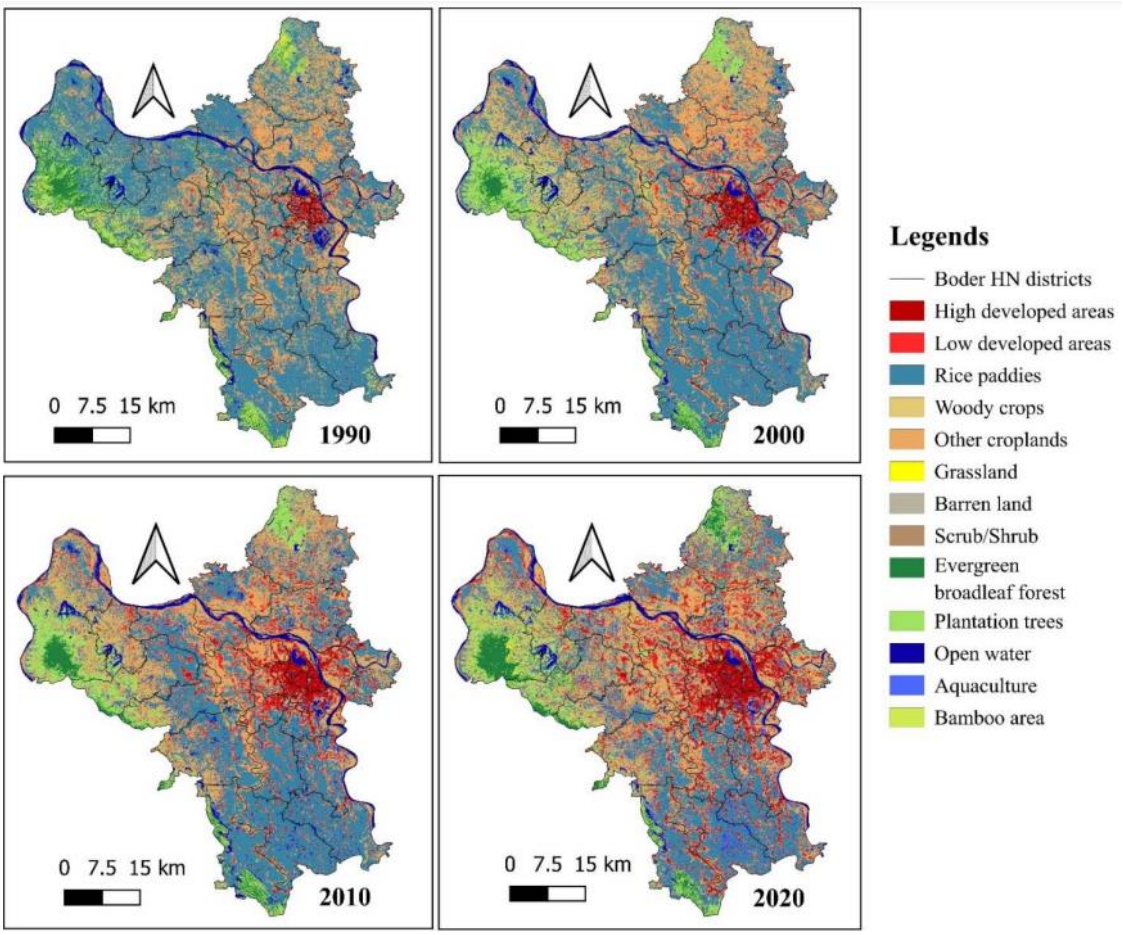


Figure 5: Land Use/ Land Cover classification in Hanoi[12]

Table 3: The results of Land Use/ Land Cover classification in Hanoi from 1990 to 2020[13]

Class	1990		2000		2010		2020	
	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%
Residential land	10,769.04	2.98%	21,522.78	5.96%	40,371.39	11.17	60,615.90	16.77
Rice paddies	191,357.91	52.96	162,092.25	44.86	144,196.38	39.90	106,798.32	29.55

[12] Land Cover Change in Hanoi: A Comparison Between Planning Cycles, page 5/12
[13] Land Cover Change in Hanoi: A Comparison Between Planning Cycles, page 5/12

Class	1990		2000		2010		2020	
	Area (ha)	%	Area (ha)	%	Area (ha)	%	Area (ha)	%
Croplands	107,860.68	29.85	126,692.19	35.06	114,663.06	31.73	117,491.22	32.51
Grassland	3,660.76	1.01	60.57	0.02	85.59	0.02	1,476.63	0.41
Barren land	1,134.36	0.31	258.93	0.07	1,551.87	0.43	2,319.93	0.64
Scrub/Shrub	72	0.02	3.51	0.00	21.06	0.01	95.67	0.03
Forests	32,584.77	9.02	33.233.22	9.20	36,714.06	10.16	43,565.76	12.06
Open water	14,193.54	3.93	15,522.84	4.30	19,673.91	5.44	14,347.44	3.97
Aquaculture	724.32	0.20	1,971.09	0.55	4,080.06	1.13	14,646.51	4.05
Total	361,357.38	100	361,357.38	100	361,357.38	100	361,357.38	100

- **Focusing on developing a multi-centric urban space and key landscape corridors.** The master plan for Hanoi's development until 2045, with a vision to 2065, is approved[14]. This plan aims to alleviate current urban pressures and drive development, positioning Hanoi as a globally connected city on par with other major capitals. A standout feature is the multi-centric urban structure, comprising a central city and satellite towns, separated by green corridors. Each satellite town has specific functions and prioritised investments. The plan notably proposes five main landscape corridors, emphasising the Red River axis, the Nhat Tan - Noi Bai axis, and others, ensuring a harmonious blend of modern development and traditional values. These corridors enhance connectivity, foster economic, social, and cultural development, contribute to a modern and sustainable urban network, and promote a TOD-integrated railway system to improve accessibility and urban design.
- The Hanoi Master Plan for 2021–2030, with a vision extending to 2050, highlights several key aspects including its vision, development perspectives, land-use development plans, and priority development areas, these are detailed as follows:
  - Hanoi is envisioned to become a global city that is green, smart, peaceful, and prosperous, symbolising Vietnam's dynamic and thriving presence on the international stage[15]. The city seeks comprehensive and exemplary growth in its economy, culture, and society, establishing itself as a regional leader comparable to the capitals of developed nations. Hanoi aspires to be an attractive destination for visitors and a place where people want to live and contribute, ensuring that residents enjoy a high quality of life and standard of living. The guiding philosophy includes "Illuminating talent; Liberating intellect; Spreading humanity; Harmonising with nature; Advancing with the times," reflecting a commitment to holistic human and societal development in harmony with nature and contemporary advancements.
  - **The plan prioritises several key areas for development**[16]. The Central Urban Area includes historical inner-city regions and adjacent areas, focusing on preserving and enhancing architectural values for cultural and tourism development. The Northern Expansion aims to develop urban areas north of the Red River, creating a balanced urban space with the river as a central cultural and commercial axis. Satellite cities are also a focus, with the Northern City (Me Linh, Soc Son, Dong Anh) envisioned as a service and high-tech industrial city with international connections, promoting green and modern urban models. The Western City (Hoa Lac, Xuan Mai) will focus on science, technology, and high-quality human resource training, linked to the Hoa Lac High-Tech Park. Son Tay and Ba Vi are planned as cultural and tourism cities, while the Southern City (Phu Xuyen, Thuong Tin) will be an industrial, service, and high-tech agricultural city.
  - **The urban system is organised as a cluster of cities, including a central urban area and radial urban axes**. The plan emphasises developing urban areas with a focus on TOD and ecological urban

[14] Adjusted master plan of Hanoi to 2045 approved, Accessed 18/02/2025
[15] Decision No. 1569/QD-TTg of the Prime Minister: Approving Hanoi Master Plan for the period 2021 - 2030, vision to 2050, page 6/57
[16] Decision No. 1569/QD-TTg of the Prime Minister: Approving Hanoi Master Plan for the period 2021 - 2030, vision to 2050, page 27/57

models, promoting sustainable and efficient urban growth. Besides, it underscores rapid, sustainable, and inclusive development, integrating green and digital transitions, and circular economy principles. It highlights the importance of preserving and promoting Hanoi's thousand-year-old cultural heritage and identity. These elements are designed to position Hanoi as a leading political, cultural, educational, scientific, and economic centre, both nationally and internationally.[17]

- The current context in Hanoi presents several urbanisation challenges, while the Hanoi Master Plan outlines a vision and development strategy to address these issues and guide the city's future growth. From that, several gaps can be identified as follows:
  - The current population trends show a concentration in the inner city, which the master plan aims to alleviate through decentralisation. Achieving this may require more robust policies and incentives to attract residents and businesses to peripheral areas.
  - While the master plan supports TOD, the high current rate of motorisation suggests a need for accelerated implementation of public transport improvements and policies that encourage public transport use over private vehicles.
  - The ongoing rapid urbanisation and land conversion may outpace the implementation of ecological and balanced urban models proposed in the master plan, requiring stronger regulatory frameworks and incentives for climate resilient, low-carbon urban development.
  - Current infrastructure challenges and uneven economic opportunities may hinder the realisation of Hanoi as a globally connected, culturally rich city unless addressed with targeted investments and policies that align with the master plan's cultural and economic objectives.
  - The current environmental issues highlight the need for immediate action to implement the sustainable practices outlined in the master plan, ensuring that urban growth aligns with ecological preservation.

This trend of urban issues leads to significant challenges, including traffic congestion and pressure on infrastructure. As more people migrate to urban centres seeking better economic prospects, the potential for overcrowding and traffic issues is heightened. It calls a comprehensive urban planning and infrastructure development strategy to address key gaps between the current context and the master plan's vision, mitigating existing challenges and promote more equitable, climate responsive growth and development in Hanoi.

In specific, an approach that fosters sustainable urban growth by promoting dense, walkable neighbourhoods centred around efficient public transport systems, thereby reducing reliance on private vehicles and mitigating congestion and pollution. It aids in decentralising population concentration by making peripheral areas more attractive and accessible through superior transit connectivity. Additionally, it's important to integrate land use with transportation planning, guiding urban expansion to preserve green spaces and support balanced growth. By focusing development on transit hubs, it helps to enhance infrastructure efficiency, optimises resource allocation, improves overall connectivity and can also improve the ability of Hanoi to both withstand climate shocks and lower its GHG emissions trajectory.

2.2. Urban Transport Issues

This section provides a comprehensive overview of key urban transport challenges in Hanoi, focusing on existing travel demand, private vehicle ownership, road network, non-motorised transport facilities, performance, and approved plan of public transport services. The key findings are as follows:

- **Increased travel demands due to population growth and rapid economic development in Hanoi.** By 2023, Hanoi's population reached 8.58 million people and a population density of 2,555 people/km², occupied 8.5% national population, ranked as the second highest population city in Vietnam[18], and is expected to rise to over 13.5 million by 2050[19]. The city's gross regional domestic product (GRDP) at its current price in 2023 reached $51.1 billion, with an annual growth rate of 8.55% from 2015 to 2023, contributing 11.8% to the national GRDP and GRDP per capita reached

[17] Decision No. 1569/QD-TTg of the Prime Minister: Approving Hanoi Master Plan for the period 2021 - 2030, vision to 2050, page 3, 4/57
[18] Hanoi Statistical Yearbook 2023, General Statistics Office
[19] Chinhphu.vn, 2024, General Planning for 2021-2030 period passed, Accessed 14/12/2024

$5,954. As a result, the daily travel demand in Hanoi nearly doubled over the past decade rising from 6.3 million daily trips in 2007[20] to 10.6 million daily trips in 2014,[21] and is estimated to reach 18.2 million daily trips by 2023 (excluding walking trips and non-motorised transport).

Table 4: Growth in daily trips in Hanoi

Trip Type	No. of daily trips (000/day)		
	HAIDEP Study, 2007[22]	METROS Study, 2015[23]	Estimated 2023 daily trips[24]
Including walk trips and non-motorised transport	8,513	n/a	n/a
Excluding walk trips and non-motorised transport	6,340	10,571	18,250

- **Motorcycle use dominates the modal splits while public transport accounts for a small share of total travel.** Among the 10.6 million daily trips (excluding walking), motorcycles represent the predominant mode of travel with over 72% of the mode share. Public transport accounted for only around 10% of total travel demand in 2014 and decreased slightly to around 9% in 2020, despite the introduction of the new BRT-1 in 2017. Meanwhile, the car mode share increased slightly from 6% in 2014 to 7% in 2020. It is noted that official statistical data on the mode share of the two newly operational urban rail lines (BRT-2a, MRT-3) is not yet available. Their contribution is expected to significantly increase the public transport mode share in Hanoi and reduce GHG emissions from the transport sector over time.

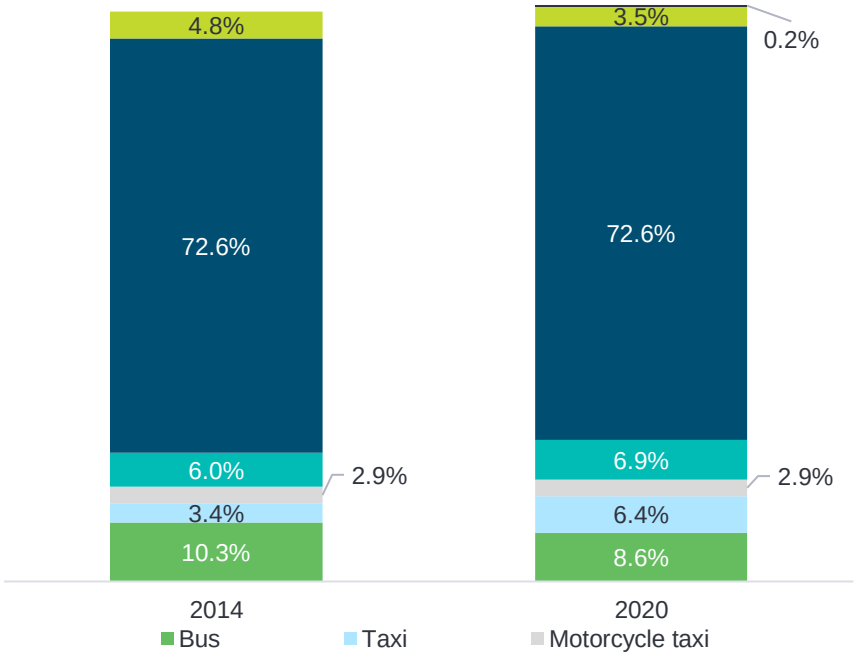


Figure 6: Changes in transport modal splits in Hanoi[25]

[20] The Comprehensive Urban Development Programme in Hanoi Capital City of the Socialist Republic of Vietnam (HAIDEP), JICA 2007
[21] Data Collection Survey on Railways in Major City in Vietnam (METROS), JICA 2015
[22] The Comprehensive Urban Development Programme in Hanoi Capital City of the Socialist Republic of Vietnam (HAIDEP), JICA 2007
[23] Data Collection Survey on Railways in Major City in Vietnam (METROS), JICA 2015
[24] Estimated by the GCIEP team based on Hanoi's 2023 population of individuals over five years old, with an estimated daily trip rate of three trips per day from the METROS study
[25] Source: A comparative study on travel mode share, emission, and safety in five Vietnamese cities, A.M Ngoc et al. 2021

- **Motorbikes are often used for short trips due to their flexibility and greater accessibility in narrow areas in Hanoi**[26]. The convenience and advantages of motorcycles for short-distance travel and their flexibility in narrow streets may contribute to the infrequent use of public transportation among residents. Although conventional motorcycles currently contribute significantly to air pollution emissions in Hanoi and shifting to public transportation and non-motorised transport and the adoption of electric motorcycles, should be encouraged towards sustainable urban mobility. In practice, when implementing the TOD model, non-motorised and public transport modes for first- and last-mile connectivity to/from transit stations are prioritised. However, in central areas with narrow street networks, where pose coverage challenges for feeder bus services, integrating electric motorcycles as a feeder mode to railway stations should be considered to enhance first-mile and last-mile connectivity in these areas. However, this reliance on motorbikes also poses challenges in improving access to public transport services for vulnerable groups, including the elderly, people with disabilities, and children.
- **Growing shift from motorcycles to cars resulting in worsening traffic congestion.** According to statistics from the Hanoi Department of Transport, by 2023, there were over 8 million registered vehicles in the city, which includes 1.2 million cars (140 cars/1,000 population) and more than 6.7 million motorbikes (140 motorbikes/1,000 population), which together account for 73% of all vehicles on Hanoi's roads with an average growth rate of 10% cars/year and 3% motorcycles/year[27]. Although motorcycles have dominated the roads in the last several decades, recent data evidenced by the increased car ownership rates, indicates a growing shift toward cars as a preferred mode. The increased private car ownership rate and the shift from motorcycles to cars in Hanoi is driven not only by increasing income levels but also by the absence of effective policies regulating private vehicle use in central areas, such as congestion charges and increased parking fees or restricting private vehicle parking spaces. This has resulted in the overload of the urban transport infrastructure and further exacerbated the worsening traffic congestion in Hanoi. Moreover, although the recent trend of shifting to electric vehicles (EVs) in Hanoi and other cities in Vietnam is expected to contribute positively to reducing air pollution and noise emissions from road traffic, the issue of traffic congestion remains fundamentally unchanged, as private EVs still occupy road space equivalent to those with internal combustion engines (ICEs).

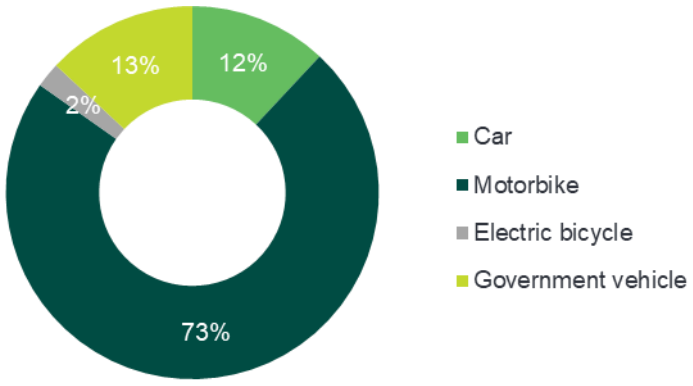


Figure 7: Proportion of registered vehicle types in Hanoi, 2023[28]

- **Various new modes of transportation have been introduced in Hanoi**. In addition to traditional transport modes, which account for most trips in the city, such as private cars and motorcycles, Hanoi has also deployed several alternative transport modes, including shared electric cars and motorbikes. Ride-hailing services like Grab Bike/Car and Xanh SM offer convenient online booking, enhancing mobility for residents. However, these services also contribute to increased road congestion due to empty-vehicle circulation while picking up passengers and pose competition to public bus services due to their affordability and convenience. Additionally, a bike-sharing service has been introduced in central areas and around metro stations. By the end of 2024, there were nearly 100 electric bike rental stations with more than 700 bicycles, enabling users to make seamless cashless payments through mobile

[26] Data Collection Survey on Railways in Major City in Vietnam (METROS), JICA, 2015
[27] Ministry of Transportation website, accessed on 16 February 2025
[28] Source: Hanoi Department of Transport

applications. This initiative is considered a sustainable solution to reduce pollution and provide first- and last-mile connectivity for public transport users. However, integrated information and fare systems with the urban rail network have yet to be implemented, creating barriers for public transport passengers who could otherwise benefit from incentives when using shared bicycle services.

- **Sidewalks are lacking and often obstructed by motorcycle parking and vendors, exacerbating pedestrian mobility issues.** Most major roads in Hanoi's urban areas are equipped with pedestrian facilities, including paved sidewalks, zebra crossings, marked crossings, and street lighting. Sidewalks within the city are typically made of asphalt or concrete and range in width from 4 to 5 metres. However, the quality of these sidewalks varies across different areas. However, like other cities in Vietnam, sidewalks in Hanoi are often obstructed by illegal motorcycle parking, vendors, and other sidewalk business activities, reducing the available pedestrian space and potentially forcing pedestrians into the roadway. This issue limits walkability and access to bus stops and urban railway stations of people, especially for people with disabilities and vulnerable groups such as the elderly and children. Access to stations is a key element of TOD model, with a focus on enhancing active mobility facilities. This can be achieved by improving existing pedestrian infrastructure, ensuring safe, convenient, and efficient access to transit stations for all users.

Figure 8: Sidewalks in the Hanoi CBD area occupied by vendors

Figure 9: The improved sidewalk along MRT-3 (Nhon – Ha Noi railway station)

- **Narrow roads in CBD areas and low road density in suburban areas relative to planning standards**. Narrow roads remain prevalent within the CBD area, where the average road density is approximately 5.94 km/km², occupying 11.38% of the total CBD land area, which is lower than the minimum of 20-26% required in the planning code. According to the 2030 Hanoi Transport Master Plan, around 70% of roads in the CBD are less than 11 metres wide, with some as narrow as 5 metres. In suburban areas, road density is relatively low, less than 1.0 km/km², causing traffic to concentrate on key corridors leading to and from the urban core. This results in significant congestion on these roads and delays for vehicles travelling to and from the city centre. The renovation and upgrading of roads in central areas, as well as the expansion of arterial roads, often face challenges related to land acquisition and high investment costs. As a result, the traditional approach of road widening is often unfeasible, necessitating alternative solutions to optimise the existing transport system. Alternatives include providing high-capacity transit routes, restricting private vehicle use, promoting non-motorised transport - especially in narrow road areas that face challenges in expanding to accommodate motorised traffic, and developing a vertically integrated transportation and land-use system instead of horizontal expansion.
- **Lack of grade-separated facilities and bypass routes in the city centre, exacerbating congestion**. The provision of grade-separated facilities is limited, meaning that many major and congested intersections are at-grade, leading to additional congestion and delays. This situation also results in vehicle and pedestrian interactions at junctions, increasing the risk of accidents. Furthermore, the existing ring road network lacks adequate bypass routes to avoid the congested city centre. Consequently, vehicles are still required to pass through the city centre before reaching their destinations. This has led to severe traffic congestion, especially during peak hours. Consideration and analysis of the planning and hierarchical classification of different road types (i.e., railways and roadways), traffic flows (i.e., local and through traffic), and transport modes (i.e., passenger vehicles, freight transport, and non-motorised transport) would likely enhance traffic flow, reduce congestion, and improve road safety. The TOD model emphasises the development of mass rapid transit systems while promoting accessibility to stations

through active transport modes and efficient first- and last-mile connectivity. This approach would help optimise the use of existing infrastructure, facilitate seamless multimodal integration and alleviate congestion in the city.

- **Bus network is overlapping, especially in the city centre, and lack of rapid transit services connecting satellite cities.** As of 2022, the public bus service in Hanoi comprises 154 routes operated by 2,288 vehicles, of which 13.6% are compressed natural gas (CNG) and electric buses. Most buses in Hanoi have high floors and inappropriate bus stop platform design, making access difficult, especially for disabled individuals and wheelchair users. The network includes 132 subsidised bus routes (including 1 BRT route), 8 non-subsidised bus routes, 12 interprovincial bus routes, and 2 city tour routes. Bus network coverage is most dense in the urban core, which also coincides with the highest-density population areas. Numerous routes operate along the same corridors within the urban core. Outside of the urban core in areas, coverage is typically limited to a single route per district. Bus service in these areas is typically concentrated on major radial corridors and lacks rapid transit service connecting to planned satellite cities. The Hanoi bus network is formed by the development of a monocentric and dispersed urban area, which results in service overlap and competition between routes. Additionally, the routes mainly provide direct connections between two origin and destination points while lacking a hierarchy between trunk routes and feeder routes. This leads to longer travel times and reduces the attractiveness to passengers. Studies on restructuring the bus network in Hanoi to enhance integration with newly operational urban railway lines have been conducted, for example, the World Bank Study in 2019. In fact, bus routes along the MRT-2A and MRT-3 corridors have been adjusted in terms of both routes and services to improve connectivity with the railway system.
- **Decline in bus ridership.** Bus ridership in Hanoi experienced the highest growth during the period from 2013 to 2014, reaching approximately 450 million passengers per year. However, it significantly declined to around 120 million passengers per year in 2021 and recovered, reaching about 200 million passengers per year in 2022. Although there have been no significant adjustments to the route network or reductions in service frequency (except for the Covid-19 period of 2021-2022), fares have not been revised, even the bus fleets have been upgraded, including the introduction of electric buses during this period. Therefore, this decline can be explained by the increase in private motorcycle use, rising private car ownership rate, competition from ride-hailing services (i.e., Grab, XanhSM), and traffic congestion, which increases travel time for passengers, while there is a lack of infrastructure prioritising buses. Additionally, limitations in pedestrian infrastructure and non-motorised transport facilities also contribute to reducing the attractiveness of bus services, leading to a continued decline in ridership in recent years.

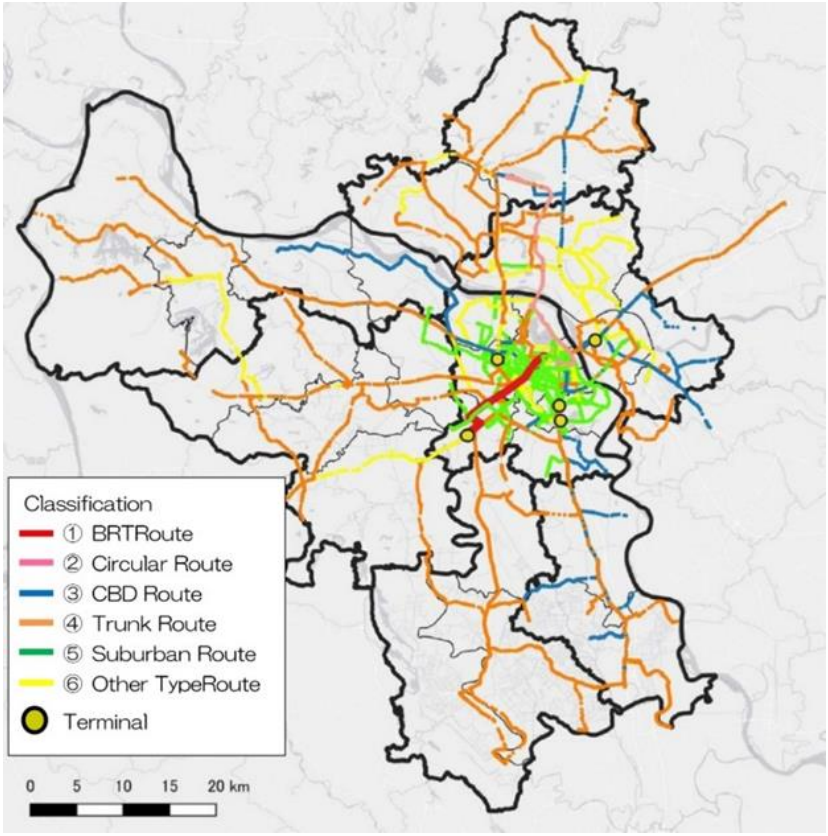


Figure 10: Existing bus network coverage in Hanoi[29]

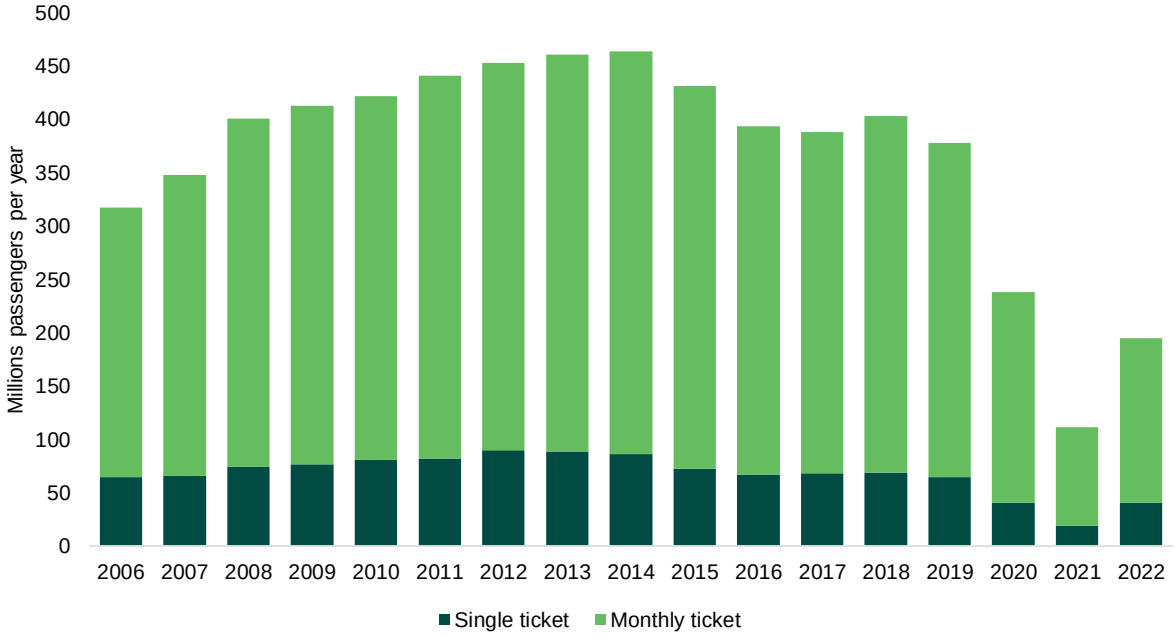


Figure 11: Changes in bus ridership in Hanoi from 2006 to 2022[30]

[29] Preparatory survey on Hanoi public transportation management and operation improvement project, JICA 2021
[30] Source: TRAMOC 2023

- Newly operational urban rail lines are gradually reshaping Hanoi's urban mobility, however, there is an urgent need for improving network connectivity for sustainable operation. The urban rail system in Hanoi currently consists of two operational lines connecting the city centre to the suburbs. Line 2A (Cat Linh – Ha Dong) extends 13.05 km with 12 stations, linking the central area to the southwest. Line 3 (Nhon – Cau Giay section) spans 8.5 km with 8 stations, connecting the city centre to the western area. Line 2a serves approximately 35,000 passengers daily, of which 47% are commuters, 45% are students, and 8% travel for other purposes. These two MRT lines have changed the daily vehicle usage of individuals along corridors towards sustainable transport modes. However, the network consists of only two lines with limited seamless integration with the public transport system and multimodal transport modes, in term of physical facilities, information and fares. Key challenges include insufficient connectivity facilities around stations, dispersed travel demand, and lacking integration with land-use development along the corridors as part of the TOD model. These factors hinder the efforts of MRT services to attract regular passengers for daily commuting.

Figure 12: Traffic condition and land-use development along MRT-2a

Figure 13: Traffic condition and land-use development along MRT-3

- **Severe road traffic congestion and increased travel times result in a huge economic loss.** According to the Hanoi Department of Transport (DoT) in 2024, Hanoi has 33 locations (including congested intersections and road segments) where traffic congestion (without indication of level of service – LOS threshold) occurs frequently. Although the Hanoi DoT has proposed measures to reduce the number of congested locations to 20 locations by the end of 2024, traffic congestion was still increasing in the other 16 locations due to the increased travel demand and construction of various road infrastructure improvements. According to data from the Hanoi Public Transport Management Centre (TRAMOC), the average travel speed of buses in Hanoi is currently 22.1 km/h. Within the city centre, the average speed is only 16.6 km/h, while in suburban areas, it reaches 26.8 km/h. Notably, during peak hours, the operating speed of buses in the city centre decreases to just 12.7 km/h. According to the Transport Development and Strategy Institute (TDSI), the economic losses due to traffic congestion in Hanoi are from 1 to 1.2 billion USD per year.
- Comprehensive traffic demand management measures for the central area have been proposed but have not been implemented due to concerns regarding the capacity of the existing public transport system. Several traffic demand management policies in the central area of Hanoi have been considered, as outlined in Decision No. 5953/QD-UBND on "Strengthening the management of traffic vehicles to reduce traffic congestion and environmental pollution in Hanoi for the period 2017-2020, with a vision towards 2030". Accordingly, in parallel with enhancing the capacity of the public transport system, Hanoi plans to restrict motorcycles on certain major arterial roads/zones, moving towards a complete ban on motorcycles in the central area by 2030. Other proposed measures include congestion charge in the central area, adjustments to school and work schedules, parking management, and the application of information technology in traffic monitoring and control. However, due to delays in the implementation of urban railway projects and the limited capacity of the bus system, the proposed measures have not yet been put into practice. Therefore, given the current process of urban railway project implementation, the capacity of the public transport system in Hanoi is unlikely to see significant improvement by 2030. As a result, sustainable traffic management plans will be difficult to implement, further exacerbating traffic congestion and environmental pollution caused by transportation activities in Hanoi in the coming years.

- **Hanoi is among the top ten most polluted cities:** According to IQ air quality report[31] Hanoi ranks among the ten most polluted cities. Notably, Tay Ho District is ranked the second most polluted area, just after South Tangerang, Indonesia. This is alarming due to the detrimental effects of GHG emissions on human health.

Most Polluted Regional Cities

Rank	City	2023
1	South Tangerang, Indonesia	71.7
2	Tay Ho, Vietnam	61.5
3	Tangerang, Indonesia	54.1
4	Chiang Rai, Thailand	50.8
5	Pai, Thailand	50.3
6	Hoan Kiem, Vietnam	50.2
7	Bekasi, Indonesia	49.9
8	Wiang Phang Kham, Thailand	43.9
9	Jakarta, Indonesia	43.8
10	Hanoi, Vietnam	43.7
11	Pong Yang Khok, Thailand	40.1
12	Nai Wiang, Thailand	39.9
13	Bandung, Indonesia	39.6
14	Wiang Nuea, Thailand	39.4
15	Nong Jom, Thailand	38.1

Figure 14: Most Polluted Regional Cities Ranking

- **Air pollution in Hanoi negatively affects people's health**. In 2024, the Air Quality Index (AQI) was measured at 141. This level is classified as "unhealthy for sensitive groups". It is advised that active children and adults, as well as individuals with respiratory conditions such as asthma, may consider limiting prolonged outdoor exertion. Notably, the air quality map highlighted that the most polluted area in Hanoi on this date was at the United Nations International School, with an alarming AQI of 170. This red alert poses significant health risks for children and youth attending the school, raising concerns about their well-being in such an environment.

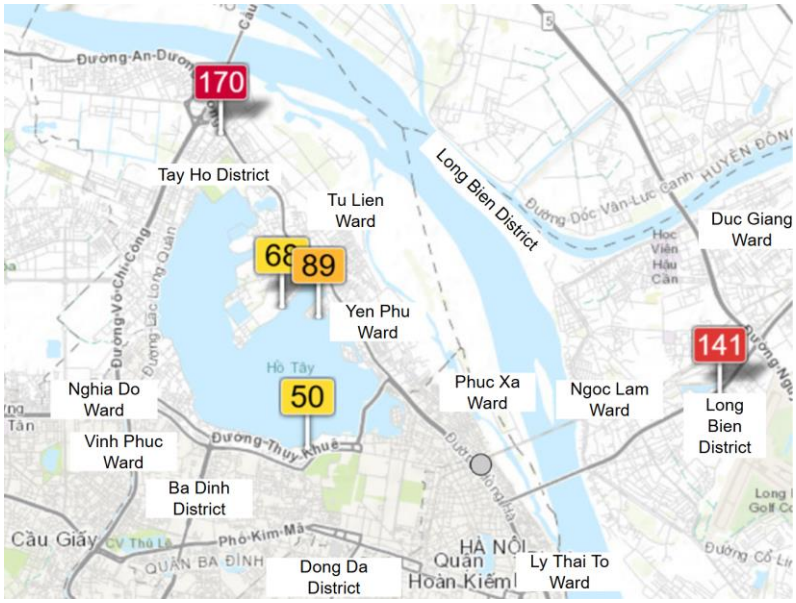


Figure 15: Hanoi Air Pollution Map: Real-time Air Quality Index (AQI) on 16/12/2024[32]

[31] IQ Air, World Air Quality Report, 2023, page 15/45
[32] IQAir, Accessed 16/12/2024

- **Road transport contributes the largest source of PM2.5 emissions in Hanoi.** The main sources of PM2.5 emission - referring to fine particulate matter with a diameter of 2.5 micrometres or smaller, are varied, with industrial activities being the largest contributor at 29%, followed by open burning of rice straw at 26%. Road transport accounts for 38% of the emissions, exacerbated by the city's heavy traffic and emissions from numerous vehicles. The remaining portion comes from residential and commercial combustion, craft villages, and waste management. These diverse sources underline the complexity of Hanoi's air pollution issues, necessitating targeted and multifaceted approaches to improve air quality.

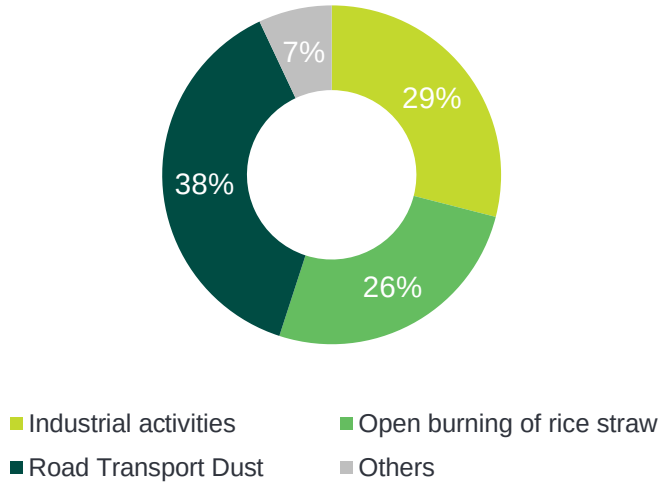


Figure 16: Hanoi primary PM2.5 sources in Hanoi[33]

- **Traffic noise pollution in Hanoi exceeds the national noise level standard**[34]**.** The number of light vehicles, mainly motorcycles, is predominant compared to heavy vehicles such as trucks and other four-wheeled vehicles (Figure 17). Although the number of light vehicles is higher, both types of vehicles generate significant noise throughout the weekdays, with a sharp decrease on weekends. The average noise level in Hanoi exceeds the Daytime Noise Level Standard retrieved from QCVN 26:2010/BTNMT of 70 dB, indicating that traffic noise pollution contributes considerably to this situation. Additionally, noise from industrial zones and construction sites in the city are also other sources of sound pollution. While lower than Ho Chi Minh City's level, which reaches 103 dB, both cities generally face major challenges with this issue. This data underscores the necessity to raise awareness, conduct research, and seek solutions to address noise pollution in major cities in Vietnam.

[33] World Bank, Hanoi air quality, page 10/36
[34] Noise pollution in developing countries: Loopholes and recommendations for Vietnam law, page 3/19

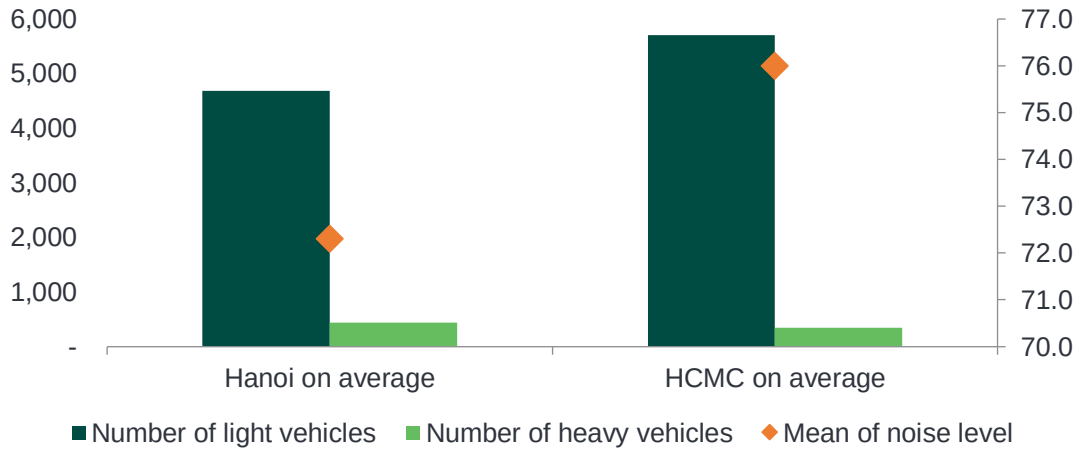


Figure 17: Noise Pollution from many Vehicles into Average of HCMC and Hanoi

- **The number of traffic accidents in Hanoi has been rising after the Covid-19 period, with most involving motorcycles**. According to Hanoi Department of Police, between 2018 and 2022, the number of road traffic accidents in Hanoi exhibited a downward trend, decreasing from 1,365 cases to 612 cases, primarily due to reduced travel demand and mobility restriction policies during the Covid-19 period. However, an increasing trend has now been observed. In the first six months of 2024, a total of 805 traffic accidents were recorded, resulting in 339 deaths and 688 injuries. Compared to the same period in 2023, this represents an increase of 227 cases (39.27%), 8 additional deaths (2.42%), and 301 more injuries (77.78%). Motorcycles were the predominant type of vehicle involved in accidents, accounting for 61.62% of all cases (including both at-fault and involved vehicles), followed by cars at 32.68%, with the remaining cases involving other types of vehicles. These issues further underscore the importance of developing safer public transportation systems, particularly mass transit along major corridors, as an alternative to motorcycles for long-distance travel. Such developments will contribute to the establishment of a safer and more user-friendly transport network.
- **Ambitious city plan to develop a mass rapid transit system to cater to 30-40% of total travel by 2030**. The city aims to increase the public transportation share to 30-40% of total travel according to Decision 1569/QD-TTg issued in 2024, which approves the Hanoi Capital Planning for the period 2021-2030 with a vision to 2050. This is envisioned to be achieved by investing in 14 urban railway lines, totalling 550 km in length, along with 2 light rail lines (monorail), which increased by 220 km compared to the previous 2030 Hanoi transportation master plan (Decision No. 519/QD-TTg, 2016). The objective is to complete 10 of these lines with a total length of 418 km, by 2035. Although this ambitious plan is supported by strong political determination, several challenges in its implementation are as follows: (i) Urban railway projects require substantial investment; however, available funding is limited; (ii) Public projects fail to attract sufficient private investment; (iii) The approval process for project plans and policies is complex and time-consuming; (iv) Issues related to land acquisition, compensation, and resettlement; (v) The lack of established technology and standards for urban railways; (vi) Inadequate integration of planning with other modes of transport and land use. Thus, the city is focusing on solutions that include securing diverse funding sources, attracting private investment through incentives, and streamlining the approval process. Key measures also involve addressing land acquisition issues, establishing standardised technologies, and improving integration with other transport modes, alongside integrating land use and transportation planning to ensure that urban development supports and enhances the transportation system.

BOX 1 – KEY DEVELOPMENT STRATEGIES IN THE HANOI 2030 TRANSPORTATION MASTER PLAN (DECISION 1569/QD-TTG)

Targeted public transport mode share: The public transport system aims to meet 30–40% of urban travel demand.

Road transport infrastructure development: Complete the expressway network by constructing, upgrading, and renovating national highways. Additionally, urban traffic corridors are planned to be developed and completed, ensuring the closure of ring roads and establishing new routes to enhance connectivity between Hanoi and neighbouring provinces and cities.

Public transport development:

- Develop a comprehensive public transport system to meet daily travel demand, including new transit routes, especially interregional lines, ensuring seamless intermodal integration to reduce the use private vehicles, allocating land for developing charging stations for EVs and public bike-sharing stations.
- Invest 14 urban railway lines including 12 MRT and 2 monorail lines, with priority on routes connecting the inner city to airports, high-tech zones, urban areas, major transport hubs, and areas with high travel demand, as well as integrating the urban railway network with key provincial centres in the region.
- Develop the Ngọc Hoi transit complex, comprising a terminal, depot, and maintenance facilities for high-speed rail, national rail, and urban rail systems, optimising passenger transfers between the Ngoc Hoi complex and Hanoi's city centre.
- Develop of new interprovincial bus terminals, aligning with the urban expansion and development process.

The urban railway station network in central areas will be rationally distributed, aligning with the urban renewal and development strategy following on TOD model. Additionally, multimodal transport systems are expected to be promoted at urban railway stations to enhance connectivity and accessibility.

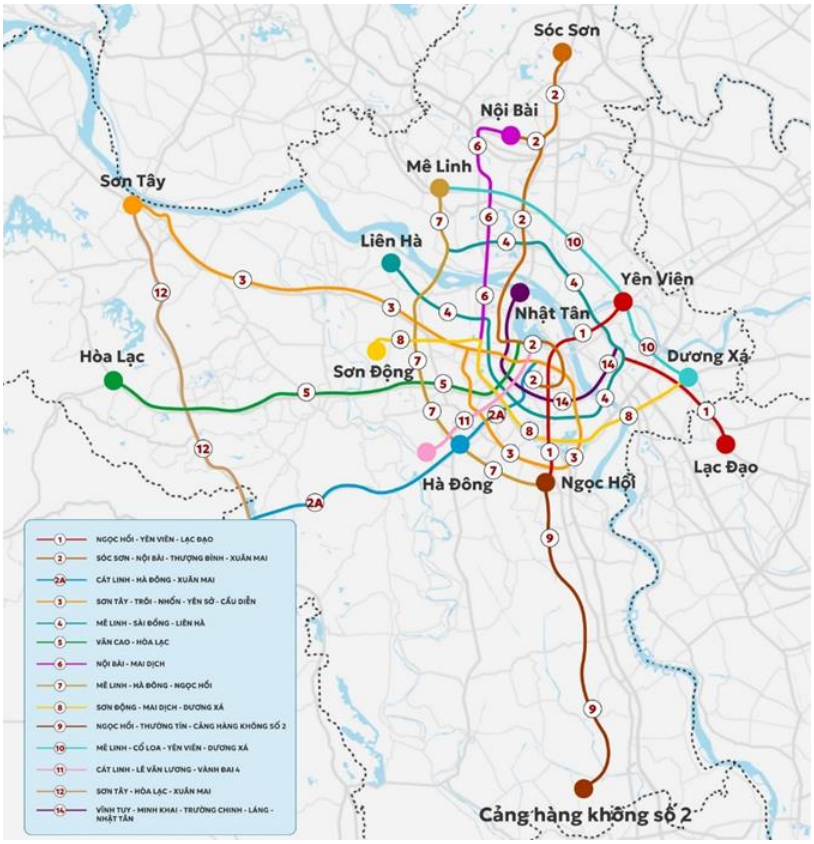


Figure 18: Map of Planned urban railway network in Hanoi[35]

[35] Decision 1569/QD-TTg in 2024

Hanoi's rapid population growth, economic expansion, and increasing private vehicle ownership, particularly motorcycles and cars, have led to severe traffic congestion, and air and noise pollution, especially in the city centre. Without adaptive solutions, such as flexible traffic management measures, the integration of land use and transport facilities, this congestion is likely to worsen, further undermining the city's mobility and economic efficiency. The slow progress in implementing urban railway projects, the limited capacity of bus routes with overlapping networks, and the lack of infrastructure for pedestrians and non-motorised vehicles have worsened the situation, making it difficult to implement traffic demand management solutions such as restricting private vehicles.

To address these challenges in the short term, it requires: (i) Accelerating the construction progress of railway projects that have already been initiated; (ii) Restructuring and enhancing the capacity of the bus system, ensuring seamless integration with operational urban railway lines - including infrastructure, scheduling, fare systems, and payment technology integration including smart card ticketing system; (iii) Implementing traffic demand management measures, such as restricting the circulation of motorcycles and private cars by time, routes, and vehicle types, as well as managing parking demand (i.e. limiting parking spaces to reduce private vehicle usage) in central areas; (iv) Deploying information technology in traffic management and control, intelligent transportation system.

In the long term, together with the development of a mass rapid transit system, it is essential to optimise the transport system through the land use and transport integration approach, which can reduce the number and daily trip lengths by encouraging mixed-use developments around urban rail stations. This approach is expected to improve accessibility and connectivity, while also contributing to sustainable urban growth, reduce dependence on private vehicles, and help achieve Hanoi's goal of significantly increasing public transport use by 2030, ultimately also reducing Hanoi's exposure to present and future climate shocks, improving both the environment and the economy.

2.3. Climate Vulnerability and Risks

Hanoi is particularly vulnerable to climate and environment risks such as flooding, heat waves, and air pollution. Seasonal floods, exacerbated by inadequate drainage systems, disrupt daily life and damage critical infrastructure. Meanwhile, rising temperatures pose significant threats to public health, specifically with findings such as those below:

- **Vietnam remains vulnerable to natural disasters due to its geography and climate**, **ranking 79th out of 194 countries.** The INFORM Risk Index[36], released on August 31, 2024, places Vietnam in the medium-risk category, an increase from 91st in 2019. Hanoi has committed to reducing GHG emissions by 12.14% by 2025 and 18.71% by 2030 (Hanoi Green Growth Action Plan 2020) and strives towards greater improvement of the environment and maintaining ecological balance. It also strives towards efficient and sustainable utilisation of resources to achieve environmental standards (Hanoi Climate Adaptation Plan). Government at both national and city levels is working on strategies to enhance resilience, lower emissions and improve disaster preparedness, but challenges persist, including with diverse disasters like typhoons, floods, and landslides. As Vietnam develops economically, balancing growth with sustainable practices is crucial.

[36] This index assesses global disaster risk to aid in crisis management.

Table 5: INFORM Risk Index Ranking 2025[37]

No.	COUNTRY	RANK	INFORM RISK	RISK CLASS
1	Myanmar	11	7.2	Very High
2	Philippines	35	5.4	High
3	Indonesia	45	4.8	Medium
4	Thailand	51	4.4	Medium
5	Cambodia	56	4.3	Medium
6	Vietnam ☆	79	3.7	Medium
7	Malaysia	115	2.9	Low
8	Brunei Darussalam	144	2.4	Low
9	Singapore	191	0.7	Very Low

- **Vietnam experienced numerous disasters, highlighting the close connection with climate change and global GHG emissions.** In 2023, Vietnam experienced over 1,100 natural disasters, resulting in 166 deaths and about 8.23 trillion VND in losses[38] due to rising global temperatures and emissions. The government has implemented real-time warning systems to mitigate impacts. The National Centre for Hydro-Meteorological Forecasting reported numerous storms, heatwaves, and heavy rains, highlighting the need for better forecasting and response strategies. Remarkably in 2024, Typhoon Yagi, the strongest in 30 years, caused $1.63 billion in damages across 26 northern localities, affecting millions and reducing gross domestic product growth by 0.15 percentage points. This underscores the need for improved urban planning and design to create more resilient cities and protect communities and infrastructure from climate change threats.

Figure 19: Yagi flooded area on the outskirts of Ha Noi[39]

These increasing climate-related challenges necessitate the development of robust and resilient infrastructure with high durability. Through land use and transport integration to address the urban and transport development issues, Hanoi's resilience can be significantly enhanced toward climate challenges, particularly flooding and heat waves. By concentrating development around transit hubs, it helps to reduce urban sprawl and minimises impervious surfaces, which are major contributors to flooding. Incorporating green infrastructure like permeable pavements and green roofs helps manage water absorption, reducing runoff and protecting infrastructure from flood damage. Additionally, this may enable to mitigate the urban heat island effect by promoting compact, walkable neighbourhoods that decrease vehicle reliance, subsequently lowering

[37] INFORM Risk Index Ranking 2025
[38] Vietnamplus.vn, Over 1,100 natural disasters hit Vietnam in 2023, Accessed 14/12/2024
[39] Baochinhphu.vn, Vietnam receives over US$22 million in aid for Yagi Typhoon relief efforts, Accessed 14/12/2024

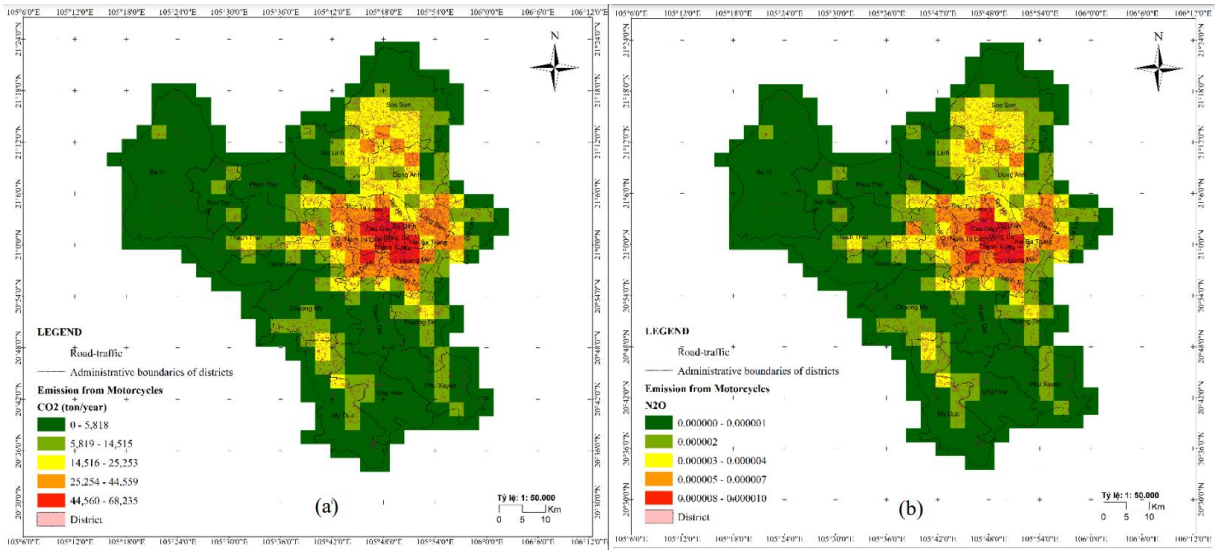
emissions and traffic-generated heat. The integration of green spaces within public transportation hubs further cool the urban environment, enhancing liveability and reducing public health risks associated with rising temperatures.

Moreover, the integration of urban development around public transport station can improve air quality by reducing dependence on personal vehicles, thereby decreasing pollution. This not only benefits public health but also makes the city more appealing for residents and businesses. The comprehensive urban and transport planning strengthens Hanoi's resilience to natural disasters by ensuring robust transportation networks and resilient infrastructure, crucial for maintaining essential services during extreme weather events. Overall, this strategic approach offers a holistic approach to addressing climate vulnerabilities in Hanoi, supporting sustainable development and climate adaptation efforts.

2.4. Climate Protection and GHG Emissions

GHG emissions and climate change are becoming pressing issues for Hanoi and Vietnam as a whole. The rapid urbanisation and industrial growth have contributed to increased emissions, exacerbating environmental challenges. These challenges require governments to urgently address to maintain sustainable future growth for the whole country.

- Motorcycles are the most common mode of transport in Vietnam, emitting nearly 4.6 million tonnes of CO_2 equivalent annually in Hanoi. Emissions are concentrated in inner-city districts and areas intersecting with major roads and industrial parks (Figure 20). The transportation sector, crucial for Hanoi's development, poses challenges as a major greenhouse gas emitter, with road transport accounting for 95% of emissions in 2016. The spatial distribution of emissions shows higher emissions in areas with high traffic density, suggesting that restricting motorcycles in certain areas could reduce emissions. According to a 2021 study on travel mode share, emissions, and safety in five Vietnamese cities, by 2020, emissions from transportation had increased by 35%, passenger motorcycles are identified as the primary source of GHG emissions, contributing to 53% of the total emissions. Furthermore, motorcycles are responsible for 68.3% of PM2.5 emissions and a staggering 83.5% of NOx emissions. This data underscores the critical need for targeted policies and interventions to manage motorcycle emissions and promote sustainable transportation alternatives in Vietnam.



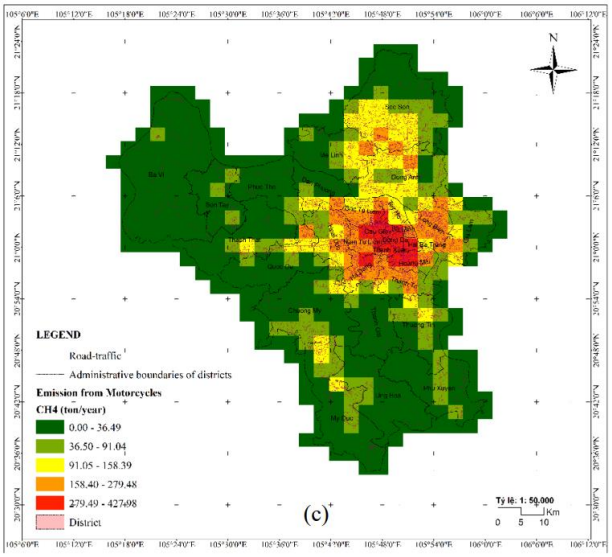


Figure 20: Visualise GHG emission distribution from Motorcycles in Hanoi with a) CO_2, b) N_2O and c) CH_4 (data range 2021-2023)[40]

- **Per capita CO_2 emissions remain significant and are increasing.** Vietnam's per capita CO_2 emissions rose from 2.3 tonnes in 2015 to 3.3 tonnes in 2023, with peaks of 3.5 and 3.7 tonnes in 2019 and 2020. This upward trend contrasts with the relatively stable global average of 4.6 to 4.8 tonnes. By 2023, Vietnam's emissions neared the global average, reflecting a concerning trend. Total annual CO_2 emissions increased from 213 million tonnes in 2015 to 335 million tonnes in 2023. This rapid rise has sparked discussions on government-led green initiatives, focusing on green urban planning, infrastructure, reduced emissions, and enhanced public transportation to support sustainable development alongside economic growth.

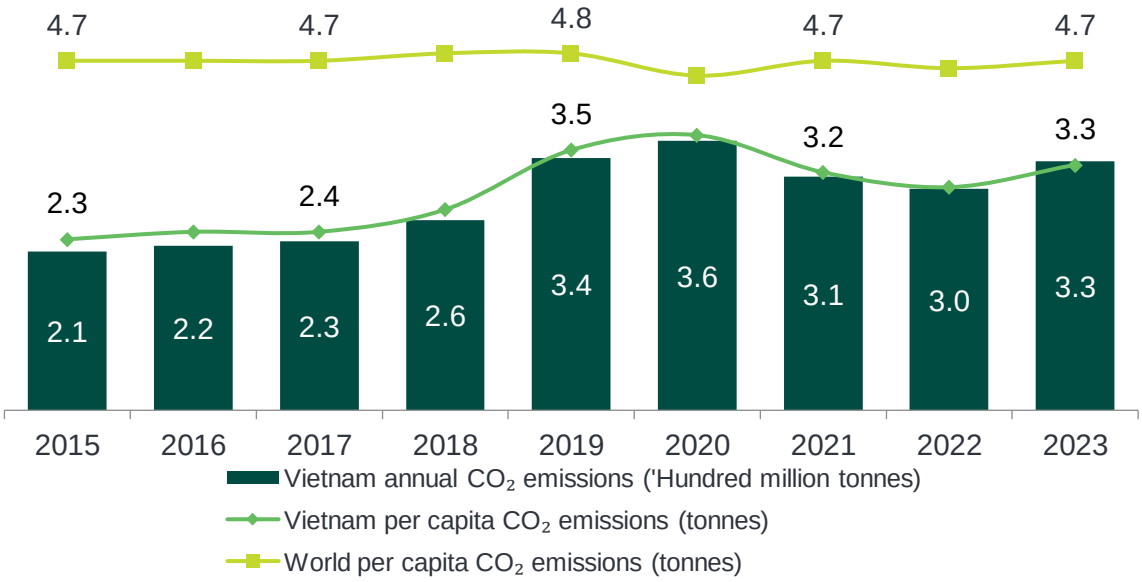


Figure 21: Per capita CO_2 emissions of Vietnam, World, and Vietnam Annual CO_2 emissions[41]

[40] Characteristics and distribution of greenhouse gas emissions from motorcycles in Hanoi, Vietnam, page 12/16
[41] Ourworldindata.org, Vietnam: CO2 Country Profile, Accessed 16/12/2024

- **Vietnam is both at risk from and contributing to climate change.** In 2023, the country is the 2nd largest year-on-year change in emitting GHG in Asia, just behind China[42] and is projected to further increase to 515.8 $MtCO_2eq$ in 2030[43]. This underscores the urgent need for Vietnam to implement effective climate policies to mitigate its environmental impact while adapting to the inevitable changes brought by global climate dynamics.
- **Electric vehicles can reduce emissions but do not solve traffic congestion issues[44].** The introduction of electric cars and motorcycles is an important step in reducing emissions in cities. However, this only addresses part of the environmental problem and does not directly tackle traffic congestion issues. The number of vehicles on the road has not decreased, leading to traffic jams continuing as before. Additionally, traffic accidents remain a major concern as awareness and traffic infrastructure have not significantly improved. Moreover, this transition may also impact the local economy, particularly industries related to the production and maintenance of traditional vehicles. Therefore, a more comprehensive approach is needed to effectively address urban challenges.

Hanoi's transport sector faces significant present and anticipated climate and environment challenges. Frequent flooding due to heavy rainfall and rising sea levels disrupts transportation networks and damages infrastructure. Increasing temperatures and heatwaves affect the durability of road surfaces and rail tracks, leading to higher maintenance costs and safety hazards. Typhoons and storms cause landslides, road blockages, and damage to critical transport infrastructure. Many of Hanoi's transport infrastructures are not designed to withstand extreme weather events, making them susceptible to damage and requiring significant investment in climate-resilient upgrades. With the urgent climate issues, developing an urban rail system can help address GHG emissions in Hanoi. By creating urban spaces integrated with adequate infrastructure around railway station enable to reduces reliance on personal vehicles like motorcycles and cars, which are major sources of pollution, reducing GHG emissions by improving public transport systems and enhancing the resilience of transport infrastructure. This approach helps decrease vehicle density, thereby reducing emissions of CO_2, N_2O, and CH_4, improving public health.

Moreover, the integration of urban development around railway stations promotes sustainable urban planning and environmental protection by establishing residential areas near public transportation systems and encouraging walking and cycling. This not only decreases the demand for personal vehicle use but also enhances urban living quality through green public spaces. It helps Hanoi better manage urban and industrial growth rates, alleviates pressure on existing transportation infrastructure, and encourages green economic development, mitigating the impacts of climate change.

2.5. Social Equity Issues

Social equality is a prominent issue in many modern societies, leading to significant disparities and injustices within communities. Economic and social inequalities have created considerable gaps between different demographic groups. Low-income individuals often face difficulties accessing essential services such as healthcare, education, and employment due to high living costs and a lack of personal transportation. Additionally, individuals with limited mobility, such as people with disabilities, children, the elderly, and pregnant women, often encounter restrictions in accessing public spaces and community services. These barriers exacerbate inequality and limit opportunities for personal and community development. Failing to integrate Gender Equality, Disability, and Social Inclusion (GEDSI) principles into urban and transport development can exacerbate these existing social issues and increase risks across social, economic, and environmental dimensions. Following are some social, environmental, and economic consequences if urban and transport development strategies are not GEDSI-sensitive.

- **Exacerbation of inequalities**: Neglecting GEDSI principles reinforces systemic barriers for marginalised populations. Inaccessible infrastructure isolates individuals with disabilities, caregivers, and the elderly, limiting their access to essential services such as healthcare, education, and employment. A key example is inaccessible metro systems in some cities, which prevent wheelchair users and visually impaired individuals from commuting independently. Typically, women use public transit more than men and are

[42] Ourworldindata.org, Vietnam: CO2 Country Profile, Accessed 16/12/2024
[43] CTU, Greenhouse Gas Emission Assessment Methods, Data Sources, And Reporting Processes In Vietnam, page 4/31
[44] Electric cars, do they bring benefits to the traffic environment?, Accessed 28/02/2025

more dependent on it, having less access to private vehicles. Women are particularly more dependent on buses because they are more convenient for shorter trips and have more accessible stops than metro or light rail. Using public transport during off-peak hours takes more time and offers less choice in terms of services and routes that can make trips more arduous, more circuitous, and costlier[]. Gender-blind urban and transport designs would exacerbate inequalities. For instance, Kuneida and Gautheire's research in Africa, India, and Bangladesh highlights that women prioritise personal safety in mobility. When safe, secure, and affordable transport options are unavailable, women often forgo essential trips to schools or healthcare facilities, leading to absenteeism, ill health, and unemployment. High transport costs relative to potential earnings also deter women from seeking employment, perpetuating economic inequalities[].

- **Community opposition and gentrification**: Exclusionary planning practices erode trust and foster opposition among local communities, particularly marginalised groups. Urban and transport projects that fail to address community needs often face resistance, delaying implementation and increasing costs. Exclusionary designs contribute to neighbourhood segregation, undermining urban and transport development goal of fostering unified urban communities. Rising property values in development zones lead to gentrification, displacing low-income residents and disrupting community cohesion. Vulnerable populations are often forced out as affordable housing diminishes, and essential services are replaced by luxury developments catering to wealthier residents. Gentrification also transforms local commercial spaces, driving out businesses that serve lower-income populations and reducing neighbourhood liveability.
- **Reduced transport system use**: Inaccessible or unsafe public transport systems deter usage, undermining sustainable urban mobility. In South Africa, persons with disabilities travel 27% to 66% less than persons without disabilities due to inaccessible transport systems[3]. Poorly lit or isolated transit hubs disproportionately impact women and other vulnerable groups, particularly during off-peak hours. For example, 46% of women commuters in Nairobi report feeling unsafe while using public transport at night[4]. Such deterrents reduce ticket revenues and the overall return on infrastructure investments, threatening the financial sustainability of TOD systems.
- **Environmental and mobility inefficiencies**: Exclusionary urban and transport planning fosters over-reliance on private vehicles, undermining environmental sustainability. Individuals with limited mobility, unable to access inclusive public transit, may resort to private vehicles, increasing congestion and carbon emissions. Development zones lacking diverse and affordable services force residents to travel longer distances for basic needs, negating the urban development goal of reducing commuting requirements.
- **Loss of economic opportunities**: Inaccessible urban development area limits economic participation, particularly for marginalised groups. Without accessible transport and proximity to jobs, persons with disabilities and women are less likely to join or sustain employment. High transport costs further constrain opportunities. For instance, households in Mexico City spend 25% of daily earnings on transportation, discouraging women from seeking work outside their neighbourhoods. The businesses of development area also lose potential customers when spaces are not designed to accommodate families, caregivers, or persons with disabilities, reducing economic diversity and profitability[5].
- **Failure to meet global development goals**: Ignoring GEDSI undermines commitments to international equity and sustainability standards, such as the United Nations Sustainable Development Goals (SDGs). Urban and transport development projects that fail to align with SDG 10 (reducing inequalities) and SDG 11 (inclusive, sustainable cities) risk criticism from global stakeholders. Governments and developers may face reputational damage, reducing opportunities for international funding and investment.

In conclusion, the risks of excluding GEDSI considerations from urban and transport planning extend far beyond social exclusion; they undermine urban's core objectives of economic development, environmental sustainability, and urban cohesion. To ensure long-term success and equity, Hanoi need to prioritise GEDSI through robust policies, inclusive design standards, and meaningful community engagement.

- In a nutshell, an integrated urban and transport strategies could address these social inequality issues by integrating high-density housing, commercial spaces, and public facilities with efficient public transportation systems. It aims to create accessible and pedestrian-friendly urban communities where all individuals can easily meet their daily needs. By reducing access and mobility barriers, this approach provides particular benefits to low-income groups and individuals with limited mobility. Moreover, it encourages community building by minimising physical distances between residents and public spaces, essential activities, and community resources. It facilitates interaction by reducing dependence on cars and promoting independent mobility,

transforming public spaces into hubs of community connection and interaction. Achieving this inclusivity requires intentional socio-economic and physical design planning that prioritises accessibility and equity.

3. Transit-Oriented Development as a Fundamental Strategy for Hanoi's Urban Sustainability – International Experiences.

As Hanoi addresses the multifaceted challenges of rapid urbanisation, climate change, and overburdened infrastructure, the city's future hinges on adopting innovative urban planning and infrastructure strategies. The population has surged, leading to uncontrolled urban sprawl, inefficient land use, and fragmented urban planning, exacerbating traffic congestion and resource strain.

In this context, TOD emerges as a strategic approach to fostering sustainable urban growth. By centring on high-density and mixed-use development around transit hubs, where activities are concentrated, the length and number of city-wide daily trips are expected to decrease. This solution also aims to increase the demand for public transport. TOD not only addresses immediate urban challenges but also lays the solid ground for a more sustainable and liveable future. It offers integrated solutions to traffic woes, environmental degradation, and urban inequities by promoting efficient land use and reducing reliance on private vehicles. Furthermore, as Hanoi contends with significant climate risks, including flooding and air pollution, TOD's emphasis on sustainable infrastructure and reduced carbon footprints is crucial for enhancing the city's resilience.
This section focuses on clarifying the concepts of TOD, principles and regulations for TOD development by examining TOD development experiences in world cities and suggesting lessons learned for Hanoi.

3.1. Concept of TOD and Its Benefits

TOD is a planning and development strategy integrating public transport and urban development around MRT stations/depots to increase public transport use and improve land use efficiency. TOD is a good fit for densely populated cities, such as Tokyo, Hong Kong, Singapore, Hanoi and Ho Chi Minh City (HCMC), where TOD maximises land use and provides efficient transport solutions.
Key features of the TOD model include:

- High accessibility: Prioritises public and non-motorised transport, ensuring transport hubs are within walking distance, reducing reliance on private vehicles.
- Mixed land use: Encourages a blend of residential, commercial, recreational, and public services near public transport hubs, minimising urban sprawl and promoting efficient land use. This approach integrates residential, commercial, and recreational spaces, creating inclusive communities with equitable access to services and opportunities, ultimately enhancing urban resilience and living standards.
- High density: Optimises land use by maximising vertical and horizontal space, promoting high-density, efficient developments and reducing urban sprawl.
- Sustainability: Balances transportation, urban development, and environmental goals, reducing carbon emissions and promoting equitable access for all residents, given Hanoi's existing and projected risks to typhoons, storms, floods and sea level rise, building the climate resilience of both people and transport infrastructure through TOD is critical.

The concept of TOD is considered at rail corridor and train station levels:

- Corridor level TOD area: Along the mass transit lines, multiple TOD areas can be developed to create a cohesive and efficient transportation network. These areas focus on urban development that integrates with rail line corridor, ensuring that the regions around the transit stations are well-connected. The TOD development along the corridor can be seen as a chain of hubs where each station or depot contributes to the larger network.
- Station-level TOD area: Surrounding the station/depot of the mass transit lines, specifically developed by adopting TOD, specific boundaries of the layers are planned and approved by competent authorities.
  - Core layer: within 200m of the station/depot, this layer is characterised by a high density of public, social, and commercial utilities. It is meant to serve as a highly accessible and pedestrian-friendly zone, focused on providing services and amenities such as: Public transportation facilities (bus, bike, car-sharing stations), Social services (community centres, libraries, medical facilities), Commercial spaces (shops, restaurants, offices).

- Main layer: 200m < R < 500m from the station/depot, this layer focuses on developing urban communities, with mixed-use residential and commercial areas, offering a blend of services to support the local population developing urban communities.
- Expansion layer: 500m < R < 800m from the station/depot, this outer layer focuses on expansion development, offering potential for future urban growth.

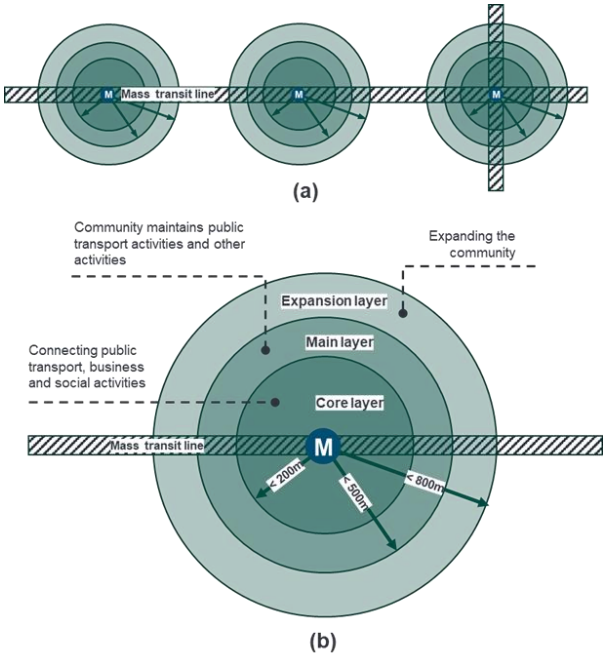


Figure 22: Concept of corridor-level TOD (a) and station-level TOD (b)[45]

[45] GCIEP Team, 2025

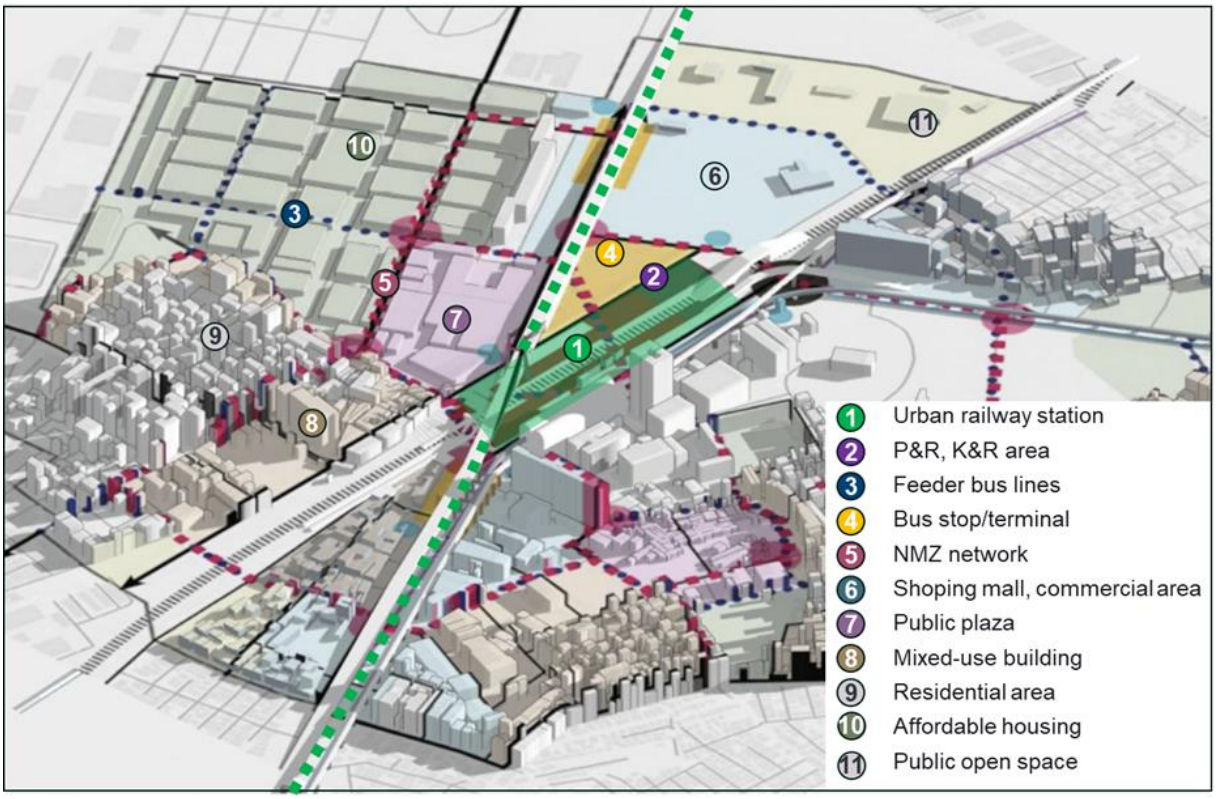


Figure 23: An example of TOD area[46]

The TOD model provides numerous benefits across key sectors, including mobility, economic, environmental and social benefits. Specific benefits are outlined as below:

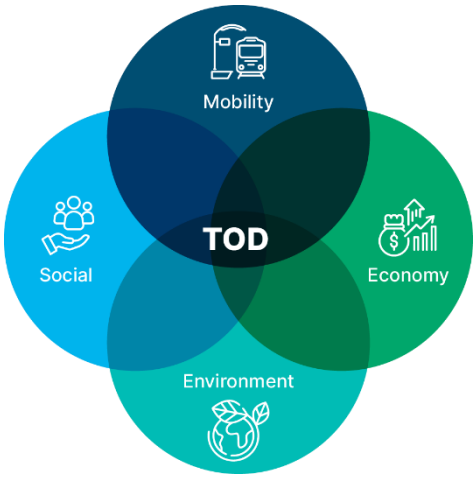


Figure 24: Core benefits of TOD model[47]

[46] GCIEP Team
[47] GCIEP Team

Mobility benefits:

- **Increasing accessibility and mobility:** TOD ensures that transport hubs are easily accessible from residential and commercial areas, allowing people to reach their destinations more quickly and efficiently. This reduces reliance on private cars, enhancing mobility for all residents.
- **Reducing traffic congestion along MRT corridors:** By promoting public transport and non-motorised transport (i.e., cycling and walking) TOD reduces the private traffic volumes, alleviating traffic congestion and improving air quality in the city area. It supports the development of walkable and cyclable neighbourhoods, shifting the focus from roads to rails and ensuring efficient and sustainable connectivity.
- **Reducing travel time and costs for citizens:** TOD encourages shorter trips, reduces number of daily trips by integrating residential, commercial, and service areas around transit stations. This proximity reduces travel times, traffic volumes, and the use of public transport decreases individual commuting costs.
- **Increasing public transport ridership and farebox revenue to cover operating cost:** TOD designs create incentives for people to use public transport by making it more convenient and accessible, leading to higher ridership of sustainable transport modes.
- **Improving traffic safety for commuters:** The integration of safer pedestrian pathways, cycling lanes, and efficient public transport systems reduces the private traffic volumes, which contributes to fewer traffic accidents and improved safety for all road users.

Economic benefits:

- **Developing service economy around transit hubs:** TOD attracts businesses and services to areas near transit hubs, supporting a vibrant local economy. This includes retail, hospitality, and service-oriented businesses, which benefit from higher public transport ridership.
- **Increasing real estate value and housing demand:** Values of properties around transit stations tend to increase due to increased accessibility, convenience, and connectivity. This leads to growing housing demand, providing economic growth for real estate developers and opportunities for affordable housing.
- **Reducing infrastructure investment costs:** By optimising land use around transit hubs, TOD minimises the need for extensive infrastructure expansion. This approach reduces the cost of building and maintaining roads, utilities, and other public infrastructure, making urban planning more cost-effective.

Climate, Nature, Environment and health benefits:

- **Reducing air, noise pollution and greenhouse gas emissions:** By decreasing private vehicle use and increasing public transport and non-motorised transport modes, TOD avoids vehicle emissions, leading to lower levels of air pollution and less noise. This contributes to a cleaner environment, reduces the city's carbon footprint and aligns Hanoi with Vietnam’s GHG emissions reductions commitments as articulated in its NDC.
- **Building resilience:** By using materials and construction techniques that can withstand Hanoi’s extreme weather conditions such as extreme heat, cyclones and flooding, the TOD infrastructure can bolster the city’s resilience to climate hazards. This supports Vietnam’s National Adaptation Plan 2021-2030 and strengthens Hanoi’s ability to cope with and recover from climate-related challenges, aligned to the goals of the Hanoi Climate Action Plan.
- **Improving public health through walking and cycling:** TOD encourages physical activity by designing walkable communities with safe walking and cycling infrastructure. This fosters healthier lifestyles and improving overall public health.
- **Improving energy efficiency:** The increased use of public transport and the reduction of car dependency contribute to improved energy efficiency, as public transport systems typically consume less energy per capita than private vehicles, leading to reduced energy consumption and lower carbon footprints. TOD-related construction, such as station buildings, could also incorporate energy efficient systems such as green roofs and walls to reduce the urban heat island effect, and renewable energy sources to create cooler microclimates and further reduce the carbon footprint.
- **Green spaces to support local wildlife and improve air quality**: Including the creation of parks, urban gardens and tree lined streets is expected to provide recreational spaces, support the creation of habitats for various species, contribute to urban biodiversity and help to improve air quality. TOD can also be designed to integrate with existing natural features in Hanoi such as rivers and wetlands, thereby

protecting and enhancing these systems. Further, green infrastructure such as permeable pavements and rain gardens can be incorporated into TOD to naturally manage storm water. This helps to reduce flooding and supports aquatic wildlife.

Social benefits:

- **Improving access to jobs, services, and social utilities:** TOD enhances connectivity, making it easier for residents to access employment, education, healthcare, and other essential services.
- **Ensuring social justice:** TOD promotes social equity by providing affordable housing options and ensuring that all residents have access to reliable public transport. This fosters inclusivity and reduces disparities in access to urban resources.
- **Building vibrant, inclusive communities:** TOD fosters community interaction by creating mixed-use spaces that combine residential, commercial, and recreational areas. These developments encourage engagement and social cohesion, leading to vibrant, active communities that are well-connected and inclusive of diverse social groups.

3.2. Key Principles and Focus Areas in Implementing TOD

TOD implementation aims to facilitate the harmonious integration of core elements of transportation, land use development, commerce, society and environment. Based on a review of international case studies on TOD implementation, the GCIEP has proposed five key principles for implementing TOD in Hanoi, along with associated 11 focus areas to guide its implementation. These principles focus on transit-oriented mobility, mixed land use, high-density development, a liveable and resilient society, smart and sustainable urban growth, and the promotion of economic activities while ensuring environmental protection.

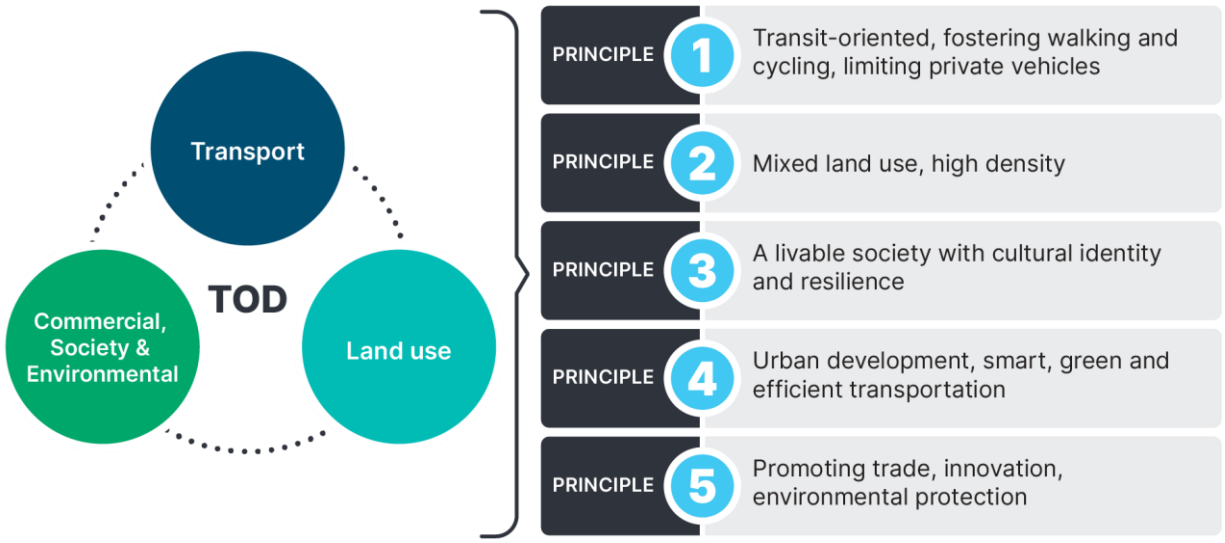


Figure 25: Key principles identified for Implementing TOD for Hanoi[48]

[48] GCIEP Team, 2025

Table 6: Key principles and focus areas for implementing TOD in Hanoi

#	Principles	Focus Areas
1	Transit-oriented, fostering walking and cycling	1. In encouraging public transport use, urban design can make non-motorised transport options (such as walking and cycling) more conducive. The safety, comfort and accessibility of these options for all users would need to be considered. For example, providing dedicated lanes for walking or cycling with priority by area and/or time have been successful elsewhere. 2. Controlling parking control (restrictions by area, by time, restrictions on the number of parking spaces) and restricting private vehicle circulations (by route, by time, by vehicle type).
2	Mixed land use, high density	3. Allocating land area for mixed use, including social housing (horizontally and vertically), fully meeting individual daily travel demand, thereby minimising the number of trips and trip length. 4. Controlling building density and height (combining FAR + BCR + Land use structure, requiring traffic impact assessment), increasing population density, limiting dispersion, optimising the capacity of public transport system.
3	A liveable society with identity and resilience	5. Identifying important landscape and historical and cultural relics in the residential areas that could be preserved under separate provisions of architectural management, construction planning, and detailed urban planning regulations. 6. Focusing on human-friendly architectural design on the ground floor and lower floors of buildings. 7. Imposing landscaping requirements to enhance the pedestrian experience, improving station recognition, and complement adjacent structures. 8. Enhancing urban resilience by integrating climate-adaptive design, flood prevention measures, and sustainable infrastructure into TOD planning regulations to mitigate environmental risks and ensure long-term liveability.
4	Smart, green and efficient development	9. Guidance for appropriate building direction and urban space optimisation including parking areas. 10. Principles of land organisation and regulations and policies to encourage conversion to reduce urban sprawl and protect natural habitats. 11. Integration of technical and social infrastructure systems to create a foundation for sustainable development. 12. Incorporation of low carbon and climate resilience measures to promote long-term sustainability and safety. 13. Promotion of green building standards to enhance energy efficiency and reduce carbon footprints.
5	Promoting commercial activities, innovation, environmental protection	14. Urban design shall promote trade in addition to transit functions, apply incentives and encourage innovation. 15. Urban design is expected to minimise environmental impact and aim to enhance nature and biodiversity.

3.3. International TOD Experiences in Selected Cities

To provide a comprehensive support to the regulatory framework of Hanoi TOD, eight cities worldwide were selected and analysed to benchmark key aspects of TOD implementation. The selection is based on criteria reflecting similarities with Hanoi, including a population of over five million, a well-developed or rapidly expanding urban rail network, and development projects integrated with railway lines following the TOD model. The findings focus on the following areas: (i) TOD planning and implementation process; (ii) Regulations on institutions, powers and capacities of TOD implementing agencies; (iii) Role of stakeholders; (iv) Community participation; and (v) Level of success or failure. Locations of the selected cities are illustrated in Figure 26.

Key aspects of each case are presented in sub-sections. Details of each case can be found in **Appendix 2**.

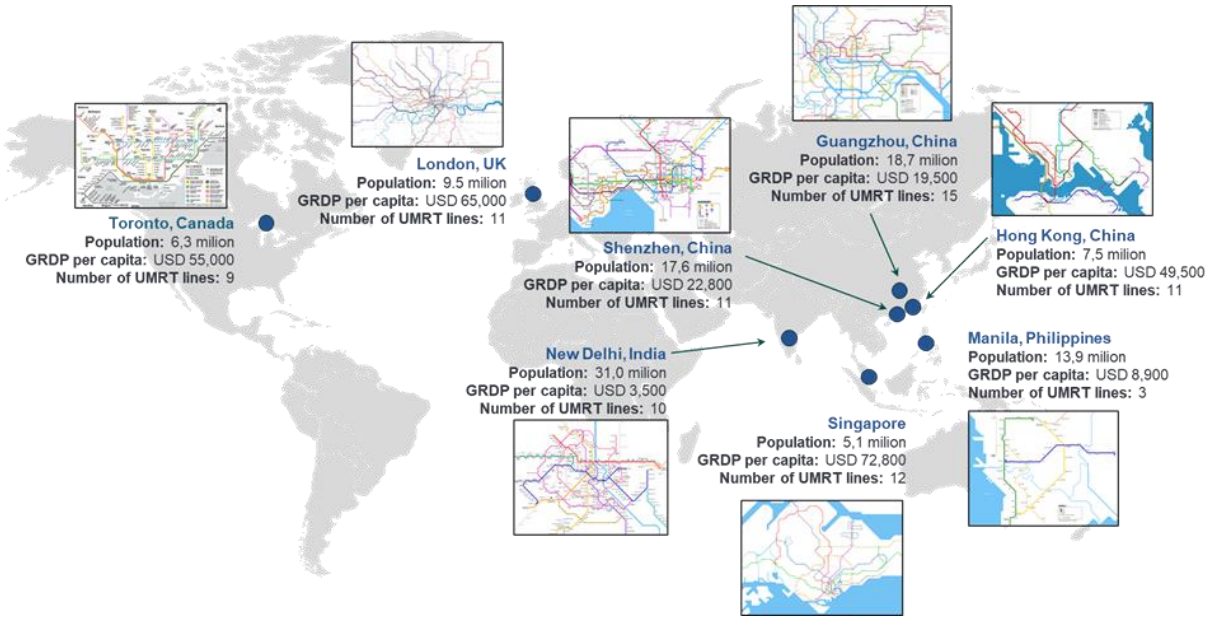


Figure 26: Overview of studied cities[49]

3.3.1. Singapore

The practice of TOD implementation in Singapore highlights several key aspects as bellows:

- **Long-term strategic planning for TOD**: Singapore's success in TOD is attributed by its long-term strategic planning, dense development along transport hubs, and policies aimed at reducing private car ownership and use. The TOD implementation process in Singapore comprises three steps: (i) Step 1 - Concept plan: A strategic land use and transportation plan guiding development over 40-50 years. It is reviewed every decade and outlines strategies for sustaining a high-quality living environment; (ii) Step 2 - Master plan: A statutory plan for development over 10-15 years, reviewed every five years. It translates the concept plan into detailed implementation plans, specifying permissible land uses and densities; (iii) Step 3 - Government Land Sales (GLS) programme: Releases state land for private development. The Urban Redevelopment Authority (URA) collaborates with other agencies to ensure basic infrastructure and utilities for new, large-scale developments.
- **The state holds the right to develop and owns railway infrastructure to optimise investments for the long-term sustainability**. Regarding the finance and operation process, the government funds the Land Transport Authority (LTA)'s budget, including rail projects, through its general budget, with no direct link to LVC. In 2016, the New Rail Financing Framework (NRFF) was established between SMRT and LTA stating that the LTA took ownership of all rail operating assets, such as trains and signal systems, LTA has responsibility for managing the buildup, replacement, and upgrading of these assets to meet ridership demand and commuter expectations. SMRT remains responsible for maintaining the rail system. This shift in asset management aims to enhance rail operations by allowing the government to control and optimise investments for the long-term sustainability of Singapore's public transportation network.
- The Singapore Government is responsible for planning and directing policies while encouraging private sector participation in TOD projects. The Land Transport Authority (LTA), an agency under the Ministry of Transport, is responsible for planning, financing, constructing, and owning rail infrastructure. SMRT and SBST are the transport operators, SMRT was established by gathering personnel from government organisations. They play central pieces in the process of TOD implementation by providing complementary feeder and mainline bus services, downtown shuttle system, light rail, taxi service, etc. Private sector involvement in TOD projects through PPP schemes cover various aspects, including asset ownership, contract duration, performance incentives, non-fare businesses, financial sustainability, and service quality.

[49] Source: GCIEP Team, 2025

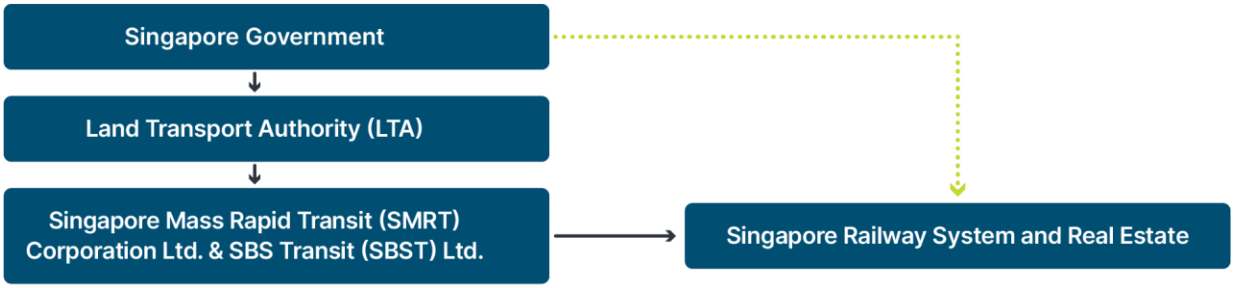


Figure 27: Interaction Between the Government, SMRT, and the Public Transit System

- **Clear TOD planning and implementation framework:** Singapore's planning and implementation framework for TOD is supported by various laws and regulations that facilitate effective urban planning and community engagement. Singapore's urban development is guided by The Concept Plan 1971, revised 1991, 2001, 2011, evolving from a satellite town model to a globally competitive city with integrated transport, housing, and sustainability strategies. Key legislative frameworks, such as the Rapid Transit System Act 1995 and the Planning Act 1998, regulate MRT development and land use planning, ensuring seamless connectivity within TOD areas. The Underground Master Plan 2019 promotes sustainable urban growth by using subterranean spaces for infrastructure, freeing up land for housing, greenery, and community use. Additionally, the State Lands (Amendment) Act 2015 and Land Acquisition (Amendment) Act 2015 clarify underground land ownership, while URA Guidelines support high-density, mixed-use developments around transit hubs to enhance urban efficiency and liveability.
- The city-state has implemented effective land value capture mechanisms, such as the Land Betterment Charge, to finance TOD projects. Singapore government is the largest landowner and auctions land/ lease land to private developers periodically through its government land sales programme. The public sector captures the land value increment largely through fee-based LVC including property tax and development charge (i.e., land betterment charge). Land sales revenues are channelled to a specific fund - "past reserves", and reserves are not permitted to be used to finance the current government's expenditure without the permission of the President. The reserves are invested and 50% of net investment returns is taken into the government's general budget for spending. The government finances LTA's budget including rail projects from its general budget. The land betterment charge[50] (LBC) in Singapore is a tax on the increase in land value arising from a chargeable consent, such as planning permission, given in relation to a development of any land.

3.3.2. Hong Kong, China

Hong Kong case highlights the success of the Mass Transit Railway (MTR) Corporation's PPP model, which integrates transit with property development. Key factors contributing to its success include the 'Rail plus Property' strategy, regulated monopoly status, government ownership with private sector involvement, and effective risk allocation.

- **Close integration between 'Rail plus Property" projects:** The implementation flow diagram for Railway + Property (R+P) projects in Hong Kong involves a series of systematic steps beginning with Property Master Planning to establish development goals. This is followed by Station/Depot Planning to ensure alignment with both the master plan and operational needs. The Integrated Design Feasibility stage assesses the feasibility of combining property and railway designs, considering technical, financial, and legal aspects. Next, Integrated Property and Railway Requirements are set to avoid conflicts, leading to the detailed planning stages for Property Development and Railway Design. These designs are then resolved for interface integration, followed by the respective implementation phases for property and railway construction. Ensuring smooth execution of construction interfaces is crucial before the projects culminate in Property Completion and Railway Opening, both of which involve inspection and acceptance of the finished constructions, ensuring they are ready for operation.

[50] Land betterment charge, page 12/21

Figure 28: Typical implementation flow Diagram for R+P

- **MTRC is a central piece of the TOD process in developing 'Rail plus Property" projects.** MTRC aims to "construct and operate, under prudent commercial principles, an urban metro system to help meet Hong Kong's public transport requirements". MTRC facilitates ongoing coordination, ensuring that both sides (government and market players) meet their objectives. This includes working closely with the developer, community, and urban planning authorities and balancing public interests (government) and private interests (market players). Also, it plays special attention to the development parameters such as area size, building densities, floor uses, and site designs. MTRC governance reports to a Board headed by a non-executive chairman and made up of local business and community leaders and government representatives.

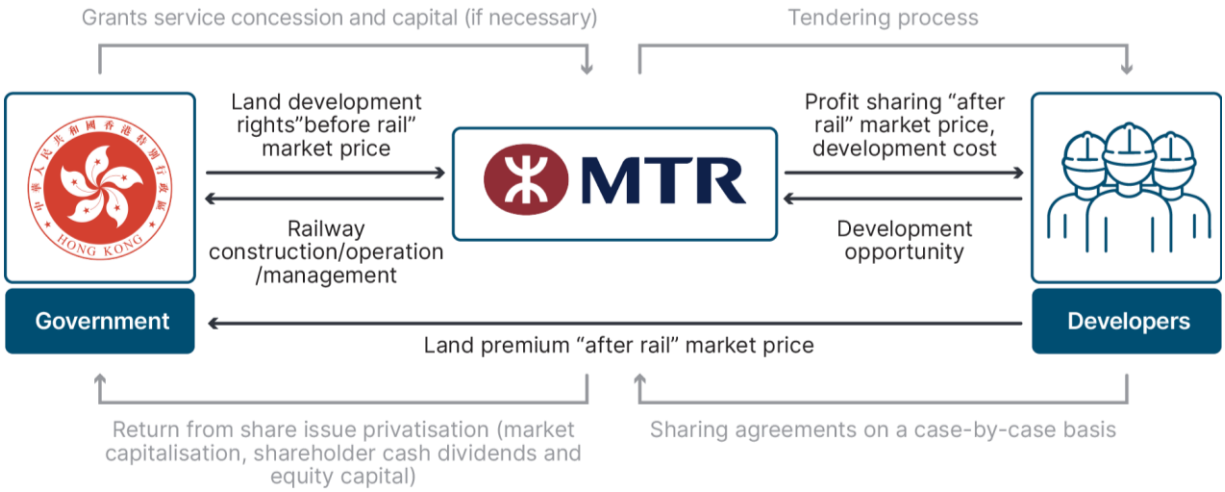


Figure 29: Framework of R+P model

- **Strong participation of private sectors in TOD projects:** The government creates a conducive environment for TOD by developing strategic and territorial frameworks, site-specific policies, and broader strategic regulations, setting guidelines that the MTRC and market players need to follow. responsible for policy-making that influences TOD, focusing on public interests with the main parties are Land Development Corporation (LDC) and Urban Renewal Authority (URA) - a statutory government agency. Private sectors are involved in deal-making, negotiating terms with the government and MTRC while considering their profit margins and market viability. They are responsible for implementing the TOD projects by handling real estate and infrastructure developments. Their involvement is more business-driven, focusing on private interests, but they must also comply with site-specific requirements set by the government.

- **Using various LVC mechanisms.** Hong Kong employs development-based LVC, where the government transfers land development rights to the MTR at pre-transit prices. The MTR then sells these rights to private developers at post-development market rates. These developers are permitted to exceed the typical floor area ratio (FAR) in exchange for funding public amenities such as parks, pedestrian pathways, or station improvements. Additionally, Hong Kong applies fee-based LVC tools, including taxes, special fees, and levies, to finance its operations such as: property taxation, stamp duty and lease modification.

3.3.3. New Delhi, India

In Delhi, TOD is managed by a Competent Authority led by the Head of the Department of Planning, involving multiple departments. The Delhi Development Authority (DDA) oversees a TOD fund and collects External Development Charges (EDC) for infrastructure improvements. Supported by the Delhi Development Act and Metro Railways Act.

- The implementation process of TOD in New Delhi involves 21 steps across four key stages—pre-approval, preparation, implementation, and certification. In the pre-approval stage, there is a need for a specialised agency, such as CA, for TOD implementation and the creation of an Influence Zone Plan (IZP). During the preparation stage, the TOD proposal is submitted by the developer entity (DE) and approved by CA, along with the introduction of an EDC and a database system. In the implementation stage, penalties are imposed for delays, and the introduction of a completion certificate is required. Finally, in the certification stage, the TOD scheme covers both saleable and unsaleable components (public and social housing components), with unsaleable components handed over to public authorities before any transaction is made for saleable components, including charges for EDC, FAR, advertising, and donations.
- **Establishing Competent Authority (CA) to manage and implement TOD projects.** The CA shall be appointed by the concerned local bodies under their respective acts for implementation of the Delhi Development Act regulations. CA facilitates the TOD process by creating a single window system for fast-tracking clearances and approvals, fixing EDC rates, and parking rates, and establishing fund transfer mechanisms. During preparation, the CA reviews and processes applications through a computerised system, ensuring all criteria are met before approval. In the implementation phase, the CA is responsible for recovering additional FAR charges and EDC from the DE and imposing penalties for project delays. CA shall be under the Chairmanship of the Head of the Department of Planning of the concerned local body. All concerned stakeholders from the following departments shall be part of the CA for approval of TOD schemes.

Figure 30: Roles and Responsibility of New Delhi CA in TOD Implementation[51]

- **Several policies have been issued to integrate LVC schemes into the development of metro lines.** The Value Capture Finance Policy Framework provides a systematic approach to adopting LVC for financing urban infrastructure, emphasising multi-stakeholder involvement, the optimisation of existing

[51] Source: GCIEP team adopted from Delhi TOD manual

urban local body mechanisms, and the generation of sustainable financial resources, alongside a guidance note on implementing impact fees. The National TOD Policy promotes affordable, comfortable, and universally accessible multimodal public transport, integrating walking, cycling, and other non-motorised transport (NMT) options, while using LVC as a key tool to ensure the financial viability of TOD. The Metro Rail Policy mandates that each project includes a section on "Enhancing Revenues" through TOD and LVC, aligns with the VCF Policy Framework, outlines financial transfers to the metro authority, and specifies estimated LVC contributions to the metro's balance sheet.

- **Participation procedure from private sector:** The DE is an individual landowner, group of landowners, cooperative societies, / Government Agencies voluntarily agreeing to participate in a TOD scheme. means an individual landowner, group of landowners, cooperative societies, / Government Agencies voluntarily agreeing to participate in a TOD scheme. DE self-evaluates land eligibility for TOD, obtains environmental impact assessment (EIA) clearance, and applies for TOD scheme approval in three stages. During preparation, the DE prepares TOD schemes based on the Master Plan of Delhi (MPD) 2021 and TOD regulations, submitting them for approval in the prescribed format. In the implementation phase, the DE must complete construction within specified timelines, paying EDC and additional FAR charges in instalments to obtain the completion certificate. Each stakeholder plays a crucial role in ensuring a structured and efficient approach to implementing TOD projects.
- **LVC mechanisms:** Financing includes EDC, additional FAR charges, and land value capture tools like purchasable FAR and Transfer of Development Rights (TDR). PPPs contribute to infrastructure development.

3.3.4. Guangzhou, China

The Guangzhou case highlights several key aspects of TOD and URT implementation. Guangzhou has experienced a rapid growth of the metro system over the past two decades, standardising train types and introducing multifunctional staff to enhance efficiency.

- **The process is divided into several phases:** Phase 1 and 2 (Planning and Design), which can be referred to in Figure 31; Phase 3 (Financing), where new metro line projects are financed through a mix of 45% grants from the People's Government of Guangzhou Municipality and 55% loans from banks, helping to manage financial burdens and support development; and Phase 4 (Operating, Vertical and Horizontal Integration), which ensures vertical integration across design, construction, operation, and resource development, alongside horizontal integration across multiple subway lines for centralised management. Additionally, Smart Operation Platforms like Suiteng OS and the 360 System are deployed to enhance equipment monitoring and reduce maintenance costs.

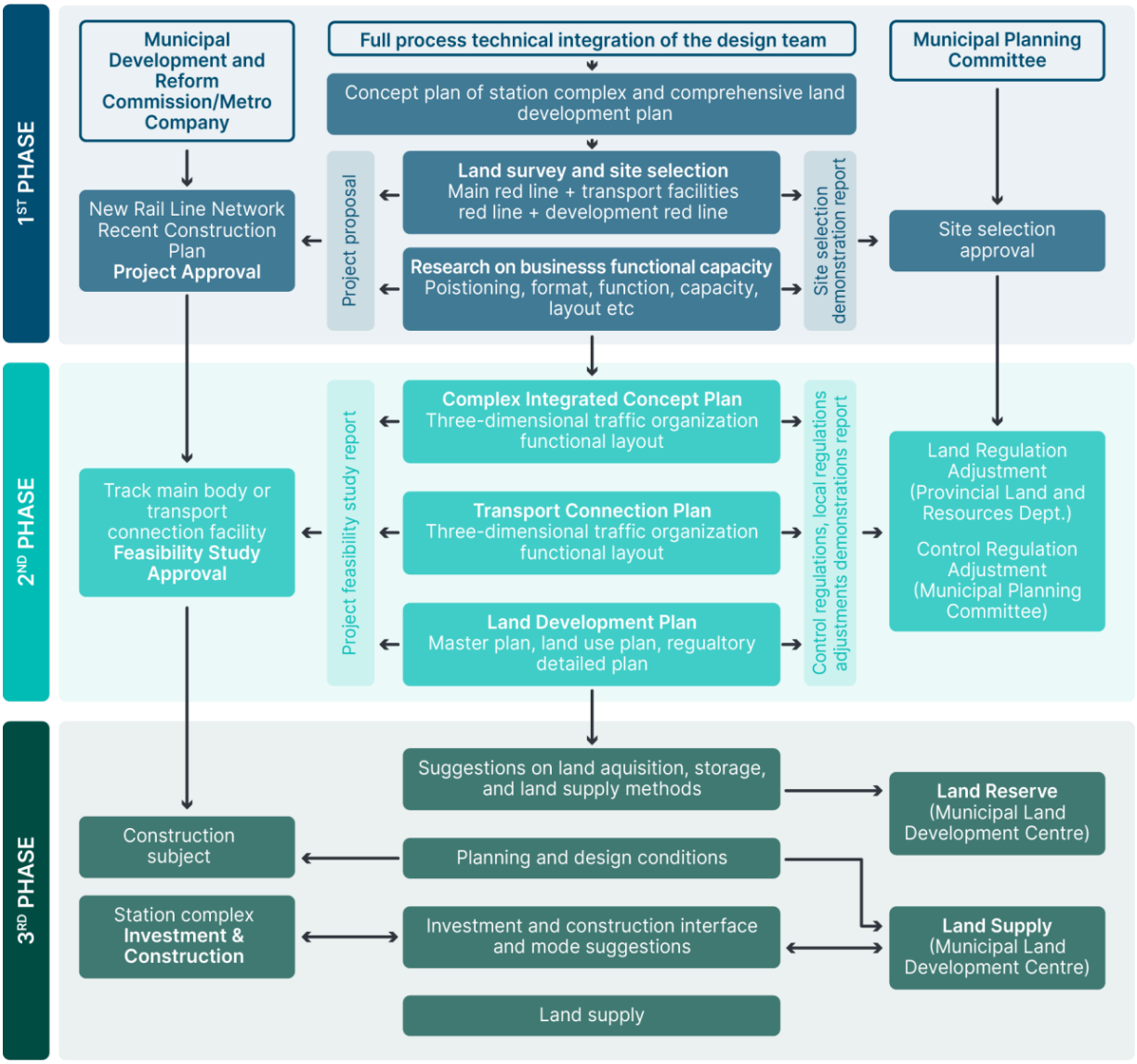


Figure 31: Process flow of TOD in Guangzhou with three phases[52]

- **Establishment integrated TOD authority.** GMC/ GMG- Established in 1992 as a state-owned government under the name GMC. GMC was later privatised and became Guangzhou Metro Group (GMG). GMG oversee the overall operations, financing, and management of the metro system in Guangzhou and plays a key role in planning, investment, and construction projects. The group's responsibilities extend beyond just operating the metro—it also handles urban development projects related to the metro system, including property and real estate developments. GMC became the subsidiary of GMG and responsible for day-to-day metro operations, including train service management, maintenance, and infrastructure upkeep. Additionally, The CEO and Vice General Manager at Guangzhou Metro are appointed by People's Government of Guangzhou Municipality.
- **Private sector participation in TOD implementation is limited due to high borrowing costs and fiscal constraints.** The current financing model for new metro lines relies on a mix of 45% grants and 55% loans, but it does not address asset replacement and renewal funding, complicating private sector involvement. The People's Government of Guangzhou Municipality (GMC) also faces fiscal limitations, with substantial debt on its balance sheet, making it cautious about increasing private sector participation.

[52] Source: Guangzhou Metro TOD 30 Years Practice and Thought, page 19/52

While PPPs could bring expertise, fiscal constraints and borrowing costs outweigh potential benefits, highlighting the need for clearer legislative frameworks and structured PPPs to support TOD.

- **Land value capture approaches:** Land Sales and Development generate revenue from land within an 800-metre radius of stations, while joint development focuses on properties primarily developed on top of stations and depots within this radius. Land is acquired through competitive bidding at low prices, and revenue is generated through sales, rentals, and real estate management.

3.3.5. Shenzhen, China

In Shenzhen, the planning, designing, financing, and operational management of TOD and railway projects involve a comprehensive and multifaceted approach.

- The planning process includes three levels: metropolitan/strategic, sub-metropolitan, and local, each with specific plans and guidelines; and five stages: economic and social development plan, land use master plan, cluster/sub-metropolitan plan, special plans, and urban design. The designing phase integrates urban and transport planning, selects pilot projects, and involves public participation and expert involvement.
- Financing is diversified through government investment, land financing, social capital, and innovative models like Rail + Property (R+P). Operational management uses the Shenzhen Public Transit-Oriented Development Information Data Online Management System, which is an information and data platform designed to support the implementation and evaluation of TOD projects, linked to the national TOD platform and other pilot cities. This platform helps government departments reflect on existing policies, evaluate and adjust policies, plan projects, allocate funds, and encourage integrated development. Rail transit enterprises can collaborate with developers on profit models, understand the government's and developers' demands and management strategies. Developers receive guidance on spatial design and understand departmental demands for successful operations.
- **Institutional setup:** Shenzhen Metro Group (SZMC) founded in 1998, SZMC is responsible for the planning, construction, and operation of the metro system, as well as developing TOD. SZMC is a state-owned enterprise 100% owned and directly supervised by the State-owned Assets Supervision and Administration Commission of the Shenzhen Municipal People's Government[53] . They collaborate with other governmental departments and private stakeholders to ensure the successful implementation of the metro system. They also play a role in the joint development of land around metro stations. Private Stakeholders participate in the joint development of land around metro stations. They are incentivised by the increase in land value due to the metro system and collaborate with SZMC and governmental departments in the development process.
- **Using LVC mechanisms** to finance metro projects including land development right through land lease revenue. The shift to the Rail + Property (R+P) model is a new method to fund metro investments using land development rights, which are transferred through bidding, auctions, and listings. The private sector contributes through PPP schemes, and Shenzhen's TOD achievements include an extensive metro network, innovative services, smart operations, high passenger satisfaction, and significant economic and social impact.
- **The legal framework supports TOD implementation.** These frameworks are designed to integrate urban development with public transportation, ensuring sustainable and efficient city growth such as Shenzhen Rail Transit Network Planning (2016-2035), Shenzhen's 14th Five-Year Plan for Comprehensive Transportation, Shenzhen Land and Space Master Plan (2020-2035), Shenzhen City Master Plan (2010 – 2020), Shenzhen Urban Village (Old Village) Master Plan (2018-2025), Shenzhen Pedestrian and Bicycle Transportation System Planning and Design Guidelines 2020, Shenzhen Urban Planning Standards and Guidelines, Regulations on Planning and Land Supervision in Shenzhen Special Economic Zone.

[53] Technical Summary Series, page 16/40

3.3.6. Manila, Philippines

The Philippines' case study on TOD and railway projects highlights a structured process managed by the Department of Transportation (DOTr) with support from international agencies like JICA and ADB.

- **The implementation process in Manila involves several phases**: the Planning Phase, focusing on urban mobility and land acquisition guided by national policies, with the DOTr playing a central role, despite delays and inefficiencies caused by complex bureaucracies; Design and Environmental Considerations, including feasibility studies, environmental impact assessments (EIAs), and community consultations to ensure sustainable design and minimise environmental impact; Financing, relying on international loans and PPPs, with JICA and ADB as key contributors; and Operation and Maintenance, where private entities may manage post-completion operations under PPP agreements, with ongoing monitoring to ensure quality and financial performance.
- **Institutional setup:** DOTr is the central player as the primary government body responsible for overseeing the development and regulation of the country's transportation systems. Private developers are often the direct beneficiaries and stakeholders in TOD projects, especially those involved in real estate near transit hubs. They engage in PPPs with the government for infrastructure funding and participate in LVC schemes by developing properties around transit projects.
- **Developing regulations and LVC mechanisms from pilot projects:** Due to a lack of standardised regulations on TOD, at first, a TOD pilot project is being implemented to learn from practical experience. Then, key regulations are published, including the Urban Development and Housing Act and the Local Government Code, which support sustainable urban planning. The Philippine Development Plan (2023-2028) and the National Transport Policy (2020) emphasise TOD as a strategy for integrated, sustainable urban development. Private sector involvement is crucial, with structured partnerships ensuring alignment with public goals.

3.3.7. Toronto, Canada

- **The Toronto case highlights a comprehensive approach involving multiple phases: planning, designing, financing, and operating.** In the planning phase, the Ontario government prioritised high-density development near transit corridors, collaborating with Metrolinx and Infrastructure Ontario. **Community consultation focused on affordability, accessibility, and local economic benefits.** In the designing phase, TOD designs featured mixed-use buildings, emphasising walkability, bike-friendly infrastructure, affordable housing, universal access, wayfinding, and consistent station architecture. In the operating phase, Metrolinx oversees daily transit operations, while Infrastructure Ontario manages commercial aspects, ensuring alignment with TOC objectives and integration with transit operations.
- **Institutional setup:** Metrolinx is the central player empowered through the Metrolinx Act (2006), is central to TOD implementation. It collaborates closely with IO, creating a project structure that co-locates transit and development expertise within one entity to streamline TOD outcomes. Private sector enterprises play critical roles in project delivery and TOD. PPPs are key to securing development, with IO overseeing the selection of developers via a Request for Proposal (RFP) process. Selected developers integrate community feedback into their proposals, often meeting criteria for affordability, sustainability, and accessibility. The PPP approach has proven successful, with developers incentivised to align projects with community and government objectives through performance bonds and penalties.
- **The LVC mechanisms for funding projects:** include a mix of government investment, LVC, and PPPs. Key mechanisms involve Air Rights Leasing, where development rights above transit stations are leased to developers; Development Charges and Density Bonuses, allowing municipalities to collect fees from developers for transit infrastructure in exchange for higher density; Property Tax Levies, generating revenue from local property owners for projects like the Scarborough subway extension; and Tax Increment Financing (TIF), borrowing against future property tax revenue to fund infrastructure upfront, leveraging anticipated property value increases from transit enhancements.
- The insights from Toronto's model suggest introducing comprehensive TOD-specific laws such as Getting Ontario Moving Act (2019), Transit Oriented Communities Act (2020), etc. **establishing a central agency for coordination**, ensuring clear criteria for PPPs, and implementing land value capture mechanisms.

3.3.8. Crossrail London, United Kingdom

Crossrail case highlights several key aspects of TOD implementation. It emphasises the importance of a clear legislative framework, such as the Crossrail Act (2008), which facilitated streamlined approvals and compulsory land acquisition. Crossrail Limited, a special-purpose entity, played a central role in integrating transit development with urban planning, supported by private sector investments from entities like Canary Wharf Group.

- **The implementation process of Crossrail London involved several key stages.** Planning focused on safeguarding the proposed route, conducting feasibility studies, and developing high-level design concepts and business cases to secure funding. Designing integrated TOD principles, incorporating over-station developments (OSD) around key stations and ensuring construction integration and urban realm enhancements. Financing combined public funds, private contributions, the business rate supplement (BRS), and the Community Infrastructure Levy (CIL), along with investments from key stakeholders. Operating and managing responsibilities were initially handled by Crossrail Limited until the Elizabeth Line was transferred to Transport for London (TfL), with MTR Elizabeth Line overseeing operations under a concession agreement, supervised by TfL.
- The institutional process of Crossrail London was driven by Crossrail Limited, a wholly owned subsidiary of TfL. As a special-purpose entity, it played a central role in project delivery, focusing on integrating transit development with urban planning. This was achieved through over-station development initiatives, supported by the Department for Transport (DfT) and private sector partners.
- **The stakeholders' roles in the project were divided between the public and private sectors.** In the public sector, the DfT provided project funding and legislative support, while TfL managed both the delivery and future operations of the Elizabeth Line. Crossrail Limited was established as a special-purpose vehicle to oversee project execution. The Programme Partner (Transcend JV – Nicholls, Aecom and CH2M Hill) ensured compliance with budgets, schedules, and safety requirements, whereas the Project Delivery Partner (Bechtel) was responsible for managing the construction contracts. In the private sector, key stakeholders such as Canary Wharf Group and Heathrow Airport Ltd provided financial contributions and played a crucial role in over-station development around Crossrail stations.
- **The financing model was a combination of public and private funding,** using a mix of direct government investment (through DfT and TfL), contributions from businesses (BRS, CIL, Direct Contributions from Businesses and Institutions), and borrowing (European Investment Bank and bond issuances). Key LVC mechanisms include BRS - Levy on larger businesses to support Crossrail's financing; Community Infrastructure Levy (CIL) - Imposed on commercial and residential developments around Crossrail to generate additional revenue; and Private Contributions: Direct investments from stakeholders like Canary Wharf Group, with property developers contributing through negotiated agreements.

3.4. Lessons Learned for Hanoi in Implementing TOD

The following key lessons have been derived from international case studies:

- **Long-term planning with a strong legal and planning framework is essential for TOD success.** Cities like Singapore, Hong Kong, and London have adopted long-term development plans that seamlessly integrate public transport and urban planning. Consistent policies and regulatory frameworks provide stability, ensuring effective TOD implementation in different phases. For example, in Hong Kong, the planning, design, and construction of the railway system and development projects are consistently integrated to ensure seamless connectivity and optimisation during the operational phase. Additionally, planning guidelines, TOD area management frameworks, and zoning regulations are strictly established to ensure that construction projects comply with the initial development strategies
- **A specialised agency enhances efficiency and coordination.** Establishing a dedicated TOD agency with clear roles and responsibilities, such as MTRC in Hong Kong, SZMC in Shenzhen, LTA in Singapore and Crossrail Ltd. in London, significantly improves project execution, cross-agency coordination, and stakeholder engagement. The TOD entity can be fully state-owned to ensure the strategic development goals in public transport development in the city or can collaborate with the private sector to leverage specialised expertise and diverse financial resources. In cases where a state-owned enterprise is responsible for developing the railway system and TOD (such as DMRC in Delhi or Crossrail International in London), significant investment is required from the national budget, loans, or financial institutions.

- **PPPs unlock funding and reduce financial risks.** Successful TOD projects in Hong Kong and Shenzhen have leveraged private sector expertise and investment through well-structured PPP programmes, reducing public financial burdens while ensuring high-quality development.
- **LVC provides sustainable funding for infrastructure.** LVC tools include land sales and leases, sales and leases of development rights for station areas or spaces within stations, betterment levies, infrastructure improvement fees, additional floor area ratio fees, and property taxes have been widely used across case studies to create revenue for reinvesting in transport and urban infrastructure. However, to effectively implement LVC tools, it is necessary to develop an LVC implementation framework, including tools applicable to each area, implementation methods, and fee structures that both incentivise investors and remain within the planning criteria set for TOD areas.
- **Community engagement strengthens project sustainability.** TOD projects that actively incorporate community feedback, as seen in Toronto and Shenzhen, are more likely to meet local needs, build public support, and ensure long-term success.
- **Complex institutions and administrative procedures are major barriers to TOD implementation.** In cities like New Delhi and Manila, fragmented governance structures and lengthy approval processes have slowed TOD projects, increased costs and limiting development opportunities. Simplifying administrative procedures and enhancing inter-agency coordination are critical to avoid similar challenges in Hanoi.

4. Opportunities for TOD Implementation in Hanoi

4.1. The Right Time to Implement TOD in Hanoi

In modern urban development, implementing urban railway projects with TOD is crucial for improving accessibility and promoting sustainable growth. The Income-Population-Needs (IPN) Index assesses the feasibility and ideal timing for launching urban development projects, especially mass transit projects like urban railways. Analysing this index can help determine the "golden time" for such endeavours.

Table 7: IPN Index in Hanoi and Ho Chi Minh City

Location	IPN Index	Comment
Hanoi	1.02	Appropriate time
Ho Chi Minh City	1.29	(Relatively) Late

- Hanoi's IPN Index of 1.02 indicates that the present time is "appropriate" for developing TOD projects. This means Hanoi is at a stage where average income, population, and needs are suitable for deploying urban railway projects. With a GRDP per capita of US$5,476 and a population of approximately 8.4 million in 2021, Hanoi is well-positioned to leverage the benefits of developing urban railway lines to boost economic development and improve the quality of life for its residents.
- Meanwhile, Ho Chi Minh City's IPN Index is 1.29, which is considered "late" compared to the ideal time. With a higher GRDP per capita of US$7,321 and a population of around 9.6 million by 2024, Ho Chi Minh City possesses the necessary socio-economic conditions. However, it may have missed the ideal window to initiate TOD projects. Therefore, expedited measures are needed to accelerate the implementation and completion of these projects to compensate for the delay. (See Appendix 3 for calculation details and data collection.)

In conclusion, Hanoi is at the perfect time to implement TOD projects, while Ho Chi Minh City needs to accelerate its efforts to catch up with sustainable urban development and maximise the benefits of an urban rail system. Timely and efficient investment is key for both of Vietnam's largest cities to improve their transportation infrastructure and promote sustainable urban growth.

4.2. Past Attempts to Implement TOD

As the capital of Vietnam, Hanoi is considered the political and administrative centre of the whole country, a special-class city. Since 2011, the city was aimed to be a 'Green – Civilised – Modern – Cultural' city, a dynamic and efficient urban area with high competitiveness domestically, regionally, and internationally; with a good living and working environment, high-quality entertainment and favourable investment opportunities[54]. Along with the growth of the economy and the continuous improvement of people's living standards, the demand for travel and the movement of passengers and goods have also been increasing. Consequently, the traffic situation in the capital city of Hanoi has been deteriorating. The traffic issues include increasing congestion, declining traffic safety, air pollution, etc. To improve the situation, the Vietnamese Government and the Hanoi City authorities have prioritised the development of an efficient public transportation system. Japan International Cooperation Agency (JICA) and the Vietnamese Government agreed to build a high-capacity, high-speed urban rail transit network, also known as the urban railway (UR), in Hanoi. Two lines in this network were planned to be built, namely UMRT Line 1 and Line 2.

One of the first efforts of the Vietnamese Government to consider TOD in the city can be referred to its request to the Japanese Government to study a model of Urban Mass Rapid Transit (UMRT) development linked with urban development under a HAIMUD project in 2009. The overall objective of the project is to develop specific strategies and programmes for integrated development between Phase 1 of UMRT Line 1 and Line 2 - which were already implemented - to maximise the benefits of both UMRT and urban

[54] Decision No. 1259/QD-TTg of the Prime Minister: Approving the General Construction Master Plan of Hanoi Capital to 2030, with a vision to 2050

development, thereby creating a new urban development model for cities. The specific objectives of the project were as follows:

- Develop development plans and implementation strategies for UMRT stations and related facilities.
- Propose ideas and development frameworks for the areas surrounding UMRT stations and along Hanoi UMRT Line 1 and Line 2.

The final report of the project was released in 2011 providing an orientation planning that aims to propose the overall development direction for the stations and the station areas of the UMRT Line 1 and Line 2, including both short-term and long-term planning. Details at the Vietnam zoning plan level were proposed for 32 stations of the two lines to achieve the following.

- Develop and upgrade physical infrastructure to ensure accessibility to the station and seamless transfer between stations.
- Develop and enhance urban areas to improve living conditions and stimulate the potential for socio-economic development and cultural preservation.
- Manage and operate in coordination with other UMRT lines, public transport services, and other operating systems.
- Establish zoning regulations to manage urban growth.

In addition, there was an independent effort related to TOD consideration included in a study of JICA for Hanoi metro line 5. Most of the land along the stations of the planned line was owned by private entities.

With an aim to further implement findings of the HAIMUD project, another TOD effort was noted with the implementation of the Research and Implementation Project for the Development of Integrated Rail Transit and Urban Development in Hanoi, Vietnam (HAIMUD 2). The aim of the HAIMUD2 was to support Hanoi in establishing an appropriate implementation mechanism to successfully integrate the rail transit system with urban development as well as other transportation systems. This would be achieved by detailing the strategic plans and realising the short-term projects proposed by the HAIMUD project. The specific objectives of the project were as follows:

- Develop strategic plans including improving station access conditions, promoting integrated urban development, and enhancing local conditions for all stations based on a review of HAIMUD results, relevant plans, and projects, serving as input for the Sub-Zoning Plan being prepared by the Hanoi People's Committee.
- Conduct pre-feasibility studies including (a) a pre-feasibility study on transportation projects to improve access conditions to urban railway stations, (b) a pre-feasibility study on the construction of an underground parking lot at Tran Hung Dao Station, and (c) a pre-feasibility study on TOD (transit-oriented development) in the Giap Bat Station area.
- Provide recommendations for improving the institutional framework to facilitate more effective project implementation.

The final products of HAIMUD2 were released in 2015 including proposed designs of the selected stations in line with the zoning level plan of the Vietnam planning system. Like the situation of the HAIMUD, there were no follow-up activities of the city to make TOD visible after the HAIMUD2 project.

A further effort on TOD from the Japan side was noted within a project scope in 2018. From November 2017 to May 2018, the Japanese Ministry of Economy, Trade, and Industry (METI) conducted a study to promote the development of urban railways in Hanoi. Based on the proposal of the METI research team, Hanoi metro line 2 (Nam Thang Long - Noi Bai section) was selected as the priority for development. With the agreement between the Hanoi People's Committee and JICA, a survey and data collection study for the northern extension of metro line 2 (Line 2.3), funded by JICA, was launched at the end of June 2018. The primary scope of this research is the integrated development planning of railways and urban areas from the perspective of TOD. The research scope was as follows:

- Review of the city railway development plan in association with the financial assessment and financial plan, the environmental impact assessment as well as the implementation system.
- Addressing the issue of the railway alignment, followed by the station layout planning.
- Designing the areas surrounding the stations with the goal of maximising the benefits of TOD.

- Based on the defined TOD areas, estimations of the population and the number of people commuting to work in the areas around each station through the following process:
  - Calculating the buildable area.
  - Determining the construction density.
  - Calculating the floor area.
- Forecasting the railway transportation demand based on the population projections for the TOD areas.

Through the above process, the railway development plan and the urban development plan were closely integrated. The output of the research would serve as the basis for the Hanoi People's Committee to conduct a pre-feasibility study for the project. The final report of the research was released in 2020.

Continued with previous efforts on TOD, starting from 2020, a survey funded by JICA on Data Collection for Urban Planning and TOD was conducted for both Hanoi City and Ho Chi Minh City on TOD. The aim of the survey was to establish future collaborative projects with the two cities in the fields of urban planning and TOD. Key scopes of work of this study are as follows:

- Identify institutional issues and solutions related to urban planning and the development of urban railway station areas.
- Analysis results and recommendations for urban planning and TOD in the two cities.

The final report of the survey released in 2022 showed several key issues for TOD consideration in the city:

- The analysis results of urban rail access conditions by phase, based on the population and estimated number of workers in the TOD area within a 500-metre radius from the stations, indicate that approximately 40% of workers and 20% of Hanoi's population can access the urban rail system via lines 2A, 2-1, and 3-1. This result underscores the significance of the aforementioned three urban rail lines.
- The general construction plan for Hanoi aims to significantly reduce the population of the eight central districts of Hanoi by 2020. However, all districts except Hoan Kiem have experienced population growth. One of the reasons for this is the delay in urban infrastructure development, particularly the development of the public transportation system, which is the primary means of commuting from the suburbs to the city centre.
- It is necessary to improve the accuracy of population forecasts by integrating all relevant data, such as private investment, market trends, the pace of public investment, and urban demographics. Population forecasts could aim to set more scientifically grounded goals, rather than merely reflecting the planners' aspirations. The overall urban planning should strive for an integrated approach to urban structure and mobility conditions, specifically addressing the locations of residential areas and employment zones.
- Hanoi still has only one central business district. Therefore, it is essential to consider an urban structure with multiple central business districts. Developing residential areas in the suburbs, expanding urban rail lines, and planning housing development is expected to enhance urban productivity. Adjusting the Master Plan for Transportation, at least in the public transportation sector from a TOD perspective, is highly necessary.

The latest TOD efforts were noted with several independent supports from the World Bank to the city. First, starting from 2022, there was a study on the vulnerability of the Hanoi UMRT Line 5 and its components to improve its resilience against natural hazards. A disaster-risk-management-informed (DRM) TOD concept was employed to assess the TOD potentials of the stations along the line. Second, to complete the overall design of the site plan for the Ngoc Hoi National Railway Station complex, the City People's Committee requested the World Bank to support the project and the technical design of the station's master plan. The site plan for the Ngoc Hoi National Railway Station, which is the starting point of the railway line, has been preliminarily designed by the Hanoi Department of Transport in collaboration with the Investment Planning Department - Ministry of Transport, and the Vietnam Railway Authority. The Ngoc Hoi complex has been approved by the Hanoi City People's Committee with a detailed planning ratio of 1:500. The station site covers a total area of approximately 251 hectares and functions as a hub for both the North-South railway line and the Hanoi urban railway line. The final report was released in 2025.

The timeline of the above-mentioned studies is illustrated in Figure 32.

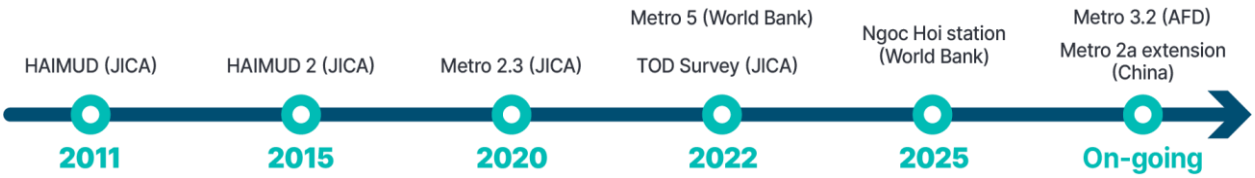


Figure 32: Timeline of previous TOD studies in Hanoi

In sum, most of previous TOD efforts made for Hanoi were at the project level, which is insufficient to enable a TOD initiative in the city because the enabling environment, especially institutional and regulatory frameworks for planning, financing and Operating & Managing (O&M) of TOD, were not systematically addressed.

4.3. National and Sub-national Policy Initiatives for TOD Development in Hanoi

One of the first legal milestones for TOD development in the country can be referred to Resolution No. 06-NQ/TW dated January 24, 2022, by the Politburo on the planning, construction, management, and sustainable development of Vietnam's urban areas by 2030, with a vision towards 2045. The resolution outlined several notable tasks, including:

- Develop and implement synchronised mechanisms and policies for the development of Hanoi Capital, Ho Chi Minh City, centrally governed cities, and regional central urban areas into modern, smart cities that lead and create a ripple effect, fostering urban regional linkages.
- Develop new urban models suitable for practical conditions, focusing on TOD models; To research and establish criteria for identifying and developing urban areas with distinctive positions and functions, such as university development, innovation centres, border-gate economies, industrial zones, islands, ports, airports, etc., and to issue appropriate specific mechanisms and policies for their development.

Regarding Hanoi City, the above direction was then strengthened by Resolution No. 15-NQ/TW dated May 5, 2022, of the Politburo on the orientation and tasks for the development of the capital city of Hanoi until 2030, with a vision toward 2045. The resolution highlighted key tasks and solutions:

- Focus on investing in and upgrading the socio-economic infrastructure system of the capital in a comprehensive, synchronised, modern, and efficient manner.
- Prioritise the rational allocation of state budget funds, coupled with enhancing decentralisation and devolution of power to the capital.
- Accelerate the development of a synchronised and modern transportation system; expedite the progress of urban railway projects.

Further commitment to the development of urban railway system in Hanoi City was noted by key documents, including:

- Resolution No. 29-NQ/TW dated November 17, 2022, of the 13th Central Committee of the Party on continuing to accelerate industrialisation and modernisation of the country until 2030, with a vision toward 2045. The resolution outlined key tasks and solutions, including "researching and promptly investing in the construction of the North-South high-speed railway and urban railway lines in Hanoi and Ho Chi Minh City".
- Resolution No. 30-NQ/TW dated November 23, 2022, by the Politburo on socio-economic development and ensuring national defence and security in the Red River Delta region by 2030, with a vision toward 2045, identifies the tasks and solutions: "Research and invest in urban railway lines connecting Hanoi with Bac Ninh, Hung Yen, Ha Nam, and Vinh Phuc."
- Resolution No. 81/2023/QH15 dated January 9, 2023, on the National Master Plan for the period 2021-2030, with a vision toward 2050, sets the goal of developing infrastructure to form the basic framework of the national infrastructure system, including urban railways, and directs the Hanoi urban area to focus on developing synchronised and modern urban infrastructure and connectivity infrastructure, including urban railway lines, accelerating the progress of completing urban railway projects.
- Conclusion No. 49-KL/TW dated February 28, 2023, by the Politburo on the orientation for the development of Vietnam's railway transportation by 2030, with a vision toward 2045, sets the goal to complete the urban railway system in Hanoi (with connectivity to the Capital region) by 2035.

- Documents and Resolutions of the 17th Congress of the Hanoi Party Committee for the term 2020-2025, under the key targets by 2025, suggests that the share of public passenger transport could reach 30-35%. Regarding the development of synchronised, modern, and expanded urban infrastructure systems, it requires an acceleration of the progress of elevated transportation projects, urban railways, and underground works associated with the ability to synchronously connect various forms of public passenger transport ... prioritise investment and put into operation 2 to 3 urban railway lines for high-capacity, high-speed passenger transport.

Regarding the development orientation of Hanoi's urban railway, on March 31, 2016, the Prime Minister signed Decision 519/QD-TTg, approving the capital's transportation plan up to 2030, with a vision to 2050, including 10 urban railway lines connecting the inner city and future satellite cities of Hanoi.

Notably, in Conclusion No. 49-KL/TW (Conclusion 49) dated February 28, 2023, by the Politburo on the development orientation of Vietnam's railway transportation up to 2030, with a vision to 2045, Hanoi is required to complete the 10 urban railway lines approved under Decision No. 519/QD-TTg (Plan 519) before 2035. To construct and complete these 10 urban railway lines as per Conclusion 49, the Hanoi City budget may need a very large investment capital. It is estimated that the construction of the urban railway lines alone could require approximately 40.5 billion USD, while the capital demand for developing TOD areas is also substantial. It is be noted that according to the adjusted Capital Master Plan, Hanoi needs to develop urban areas following the TOD orientation for 09 urban railway lines with 217 stations and a total planned TOD area of 6,073 hectares.

In a clear notion on the importance of TOD development to the city, a critical milestone for the development was set through a strong support of the Capital Law approved in 2024. According to Article No.31 of the Capital Law (revised one), the following key policies for TOD are explicitly stated:

- Urban development oriented towards public transportation (the TOD model) is a planning, renovation, refurbishment, and urban development solution that takes urban railway transit hubs or other mass passenger public transportation hubs as focal points for residential, commercial, service, and office activities within walking distance to public transportation. This aims to enhance land use efficiency, public infrastructure, community health, reduce personal motorised vehicles, decrease environmental pollution emissions, and integrate with the preservation and promotion of cultural values.
- The TOD area includes urban railway stations, depots, pick-up and drop-off points for other mass passenger public transportation modes, and adjacent zones as determined by relevant zoning or detailed planning for the construction of transportation routes, urban railways combined with urban renovation, refurbishment, and urban development investment.
- The formulation, decision-making, and management of urban railway system planning, transportation route planning using other mass passenger public transportation modes, and TOD areas shall comply with the following regulations:
  - Based on the Capital Master Plan and the General Capital Plan, the Hanoi People's Committee may adjust land use functions within TOD areas to exploit land resources and added value from land, develop urban railway routes, other public transportation modes, and urban development within TOD areas.
  - Within TOD areas, the City People's Committee may decide on architectural planning indicators, technical infrastructure, social infrastructure, spatial requirements, and land use that differ from national technical regulations on construction planning, ensuring compatibility with the General Capital Plan.
  - For areas with approved zoning plans or equivalent, when formulating urban railway route plans, transportation routes using other mass passenger public transportation modes, or TOD area plans, the assigned agencies or organisations may propose new or different content from the approved plans and submit them to the City People's Committee for consideration and decision. The approval of urban railway route plans or detailed TOD area plans shall replace the relevant partial adjustments in the approved zoning plans or equivalent, and no further procedures for partial adjustment of previously approved planning documents are required.
- Investment in urban railway development in the City shall prioritise the TOD model, ensuring modernity, synchronisation, sustainability, and compliance with the following regulations:

  - The City People's Council shall decide on investment policies for urban railway projects under the TOD model according to investment phases; decide on separating compensation, support, and resettlement components into independent projects.
  - The City People's Committee shall decide on investment in urban railway projects under the TOD model, decide on or approve investment policies for component projects, and decide on land acquisition, compensation, support, and resettlement projects.
  - The content, sequence, procedures, and authority for appraising projects shall be like Group A projects under the authority of provincial-level People's Councils as per public investment laws.
  - The City People's Committee may decide on the application of standards and regulations for the City's urban railway routes.

- Within TOD areas, the Hanoi City may collect and use 100% of revenues from the following sources to develop urban railway systems, public transportation systems, and technical infrastructure connecting to public passenger transportation systems:

  - Revenue from the increased floor area of civil construction projects due to increased land use coefficients and other planning indicators in TOD areas.
  - Revenue from exploiting added value from land in TOD areas.
  - Infrastructure improvement fees.
  - The City People's Council shall specify the management, operation, and exploitation of urban railways and TOD areas; methods for determining revenue levels, authority, sequence, and procedures for collecting revenues specified in the Article, ensuring no overlap with other taxes and fees.

In addition, TOD development in the city is strongly supported by a new version of the Land Law approved in 2024. There are three special points in the law that are expected to create a breakthrough for the TOD development:

- First, the procedures for compensation, support, and resettlement when land is reclaimed are clearer and more transparent. This helps both project investors, state management agencies, and the people to easily agree and apply.
- Second, Article 159 of this law stipulates that provinces and centrally run cities will announce new land price tables effective from January 1, 2026. Annually, the People's Committees of provinces and cities must submit to the People's Councils at the same level for approval any adjustments, amendments, or supplements to the land price tables to be announced and applied from January 1 of the following year. This means that the land price table will be issued annually (if there are adjustments, amendments, or supplements) instead of every five years as the old version of the Land Law. Adjusting the land price table according to the new regulations will be very flexible, suitable for the actual land prices in localities, avoiding disadvantages for the people, and helping project preparation and investment planning to be more realistic, especially in site clearance.
- Third, the 2024 Land Law emphasises that land valuation must ensure market principles instead of being based on the minimum and maximum land prices in the land price framework issued by the Government as currently. At the same time, the law stipulates on-site resettlement, increasing people's consensus when implementing land recovery for TOD construction. Additionally, there are many other new points that will create very favourable conditions for land management and use for the TOD development goals of Hanoi and the whole country.

Notably, the determination of TOD implementation was demonstrated through the Decision No. 1668/QD-TTg of the Prime Minister approving the Adjustment of the General Planning of Hanoi Capital to 2045, with a vision to 2065. In which, TOD is considered a counterbalancing approach aimed at transforming a society towards a compact urban model. TOD contributes to the formation of an environmentally friendly, low-carbon society by shifting from the use of personal vehicles to public transportation, which consumes less fuel and has lower CO_2 emissions, thereby striving towards "smart growth". It can also contribute to enhancing biodiversity and building climate resilience. The aim of TOD is to form a small, concentrated, and mixed-use residential and commercial area designed to optimise access to public transportation, encouraging the use of public transport services within walking distance. TOD fundamentally aims not only to effectively use urban rail systems but also to promote smart growth for urban areas, ensuring faster socio-economic development in the regions surrounding urban rail stations.

Three types of TODs were suggested in the adjusted General Planning of Hanoi Capital. Type 1 TOD orientation is associated with national and regional infrastructure. It corresponds to the Master Construction Plan. Type 2 TOD orientation is associated with urban and urban cluster infrastructure. It corresponds to the Master Plan and Zoning Plan. Type 3 TOD orientation is associated with planning and projects within a 500–1000-metre radius and station areas correspond to the Zoning Plan and Detailed Plan. The orientation for redevelopment following the TOD Model in Hanoi is presented in Figure 33.

The city's most recent TOD development plan is outlined in Resolution 188/2025/QH15 dated February 19, 2025, on piloting certain special mechanisms and policies, particularly those related to the development of the urban railway network in Hanoi and Ho Chi Minh City. Notable points of the resolution include:

- TOD area planning is a specialised development plan oriented towards prioritising public transportation for areas including urban railway stations or depots and their adjacent zones, aimed at constructing urban railway lines combined with investment in renovation, urban refurbishment, and urban development.
- An urban railway project following the TOD model is an investment project for urban railways combined with urban development investment within the TOD area.
- The urban railway project and the TOD model urban railway project shall be implemented immediately upon the formulation, appraisal, and investment decision of the project, without having to carry out the procedures for formulating, appraising, and deciding on the investment policy, as well as other procedures related to the investment policy decision as stipulated by relevant laws.
- The City People's Committee is authorised to organise the formulation, appraisal, investment decision, and adjustment of urban railway projects and TOD model urban railway projects without having to formulate, appraise, approve, or adjust land use planning and plans as stipulated by relevant laws.
- The procedures for formulation, appraisal, investment decision, and adjustment of urban railway projects and TOD model urban railway projects shall be carried out similarly to Group A projects managed by local authorities as stipulated by relevant laws.

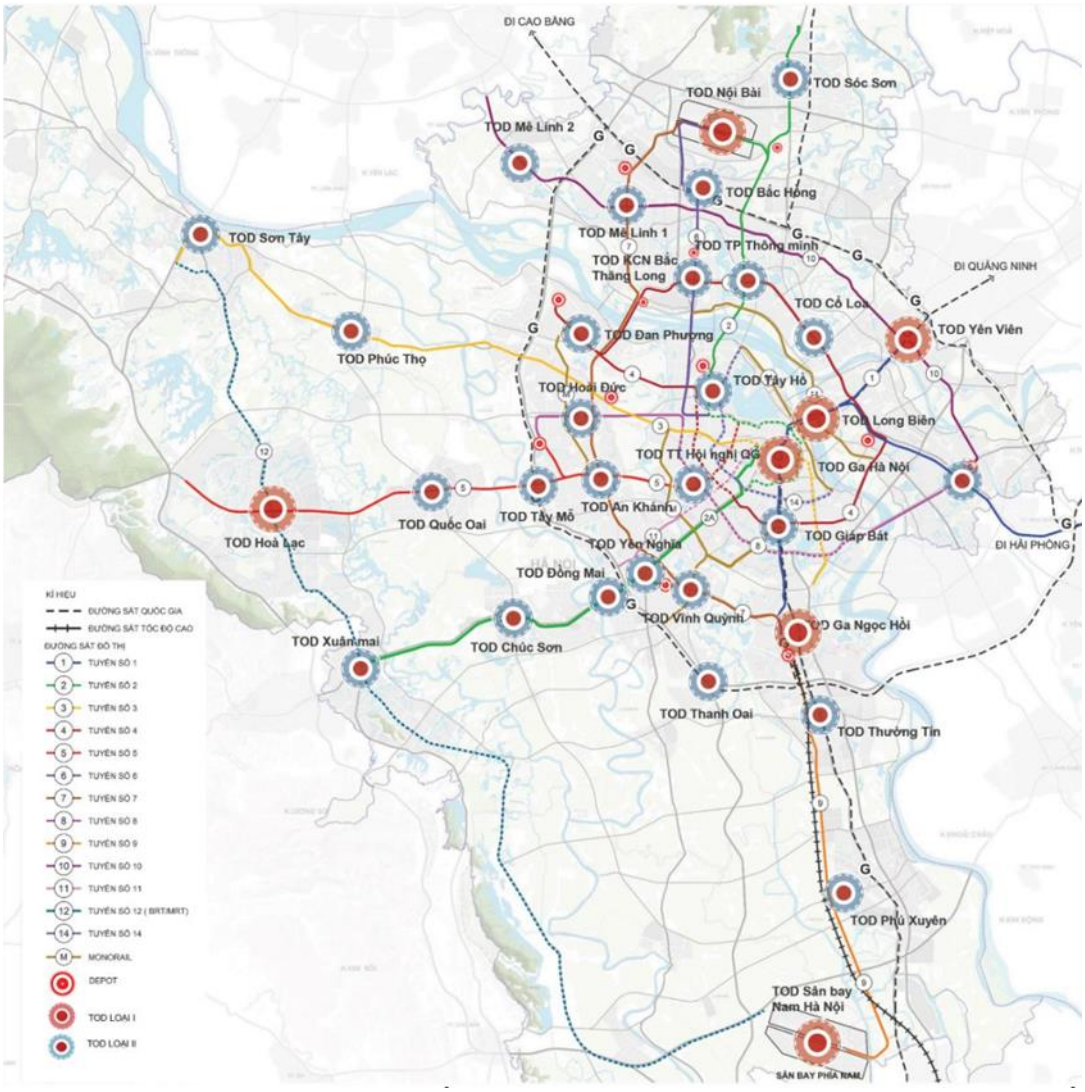


Figure 33: Tentative plan of TOD development in Hanoi

- The City People's Committee decides on the division of the project into component projects and sub-projects when making the investment decision. The division into component projects and sub-projects does not need to comply with the regulations of construction law.
- In cases where the project implementation period is extended without increasing the total investment, the City People's Committee has the authority to decide on the extension of the implementation period without having to carry out project adjustment procedures.
- The City People's Committee has the authority to decide on urban railway works (stations, intersections, bridges, and related items of the urban railway project) without requiring architectural design competitions.
- Urban railway projects and urban railway projects following the TOD model shall prepare a comprehensive technical design (FEED) to replace the basic design in the Project Feasibility Study Report; the selection of EPC contractors is based on the approved investment project; the investor has the authority to approve design stages following the FEED design.
- For work items that exist but are not yet suitable or not included in the system of norms, unit prices for construction, operation, and maintenance of projects issued by competent authorities, urban railway projects, and TOD model urban railway projects shall apply the system of construction norms, construction prices, operation, and maintenance published by international organisations or from similar railway projects worldwide, and these shall be converted to the calculation time point.
- The City People's Committee is authorised to decide on the application of forms of contractor appointment for the selection of consulting contractors, non-consulting contractors, construction contractors; EPC contractors, turnkey contractors; and investors for urban railway projects and urban railway projects

following the TOD model. The procedures and processes shall comply with the legal regulations on bidding.

- The City People's Committee is authorised to decide on the use of the local budget reserve annually and to advance the following year's local budget estimate to implement projects, ensuring that the advance does not exceed 50% of the investment budget for basic construction in the implementation year of basic construction projects included in the assigned medium-term public investment plan.
- The City People's Committee organises the formulation and adjustment of the TOD area planning to determine the location, boundaries, and area of land to be reclaimed. Within the TOD area, the City People's Committee has the authority to decide on technical-economic indicators and land use planning indicators that differ from the national technical standards for urban and rural planning. However, these decisions also need to ensure the provision of technical infrastructure and social infrastructure systems. The City People's Committee is also authorised to adjust the land use functions within the TOD area to exploit land resources and the added value from the land, develop urban railway lines, and promote urban development within the TOD area.
- When formulating or adjusting the alignment plan, location of structures on urban railway lines, or TOD area planning, the City People's Committee has the authority to decide on matters that differ from the approved urban and rural planning, land use planning, and land use plans. The approval decision for the alignment plan, location of structures on urban railway lines, or TOD area planning will replace the relevant partial adjustments to the regional planning and does not require procedures to adjust the previously approved planning.
- Based on the TOD area planning, the City People's Committee is permitted to decide on the transfer of planning indicators between projects and structures within the TOD area without having to formulate or adjust land use planning and land use plans as stipulated by relevant laws.
- The City People's Council stipulates the content, procedures, and processes for implementing the transfer of planning indicators between projects and structures within the TOD area.

The timeline of the above-mentioned legal and regulatory efforts is illustrated in Figure 34.

Figure 34: Timeline of the legal efforts for TOD implementation in Hanoi

In sum, there have been strong policy efforts from the governments (central and local ones) to promote TOD implementation. These efforts are not limited to some general policies but comprising numerous special mechanisms to overcome legal obstacles and practical issues to TOD and urban railway implementation.

4.4. Potential Locations for TOD Pilot Project

This section aims to preliminarily review previous studies on specific sections of the Hanoi metro lines that were investigated for TOD implementation. This is to provide a general sense on the TOD locations potentially for a pilot project.

Hanoi urban railway system currently consists of 10 urban railway lines with a total length of approximately 410.8 km and 03 monorail lines with a total length of about 44 km. According to the Revised Master Plan for Hanoi Capital up to 2045, with a vision toward 2065, the urban railway network of Hanoi is expected to adjust lines 1, 2, 6, and 7, and add 5 new lines/sections with a total length of approximately 206.1 km. In addition, the city currently has 03 sections that have been approved for planning, and 06 sections where route alignment and station location studies have been conducted but have not yet been approved for planning. Of the metro line 2, the section from Thuong Dinh – Ring Road 2.5 - Buoi, may not be constructed. Of the metro line 4, the section of Me Linh - Sai Dong - Lien Ha, is proposed for partial adjustment of the route south of the Red River (within Ring Road 3) from elevated to underground. The urban railway system is illustrated in Figure 35.

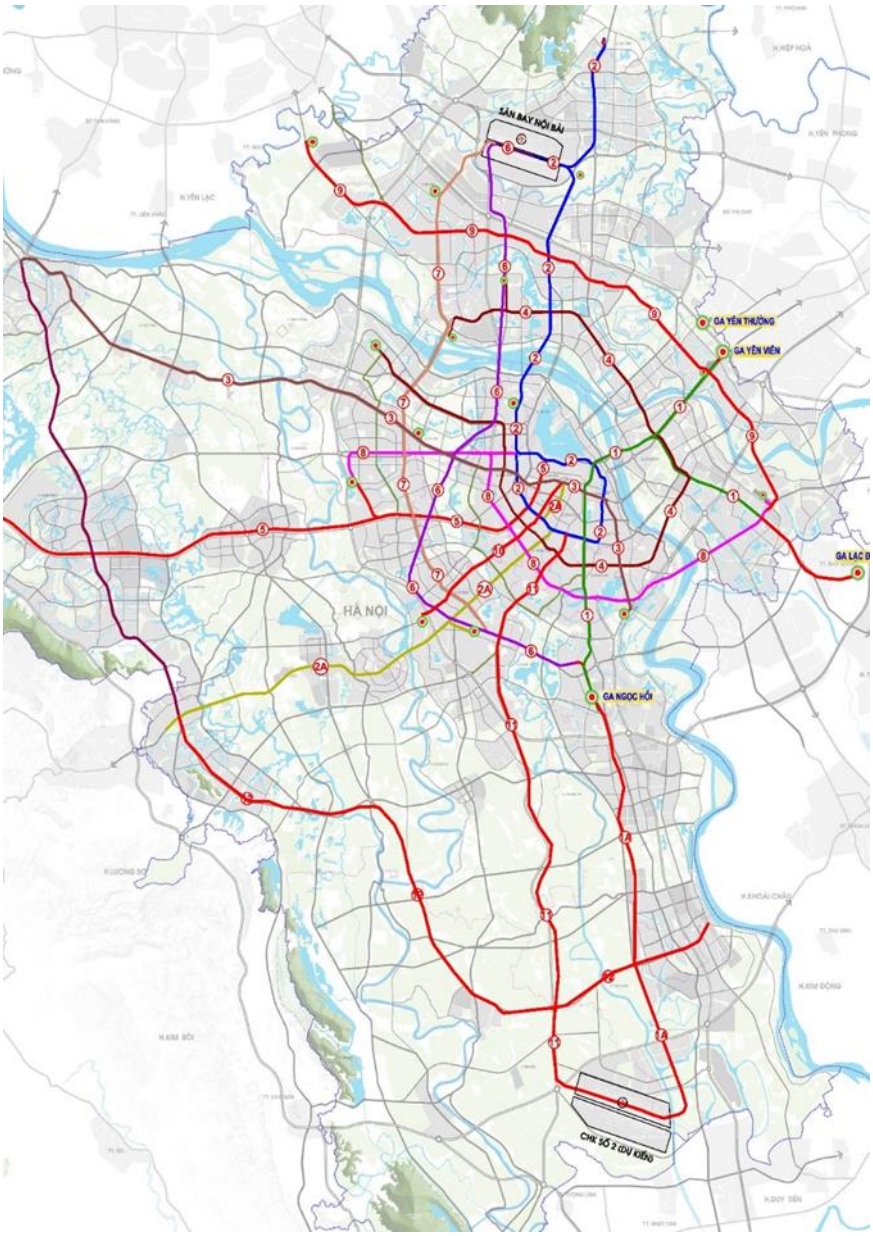


Figure 35: Hanoi's planned urban railway system[55]

Previous TOD studies suggested numerous potential locations for TOD development. These locations are presented in Table 8. It is be noted that these locations were mainly evaluated based on their importance in the investigated metro lines and related urban opportunities. Thus, they were not comprehensively evaluated according to the suggested 3V approach of the World Bank (i.e., node value, location value and market value). Importantly, they were considered in association with the existing legal framework which was insufficient for a TOD initiative. It is however that these evaluations can provide a good starting point for a screening work to identify a good candidate for a pilot TOD project in the city.

[55] MRB

Table 8: Candidates for a TOD pilot project in Hanoi

No.	Railway line	Section, direction	Length (km)	TOD investigation?	Prioritised TOD station/depot	Notes
1	Line 1	Ngoc Hoi - Yen Vien section	~ 36	Yes	* HAIMUD project: Gia Lam (Detailed Design, Line 1); Southern Long Bien Bridge (Detailed Design, Line 1); Hang Dau (Detailed Design, Line 2); Ha Noi (Line 1); Thong Nhat Park (Line 1); Bach Khoa (Line 2); Hoan Kiem Lake (Line 2). * HAIMUD2 project: Pre-feasibility TOD study for Giap Bat (Line 1) * The study on section 2.3 of metro line 2 (Noi Bai - Nam Thang Long): all stations * The survey project for urban planning and TOD for Hanoi and Ho Chi Minh city: two stations of section 2.1 of metro line 2 including Cong Vien station (C2) and Xuan Dinh depo.	JICA
		Gia Lam - Duong Xa section				
2	Line 2	Nam Thang Long - Tran Hung Dao section	~ 52	Yes		
		Tran Hung Dao - Thuong Dinh section				
		Thuong Dinh - Ring Road 2.5 - Buoi section				
		Noi Bai - Nam Thang Long section				
		Extended section to Soc Son				
3	Line 2A	Cat Linh - Ha Dong section	~ 34	Yes, for the extended section to Xuan Mai	Ongoing study. No information available	China
		Extended section to Xuan Mai				
4	Line 3	Nhon - Hanoi Station section	~ 57	Yes, for the section of Hanoi Station - Yen So section	Ongoing study. No information available	AfD
		Troi - Nhon section				
		Hanoi Station - Yen So section				
		Extended section to Son Tay				
5	Line 4	Me Linh - Sai Dong - Lien Ha	~ 54	No	N/A	
6	Line 5	Van Cao-Ring Road 4 section	~ 40	Yes	Stations within Ring Road 4 are highest in TOD readiness	World Bank
		Ring road 4 - Hoa Lac section				
7	Line 6	Noi Bai - Ngoc Hoi	~ 43	Yes, for Ngoc Hoi station	Ngoc Hoi station is the connecting point between national railway and urban railway	World Bank
8	Line 7	Ha Dong - Me Linh	~ 28	No	N/A	
9	Line 8	Son Dong - Mai Dich section	~ 37	No	N/A	

No.	Railway line	Section, direction	Length (km)	TOD investigation?	Prioritised TOD station/depot	Notes
		Mai Dich-Ring Road 3 - Duong Xa section				
10	Satellite Urban Connection Line	Son Tay - Hoa Lac - Xuan Mai	~ 32	No	N/A	
Additional railway lines according to capital regional planning and general capital planning						
11	Line 1	Gia Lam - Lac Dạo (extension from Duong Xa to Lac Dao)	5.4	No	N/A	
12	Line 2	Adjusted section from Tran Hung Dao - Cho Mo - Nga Tu So - Hoang Quoc Viet	6.7	No	N/A	
13	Line 7	Section Me Linh - Noi Bai	18	No	N/A	
14	Line 1A	Ngoc Hoi - Second Southern Airport	29	Yes, for Ngoc Hoi station	Ngoc Hoi station is the connecting point between national railway and urban railway	World Bank
15	Line 9	Me Linh - Co Loa - Duong Xa	48	No	N/A	
16	Line 10	Cat Linh - Lang Ha - Le Van Luong - Yen Nghia	12	No	N/A	
17	Line 11	Ring Road 2 - Southern Axis - Second Southern Airport	42	No	N/A	
18	Line 12	Xuan Mai - Phu Xuyen	45	No	N/A	

While Ngoc Hoi station is a unique station that serves as the connecting point between the national railway system and the Hanoi urban railway system, most of the investigated stations were with stations along metro lines 1 and 2. Among these, four emerging locations highlighted by previous studies include the followings:

- Gia Lam station (Line 1).
- Southern Long Bien Bridge station (Line 1) in association with Hang Dau station (Line 2).
- Cong Vien station (Line 2).
- Xuan Dinh depot (Line 2).

The above-mentioned stations could be further evaluated to define the best candidate for a TOD pilot project in Hanoi.

5. Assessment of Existing Laws and Regulations for Urban Development Projects in Relation to TOD

5.1. Urban Development Legal Framework

Legal Framework of Vietnam explains a hierarchy of legal documents and the issuing organisations. National Assembly is the legislative organ enacting constitution and laws. Standing Committee and the President Office are the organs of the National Assembly. They also issue legal documents, as the sessions of the National Assembly are held just several times a year. Usually, a law is enacted, and decrees are issued to determine the details for the implementation of the law. Circulars and decisions are to determine further details of the Decree. An ordinance is issued by the Standing Committee and not enacted by the National Assembly. It is issued in place of a law only when relevant law is not yet legislated by the National Assembly.

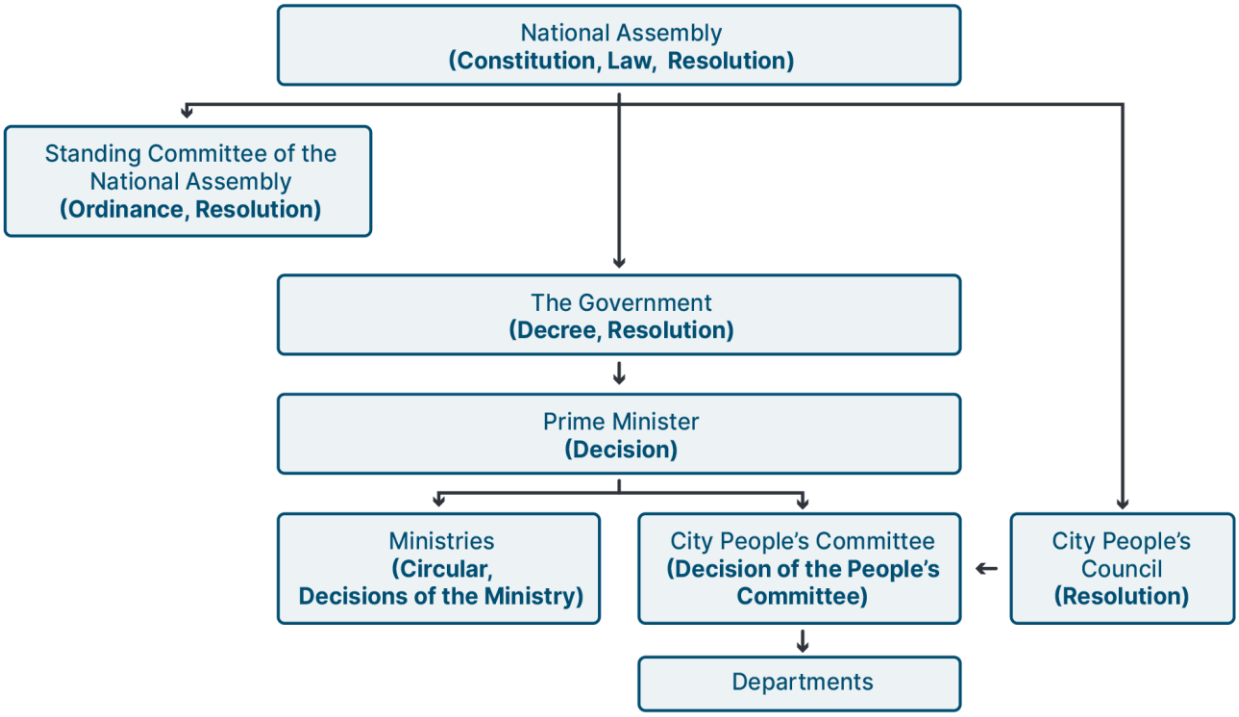


Figure 36: Legal frameworks of Vietnam

The legal framework governing urban planning and development management in Vietnam faces significant challenges due to overlapping regulations at various levels. This complexity manifests in two dimensions:

- Vertical overlap: Inconsistencies exist between legal documents at different hierarchical levels of government.
- Horizontal overlap: Discrepancies occur across different sectors involved in urban development.

As a result, the multitude of decisions, resolutions, circulars, directives, and regulations issued by various government bodies often lack coherence, leading to implementation conflicts. This situation is further complicated by two factors:

- The 10-year cycle for adjusting the law system, which can leave regulations outdated or misaligned with current needs.
- Delays in issuing supporting Decrees and Circulars that specify the implementation of laws, often taking 1–2 years.

These delays create additional complexity as new amendments and supplements to laws are introduced, sometimes before the previous regulations have been fully implemented or understood. This ongoing flux in the legal landscape poses significant challenges for urban planners, developers, and local authorities in effectively managing urban development projects.

5.2. Process of Planning, Designing, Financing and Operating Urban Development Project

Urban development projects in Vietnam follow a complex and complicated process involving multiple stages and stakeholders. The process is also affected by multiple laws in different sectors. Basically, The Ministry of Construction issued Consolidated Document No. 03/VBHN-BXD on consolidating the Decree on urban development investment management.

Principles of investment in urban development

- Ensure compliance with local and national socio-economic development master plans, comply with construction planning, urban planning, urban development area implementation plans, and investment laws construction and relevant laws.
- Ensure synchronous development of technical infrastructure, social infrastructure, and landscape architecture in urban areas, associated with national security and defence.
- Ensuring economical and effective exploitation and use of resources; Protect the environment and respond to climate change and natural disasters for the purpose of sustainable development.
- Create a good living environment for urban residents; ensure the interests of the community are in harmony with the interests of the State and investors.
- Preserve and promote national cultural identity, preserve and embellish existing cultural and historical relics.

It is noted that there are multiple types of urban development projects, classified based on various criteria: scale, characteristics, type of construction works and capital resources[56].

Requirements for preparation, appraisal and approval of urban planning: The preparation, appraisal, and approval of urban planning in Vietnam are conducted in compliance with the provisions of the Construction Law, Urban Planning Law, and their related guiding documents. These processes are initiated by the relevant authorities and include a clear decentralisation of planning responsibilities. Specifically, the People's Committees at various levels (city, provincial, or district) are entrusted with the authority to oversee urban planning activities, depending on the type and scale of the urban plan. This structured delegation ensures that planning is appropriately managed at the level best suited to the scope and impact of the plan.

Different types of urban plans

Figure 37: Type of urban plans in Vietnam[57]

According to Urban Planning Law No. 30/2009/QH12 (2009) and No. 16/VBHN-VPQH (2020), it is essential to understand and comply with content and regulation criteria upon each urban plan, including:

- **Master planning** is prepared for centrally cities, provincial cities, towns, townships and new urban areas.
- **Zoning planning** is prepared for areas in cities, towns and new urban areas.

[56] Law on Construction 2014 - as amended in 2020
[57] Urban Planning Law No. 30/2009/QH12 (2009) and No. 16/VBHN-VPQH (2020)

- **Detailed planning** is prepared for the area according to development requirements, urban management or construction investment needs (as outlined in Article 16.1) And
- **Urban design:** In cases where the urban area has basically stabilised the use of land plots, it is not necessary to prepare an urban planning project but must prepare a separate urban design project as a basis for construction investment management and construction permits. (as outlined in Article 33).

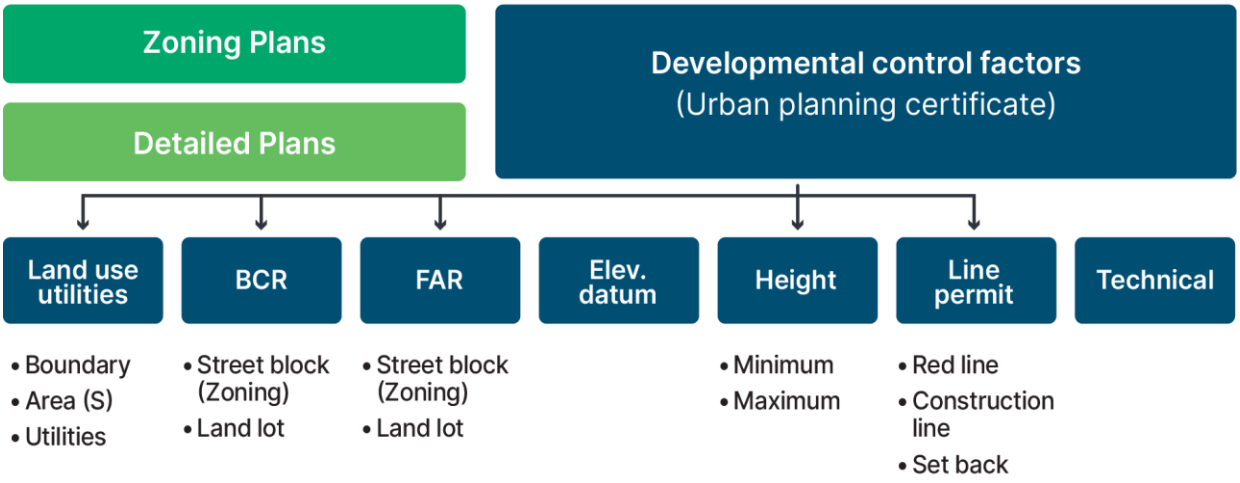


Figure 38: Regulations in accordance with urban plan in Vietnam[58]

Various components are regulated in accordance with urban plan, including:

- Boundaries, scope, and nature of the planning area.
- Location, boundaries, nature and scale of functional areas in the planning area; indicators on building coverage ratio, floor area ratio and maximum and minimum height and elevation datum for each street block; red line boundaries, construction boundaries, construction grade and specific technical requirements for each route; Protection scope and safety corridor of technical infrastructure works.
- Main spatial axes and highlights of the urban area.
- Location, scale and scope of protection, safety corridor for underground works.
- Areas for conservation, renovation and beautification of historical and cultural relics, scenic spots, landscape topography and environmental protection.

Steps of elaboration of urban plans

- Step 1: Prepare and approve urban planning tasks.
- Step 2: Investigation and field survey; Collect maps, documents, and data on natural conditions, current socio-economic status, relevant national planning, regional planning, and provincial planning to create urban planning projects.
- Step 3: Prepare construction planning projects.
- Step 4: Appraises and approve urban planning projects.

The contents of the urban development area proposal dossier include:

- Proposal document
- Summary report on expected urban development area including:
  - Name of urban development area; Location and boundaries of urban development areas (with illustrative diagram).
  - Describe the current status of the urban development area, explanation of the rationale for forming urban development areas.
  - Nature/main functions of the area.

[58] Urban Planning Law No. 30/2009/QH12 (2009) and No. 16/VBHN-VPQH (2020)

- Introducing the basic content of the approved urban general planning.
- Urban development area implementation plan.
- Estimated implementation period.
- Preliminary estimates and estimates of investment resources for urban development.
- Propose a form of management or establish an Urban Development Area Management Board according to the provisions of Article 13 of this Decree.
- Establish a new or use an existing Urban Development Area Management Board to manage each urban development area.

Contents of the urban development area implementation plan:

- Determine the list of projects in urban development areas on the basis of zoning planning for urban areas of type IV and above, general planning for urban areas of type V and areas with specialised functions.
- Determine the order of construction investment and implementation progress of urban development investment projects, ensuring the implementation of frame technical infrastructure projects and a number of urgent social infrastructure projects. of the region before implementing other component projects.
- Relocation and resettlement plan.
- Capital plan, capital mobilisation model.
- Organise management and implementation of capital mobilisation models.

5.3. Urban Development Areas

Urban development area is an area identified for urban development investment in a certain period. Urban development area includes 5 types:

- New urban development area
- Expanded urban development area
- Renovation area, conservation area
- Urban redevelopment area
- Area with specialised functions

An urban development area may include one or more urban functional areas. An urban development area may be within the administrative boundaries of one or more provinces or cities. An urban development area may **include one or more urban development investment projects.**

Urban development investment projects: Urban development investment projects include projects specified in Clause 8, Article 2 of Decree 11/2013/ND-CP, amended by Point a, Clause 1, Article 4 of Decree 35/2023/ND-CP: *"**Urban development investment projects** include **urban area construction investment projects and urban construction investment projects".***

Based on the classification of urban development areas, there are five types of urban development investment projects.

Figure 39: Five types of urban development investment projects[59].

- **New urban area construction investment project** is an investment project to build a new urban area on land converted from other types of land into urban construction land.
- **Urban area redevelopment project** is a project to build new architectural works and technical infrastructure on the foundation of existing works that have been demolished according to the urban planning approved by competent authorities.
- **Urban area renovation and beautification project** is a project to renovate and upgrade the exterior or structure of works in the existing urban area but not change more than 10 of the land use indicators of the area.
- **Urban area conservation and beautification project** is a project to preserve and embellish the cultural, historical and architectural values of works and landscapes in the cultural heritage area of the urban area.
- **Mixed-use urban area construction investment projects** are urban area construction investment projects that may include new construction works, renovation, redevelopment, conservation and beautification work.

There is no specific instruction on the process of implementing urban construction investment projects according to the above classification. The implementation processes are mentioned sporadically according to specific content, overlapped by laws and guiding decrees that are constantly changed in short periods of time.

5.4. Role of Investors in Urban Development Process

Figure 40 outlines the requirements for becoming an investor in different types of urban development projects. As defined by the Law on Construction and the Law on Housing, the categories of investors include state agencies, enterprises, and various political or socio-professional organisations. Each category must satisfy specific criteria, details as follows:

[59] Clause 8, Article 2 of Decree 11/2013/ND-CP, amended by Point a, Clause 1, Article 4 of Decree 35/2023/ND-CP

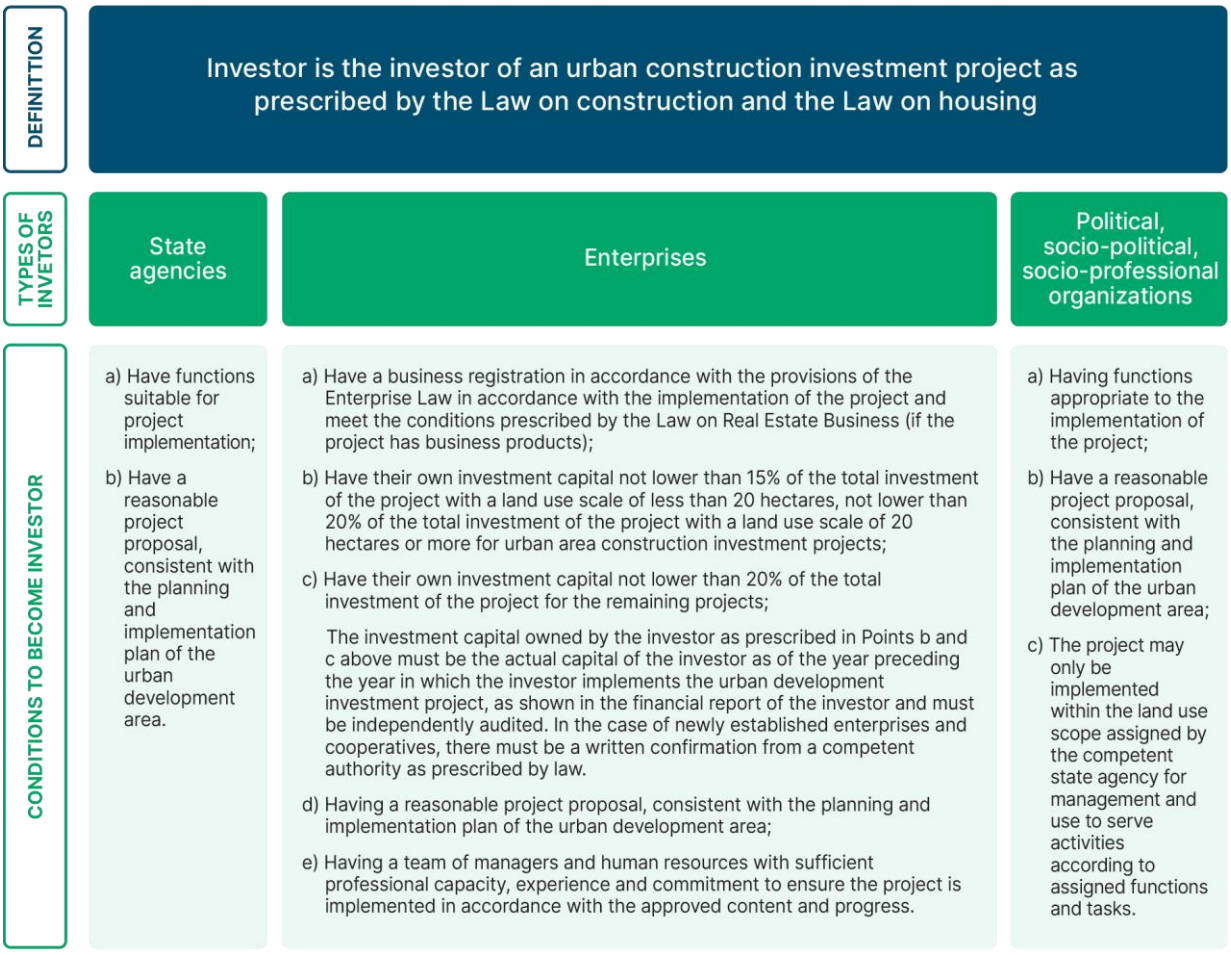


Figure 40: Overview about conditions to become investors in each type of urban development process

Table 9 provides an analysis of the characteristics and responsibilities of investors at various levels within the urban development process. It distinguishes between primary investors, who engage in urban development through mechanisms like land leasing or transfer and highlights the distinct roles and obligations each level of investor has in project planning, infrastructure development, and management. By detailing these responsibilities, the table offers a comprehensive framework for understanding how different investor levels contribute to urban development projects.

Table 9: Investor characteristics and its responsibilities by level in urban development process

By levels [60]	Level 1 Investors	Level 2 Investors
WHO	• State management agencies with functions. • Urban development area management boards; construction investment management boards assigned by competent state agencies. • Enterprises of all economic sectors, cooperatives. • Qualified socio-political and professional organisations according to the provisions of law.	• Secondary investors are level 2 investors or investors at the next levels participating in investing in urban development investment projects through leasing, transferring or receiving transfer of land use rights with infrastructure belonging to urban development investment projects to invest in construction works.
WHAT TO DO	• Prepare detailed planning (if the project area does not have an approved detailed planning), urban design and urban area construction investment project, submit to competent authorities for approval and implement in accordance with the approved detailed planning. • Carry out investment in construction of works in accordance with the approved detailed planning and project progress. • Invest in construction of technical infrastructure and social infrastructure systems to ensure synchronisation with the infrastructure system of the surrounding area, in accordance with the approved project implementation progress. • Ensure temporary connection between technical infrastructure in the project area and technical infrastructure systems outside the project scope in case the technical infrastructure system outside the project scope has not been invested in accordance with the approved planning. • Implement the requirements of the Provincial People's Committee on contributing to the construction of regional infrastructure and handing over the land area with infrastructure to create a fund for social housing construction in accordance with the provisions of the law on housing.	• Prepare detailed planning (if the project area does not have an approved detailed planning). • Urban design and urban area construction investment project, submit to competent authorities for approval and implement in accordance with the approved detailed planning. • Carry out investment in construction of works in accordance with the approved detailed planning and project progress. • Invest in construction of technical infrastructure and social infrastructure systems to ensure synchronisation with the infrastructure system of the surrounding area, in accordance with the approved project implementation progress. • Ensure temporary connection between technical infrastructure in the project area and technical infrastructure systems outside the project scope in case the technical infrastructure system outside the project scope has not been invested in accordance with the approved planning. • Implement the requirements of the Provincial People's Committee on contributing to the construction of regional infrastructure and handing over the land area with infrastructure to create a fund for the construction of social housing in

[60] Pursuant to Clause 12, Clause 13, Article 2 of Decree 11/2013/ND-CP

	• Organise the implementation of activities to provide housing management services, technical infrastructure systems, and other urban services within the scope of the project during the time of non-handover. • Manage the operation and ensure the quality of works that are not transferred or have not been transferred to the local government. • Supervise the implementation of construction investment by secondary investors (if any) in accordance with the detailed planning and approved project progress. • Provide guidance on procedures and coordinate with secondary investors (if any) to carry out procedures for transferring land with technical infrastructure or other products of the project in accordance with the provisions of law. • Other obligations as prescribed by law.	accordance with the provisions of the law on housing. • Organise the implementation of activities to provide housing management services, technical infrastructure systems, and other urban services within the scope of the project during the period of non-handover. • Manage the operation and ensure the quality of works that are not transferred or have not been transferred to the local government. • The secondary investor is typically under the management of the primary investor during the construction investment process, ensuring compliance with the approved detailed planning, implementing the construction investment according to the provisions of the contract signed between the two parties, the provisions of the Law on Construction and relevant laws. • Other obligations as prescribed by law.

5.5. Role of Government in Urban Development Process

Table 10 outlines the roles and responsibilities of various actors in the urban development process. It describes the procedures for recognising urban development areas, including the announcement and information dissemination by the **Provincial People's Committee**; also details the appraisal and approval processes for urban planning tasks by different levels of government, ensuring that projects align with approved plans. Additionally, it highlights the management of urban architectural landscapes and the preparation of land for development, emphasising the coordination needed among governmental bodies to facilitate successful urban development.

Table 10: Government roles in each part of the urban development process

Step of the process	Role of actors
Recognition of Investor/ urban development area	• Within 30 days from the date of the decision approving the urban development area, the Provincial People's Committee shall be responsible for organising the announcement of the urban development area and the implementation plan: providing information and creating conditions for investors to participate in investing in urban development projects. • The public announcement of the urban development area and the implementation plan shall be conducted through mass media and other methods suitable to the specific conditions of the locality. • The announcement content includes the main contents of the Decision approving the urban development area and the Urban Development Area Implementation Plan so that investors know, select and decide on investment projects.
Prepare, Appraise, Approve Urban Planning Tasks	• The Ministry of Construction shall appraise urban planning tasks and projects under the approval authority of the Prime Minister. • The provincial-level urban planning management agency shall appraise urban planning tasks and projects under the approval authority of the People's Committee at the same level, except for detailed planning tasks for areas under construction investment projects that have been granted planning permits.

	• The district-level urban planning management agency shall appraise urban planning tasks and projects under the approval authority of the People's Committee at the same level, except for detailed planning tasks for areas under construction investment projects that have been granted planning permits.
Prepare, Appraise, Approve Urban Planning	• The Ministry of Construction shall appraise urban planning and projects under the approval authority of the Prime Minister. • The provincial-level urban planning management agency shall appraise urban planning and projects under the approval authority of the People's Committee at the same level, except for detailed planning tasks for areas under construction investment projects that have been granted planning permits. • The district-level urban planning management agency shall appraise urban planning and projects under the approval authority of the People's Committee at the same level, except for detailed planning tasks for areas under construction investment projects that have been granted planning permits.
Management of urban architectural landscape space	• 1. The People's Committee of a city, town, or township comprehensively manages urban space, architecture, and landscape within the administrative boundaries under its management. • 2. The urban planning management agency assists the People's Committee of a city, town, or township in managing urban space, architecture, and landscape.
Prepare land fund for urban development according to planning	• The People's Committee at the competent level is responsible for organising site clearance for the area identified in the planning for the construction of technical infrastructure works and social infrastructure works serving public interests to implement the approved and announced detailed planning. • The recovery of land funds and compensation for people whose land is recovered shall be carried out in accordance with the provisions of the law on land. When recovering land funds, land users shall be compensated for assets legally created before the public announcement of the approved detailed planning. • The People's Committees at all levels shall create favourable conditions to ensure that investors properly implement the planning and investment plan. • When implementing a project to develop traffic routes according to the approved planning, it would be good practice for the competent state agency to simultaneously organise land recovery on both sides of the road according to the planning, organise auctions or bidding to select investors according to the provisions of law. • The scope of the construction investment project must be determined on the basis of ensuring compliance with the current land use status, harmoniously meeting the project objectives and urban beautification, avoiding the emergence of land areas that do not meet construction requirements or affect urban architecture and landscape. • In the case where the investment project only uses a part of the land plot, if the remaining area is too small to meet the requirements for use or affects urban architecture and landscape according to the Government's regulations, the State will recover and compensate the land user. • After the detailed planning is approved and announced, if the State has not yet carried out the reclamation, organisations and individuals in the planning area are allowed to continue to exploit, use, renovate, repair and temporarily construct according to the provisions of the Law on Construction.

5.6. Greenfield vs Brownfield Projects

Greenfield development project means conversion from agricultural or natural/unbuilt or unserved land. While **Brownfield development projects** refer to the conversion or redevelopment of previously built land. While the term "brownfield" does not have an official equivalent in local regulations, it can be closely associated with the redevelopment of "built land." These projects typically focus on large plots of land, such as decommissioned industrial sites, former military or institutional properties, and obsolete infrastructure. Brownfield development also targets degraded urban or suburban areas, including sites where property rights have become significantly fragmented, such as old residential zones with condominium apartments or other similar developments.

There are differences in management and regulations, including (I) Land and (II) Planning and building. For land, in terms of land use planning, greenfield development faces stricter control under land use plans ("Quy hoạch sử dụng đất") if the site involves rice crops, particularly bi-annual crops, or natural forests. Short-term land use plans ("Kế hoạch sử dụng đất") introduce additional technical barriers for land conversion. Brownfield development, especially in institutionally owned areas, typically involves less fragmented stakeholders compared to residential land acquisition, which can be highly complex. In term of land acquisition regulations, for compulsory acquisition, residential land acquisition takes longer than agricultural land, requiring at least 180 days to notify residents and finalise resettlement plans — 90 days longer than for agricultural land [61] (See below). **For** voluntary acquisition, acquiring residential land voluntarily is further complicated by fragmented ownership, individual negotiations, and loopholes in land tenure systems. These include unclear property rights and incomplete certifications for associated buildings.

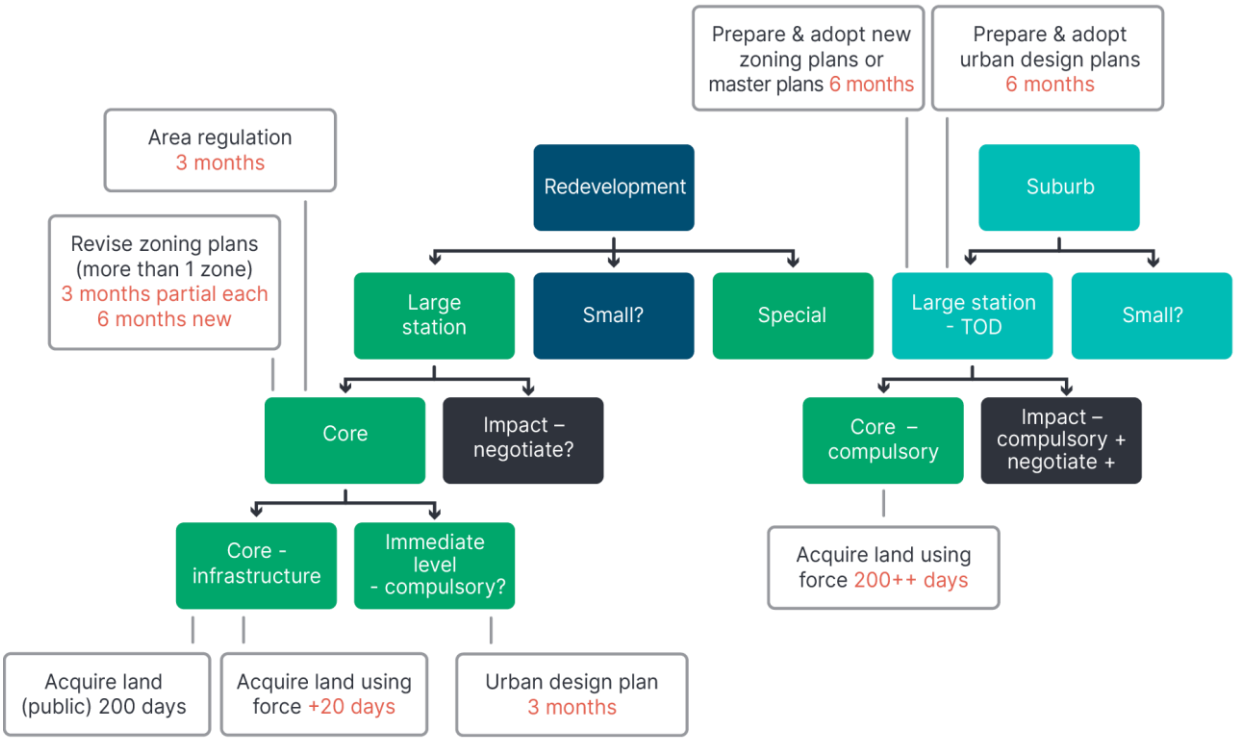


Figure 41: Land acquisition timeline analyses (green and brownfield development)[62]

[61] Item 1, Article 85, Land law 2024.

[62] GCIEP Team incorporated from various sources

For the redevelopment of brownfield sites, it's crucial to first consider the scale and significance of the project. In the case of urban railway development, where constructing a large station is necessary, it can be useful to carefully evaluate the zoning plan. This plan will delineate boundaries for three distinct layers: core, primary, and affected layers

- **The core layers, being vital to the station's operations, require particular attention**. Several tasks need to be considered: (1) Revising zoning plans that encompass more than one zone, which can take up to three months for each partial revision, with a new plan every six months; (2) Establishing area regulations, typically requiring around three months; (3) Developing urban design plans, which also take approximately three months. Additionally, the urgency of the core layer likely needs to be evaluated. If deemed immediate, compulsory land acquisition measures may be considered necessary, and other factors are likely to need to be weighed to make an objective decision. If the core layers are designated for infrastructure development, acquiring public land may take around 200 days, while acquiring land through compulsory measures could take an additional 20 days or more
- **If the area is impacted by the construction of large stations but is not as critical as the core layers,** it may be necessary to assess the level of impact. This assessment could help guide negotiations and decisions regarding land acquisition, determining whether it should be compulsory or not for specific locations.

In contrast, **the process of greenfield development** is generally more straightforward than brownfield redevelopment. Initially, when developing suburban stations to connect the city centre with outlying areas, the scale of the project—whether large or small—can be considered:

- **For a large station following the TOD model,** (1) preparing and adopting new zoning or master plans can take about six months, and (2) preparing and adopting urban design plans might also require six months. The next step involves identifying the corresponding layers, core layers that require compulsory acquisition may take over 200 days to complete, while negotiations for the remaining affected layers are likely to depend on the significance of their location, with compulsory acquisition proceeding if necessary.
- **For smaller stations constructed in suburban areas**, the preparation process is similar but generally simpler and less time-consuming.

For planning and building, in terms of public consultation, public consultation for detailed planning in brownfield areas is often more complex due to the need for extensive stakeholder engagement. In contrast, greenfield development may bypass detailed zoning, urban design, or area-specific regulations. Public consultation typically involves media presentations and feedback collection from local authorities (grassroots or higher-level) for both urban and rural settlements[63]. In terms of planning guidelines**,** while urban planning laws generally apply to brownfield sites, some greenfield areas, already designated as urban land, also follow urban planning laws. Areas outside urban boundaries may follow other regulatory frameworks, such as the Construction Law (for special functional areas or regional construction zones) or the Planning Law. Areas planned for urban development, however, are subject to urban planning laws. Building permits: Urban developers must apply for building permits unless exemptions apply. In non-urban areas, permits may also be waived unless specific conditions are met (e.g., structures taller than seven floors, located in planned zones, or classified as grade 3 structures or higher) [64]. On top of that, there is also an issue with permit Issuance: Individual permits are typically issued by district authorities. Institutional projects and larger developments are handled by Provincial Authorities.

[63] Article 17, Construction Law 2020 and Article 19 Urban Planning Law 2009 – updated 2020.
[64] Item 30, article 1, Construction law 2020).

5.7. Taxes and Fees Collected by the Government in the Urban Development Project

In Vietnam, urban development projects are subject to various taxes and fees to fund infrastructure and services. Here are some of the key taxes and fees collected by the government:

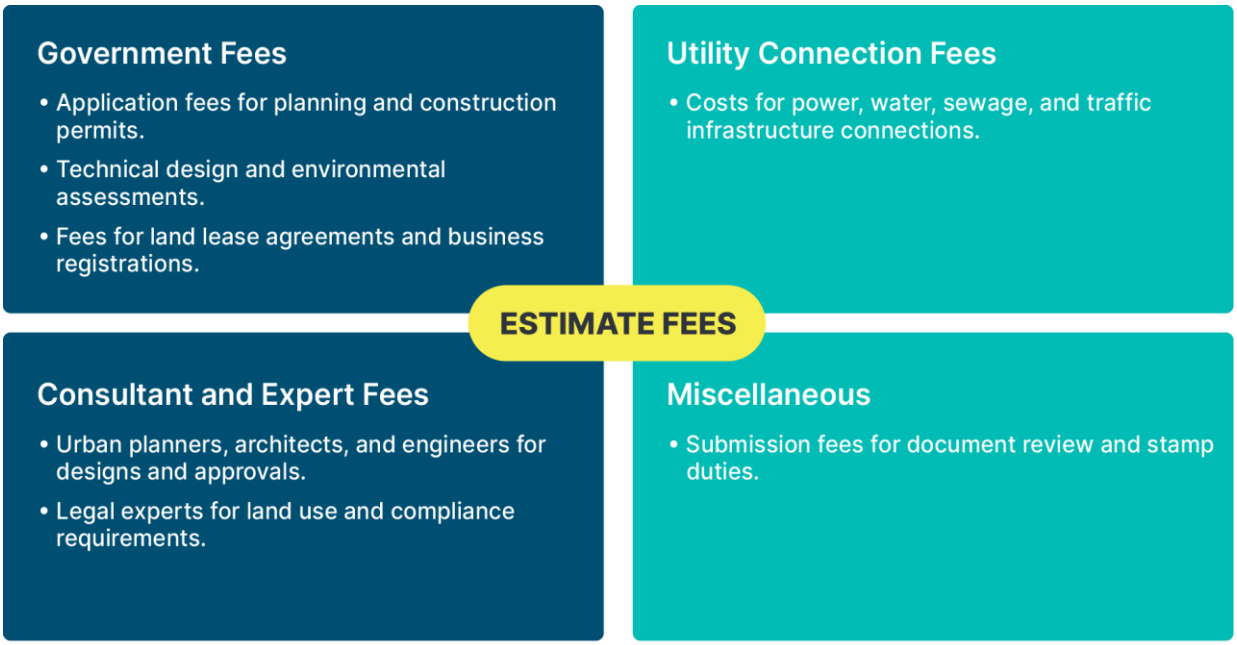


Figure 42: Developer's cost/Fees perspective[65]

Land Levies (for grant and development): Charge for granting, development project, or change the use land, especially from forest, non-use or agricultural ones to building in urban areas - mostly residential/commercial/ industrial or mixed-use purposes[66]

The calculation of levies follows the formula that extract the land value change during the change of use and development[67] specified that:

Equation 1: Calculation formula of Land levy upon land repurposing

Land levy upon land repurposing	=	*Levy on the repurposed land*	-	*Land levy or land rent within the project before land repurposing (if any)*

where:

- The levy on the repurposed land is calculated as follows:

Equation 2: Calculation formula of Levy on the repurposed land

Levy on the repurposed land	=	*Levied land area of the repurposed land as prescribed in Article 4 hereof*	*x*	*Land price on which land levy is calculated as prescribed in clause 2 Article 5 hereof*

- The land levy or land rent within the project before land repurposing (hereinafter referred to as "land-related fee") is calculated as prescribed in clause 2 and clause 3 of the Article 7.
- If the levy on the repurposed land is less than or equal to the land-related fee, the land levy upon land repurposing is zero (=0).

[65] GCIEP Team incorporated from various sources
[66] Article 53 of the Land law 2024 and the Decree 103/2024 on land levies and land rents
[67] Article 7 of the Decree 103/2024 on land levies and land rents

For the conversion of agricultural/gardening land of owners having used land in the same plot use with residential, the levies are 50% of the normal rate. But this only applies until the end of 2024[68]

Land conversion from 2025 applies to the new Land Law 2024[69] where there is **no exception** of 50; however, the land price follows the provincial regulation on when to enact the new land price. More details of land levies are available in Decree 103/2024/ND-CP[70] with cases on merging from different sources, legal status of changes, and (time) terms of use/leasehold.

Land use Taxes (for continual use): Taxes on the value of real estate properties, especially within urban areas where land has higher value.

Land use tax is based on several criteria[71], following the Decree 103/2024 on land levies and land rents.

- For residential land use rights for households and individuals, the tax is calculated based on the recognition of land use rights by the state. The actual charge (for residential) can be determined by the local (provincial) government (frame/list), which is adjusted annually based on the market price. The frame price is regulated to different locations (or segments of the road/lane – location to the main road).
- Besides, the charge can depend on Land Lease Agreements: For land leased by the state, the tax is calculated based on the annual land rent, except in cases where land is leased through auction.
- Land law establishes price using Market price reference, e.g. the land use fee and land rent can be calculated based on specific prices or market prices, which can be determined through auction, bidding for projects using land, or other methods following Decree 71/2024 on land price[72].

Construction Fees: Fees for obtaining permits and licences for construction projects, especially the project appraisal fee[73]. The fee is calculated upon the cost of the project and the ratio of charge – following the regulation (see below*).*

Table 11: Construction permit fees (categorised by the project cost)[74]

Total project investment (VND bn)	Ratio
≤15	0,019
25	0,017
50	0,015
100	0,0125
200	0,01
500	0,0075
1.000	0,0047
2.000	0,0025
5.000	0,002
≥10.000	0,001

Minimum of the fee is ~$20 and maximum 150 mil or $6000 per project (urban), which can be reduced to the project using different capital sources (public/private) and reduce to 50 to share cost to assess with outsourcing technical appraisal firms.

[68] Decree 45/2014/ND-CP
[69] Land Law 2024
[70] Decree 103/2024/ND-CP
[71] Decree 103/2024/ND-CP
[72] Decree 71/2024 on land price.
[73] Circular 28/2023/BTC
[74] Circular 28/2023/BTC

Environmental assessment-related Fees: Fees related to environmental impact assessments and compliance with environmental law and bylaw regulations[75] and follow the Resolutions of the Provincial authorities over the rate and use of the charges to appraise development projects at the province. The regulations of the Ministry of Resource and Environment specify which issues should be covered over different kinds of projects or their impacts. Strategic Environmental Assessment (SEA) report for plans (or EIA report for development project) may require both appraisal fee and consulting fees, which range from $1000 to $2000 for preparing report, and $1000 to $3000 for appraisal is not big during the plan making process; however, for projects with large emission or recurrent wastes, costs are higher due to the enlarged scope of appraisal.

Corporate profit/income tax: Other fees applicable for contractor. VAT 10 or 5 of contractor revenues depending on the types of projects, e.g. social housing project owner following the Housing Law 2024[76] can have reduced VAT (5 instead of 10 VAT and 10 business income instead of 20 Law of Business Income Tax 2008[77], updated 2023).

Service Fees: Fees for public services such as water supply, sewage, and waste management, which follow provincial authority's decision[78]. Developers can generate their own use of water and electricity, but the exploitation of water should be subject to charges for industrial level use.

Infrastructure Development Fees: Normal projects don't have to pay fees if there is no conflict to the functional and normal use of existing infrastructure in urban/suburban. However, if the use of existing infrastructure disrupts or damage them due to the excessive use during the development period, then developers have to pay some fees/cost to fund the recovery of such transportation, utilities, and other essential infrastructure upon negotiated agreements with responsible authorities (including communities and related stakeholders – if they contributed to develop such infrastructure). Provincial authorities can issue this rate of charge and scope of activities to be charged[79].

These taxes, levies, and fees help finance the necessary infrastructure and services to support urban development and ensure sustainable growth. According to the State Budget Law [80](SBL), taxes over official aids, state own enterprises, imported tariff, and VAT of the import tax are owned by central government; while land/levies related taxes and registration tax, fees and local charges kept at local government. Shared taxes and charges include environmental tax, income (individual and corporate) taxes, VAT of domestic production. The SBL has key features as follows:

- **Centralised tax collection**: all tax collections are centralised, meaning that the central government plays a significant role in collecting taxes and fees.
- **Revenue sharing formula**: the revenue sharing rate between central and provincial governments is determined by a formula based on the gap between expenditure needs and revenue capacity.
- **Taxation departments**: the general taxation department is responsible for implementing tax policies and collecting taxes.
- **Local governments**: local governments also play a role in collecting certain taxes and fees, especially those related to local services and infrastructure.

The collection process involves:

- **Taxation Departments**: Responsible for implementing tax policies and collecting land use fees.
- **Local Governments**: Play a role in collecting certain fees related to local services and infrastructure.

[75] Circular 38/2023/BTC
[76] Housing Law 2024
[77] Law of Business Income Tax 2008
[78] Law on fees and charge 2015.
[79] Law on fees and charge 2015.
[80] State Budget Law (2015)

5.8. Summary

There is no concept nor regulation yet to demarcate TOD zones in urban planning and development management. As there is no regulation to work out the boundary of the rail station adjacent area, land acquisition outside the infrastructure space is difficult. Land can be compulsory acquired when the detailed plan has been adopted (normally together with a development project). Meanwhile, there is no, or very rare public investment project adopted outside of (rail) infrastructure space, so there is no proposal to acquire land in the TOD zone (adjacent to the dedicated space for rail infrastructure).

Valuing land in both commercial and compulsory purposes faced with obstacles recently due to the shortages of capable valuers and complicated method to value the land (especially using the residual method for development projects). Delays in valuing land caused disputes and delays to all land acquisition tasks.

A robust TOD planning framework (including urban design and area regulation) is critical to make plans more implementable (both means and ends) with financial resources using evidence-based calculations, being more integrated with sectoral plans, and to promote meaningful stakeholder engagement and participation. There is a lack of tools to support plan making and adoption to redevelop the brownfield area, given the fact that land readjustment (and the like) tools have not been scaling up after years of discussion.

Plan making method still follows tradition that land or zone-based planning (focus on land use purposes) instead of using smart-code (form-based planning with urban design purposes) to control development effectively in the high-density areas.

The lack of coordination between plan making authorities (City's and District's, transport (rail and road) infrastructure and urban development management - Department of Construction or Planning and Architecture Department) often result in obstacles to align the public investment in critical areas (phasing the plans and coordinate component projects and mobilise the private resources to support the development of infrastructure outside of private sites).

The current land value capture tool relies mainly upon land use levy, especially applies to projects that convert raw (agricultural or else) land to residential mix use (built land) in the urban area. However, there is a shortage of tools to capture residential/mix use land in the urban upgrading/redevelopment zones (except for some sites that authorities can apply compulsory purchase method and then use auction measure and the sales of FAR in TOD densifying enable area mentioned in the Capital Law recently adopted in 2024).

6. Barriers and Challenges to TOD Implementation in Hanoi

6.1. Overall Barriers to TOD

The implementation of TOD, as an effective sustainable urban planning approach and as a mechanism to finance transport infrastructure, is constrained by a range of barriers and challenges as identified under the scoping study for the GCIEP TOD intervention. These are summarised as follows:

Limited experience in and capacity to implement TOD as an instrument of sustainable, climate-resilient urban mobility: While the concept of TOD is well known in Vietnam, knowledge and capacity on how to apply it in practice is still nascent. Stakeholders consulted during the GCIEP design phase suggested that may be useful to sure that the basics of sustainable urban mobility and spatial planning are addressed, when building capacity of city government stakeholders in TOD. GCIEP would start by providing guidelines on urban mobility oriented by TOD. This includes orienting it within concepts of integrated spatial planning and transport planning, the 10 or 15-min city concept, enabling active mobility such as walking and cycling. It could also be valuable to include how TOD in Hanoi can support building the adaptive capacity of the city to better withstand climate change impacts, contribute to GHG emissions reductions and potentially also improve urban wildlife, better aligning TOD to city and national strategies and plans such as the Nationally Determined Contribution (NDC), the National Adaptation Plan (NAP) and the Hanoi Climate Change Action Plan.

Uncertainty in how to achieve a wide range of criteria that are required for TOD to function effectively: The theoretical framework for TOD implementation has been widely explored in Vietnam, including in a recent academic study by the University of Transport and Communications (UTC) in Hanoi. This study included a range of eight key criteria related to urban planning that could be considered for effective TOD, which have gained traction with Hanoi DoT. However, there is limited capacity to implement these in practice and for modifying the criteria for the unique context of each zone. If GCIEP can support city governments to create a step-by-step framework for TOD planning, including these criteria, this could be very valuable. These supports can be concretised through the development of planning indicators, design guidelines for TOD areas, as well as relevant training courses and workshops

Absence of effective stakeholder coordination and alignment on TOD and related aspects: The structure of making decisions on the TOD enabling environment and for specific transit hub planning and financing decisions is complicated. Many stakeholders need to be involved and aligned, including developers, investors, community and advocacy groups, representing the interests of residents, especially women and marginalised communities, to ensure that the developments are inclusive and equitable**.** There is currently a lack of stakeholder groups on TOD, although the Ministry of Transport has set up several ad hoc working groups in recent years. There is also a working group between HCMC and Hanoi PCs on how to move forward on some specific aspects of regulation relating to TOD. MRB and the Management Authority for Urban Railways facilitated a conference on TOD in January 2024 and there are some non-governmental communities of practice, such as the Institute of Transportation and Development Policy (ITDP). However, generally, a key barrier to TOD implementation is the lack of a shared vision and alignment between stakeholders on what steps ought to be taken to implement TOD.

Uncertainty on TOD-related regulations: A significant barrier to TOD is the complex regulatory environment in Vietnam. While some points in the city regulatory framework for Hanoi and HCMC (Resolution 98 for HCMC and Hanoi Capital Law for Hanoi) and in city masterplans mention TOD, a clear regulatory enabling environment for TOD is absent. City authorities have limited autonomy in policy execution, and a clearer decision-making process at both national and municipal levels would help to facilitate TOD. The Hanoi Capital Law and HCMC Resolution 98 was an attempt to address this barrier, but it does not yet appear to be effective. In the meantime, the above-mentioned Government of Vietnam working group has taken on the challenge.

Regulatory clashes between sectors: TOD development has also been seen as facing various obstacles from the rigid regulatory system in Vietnam. According to the 2017 Planning Law, preparation and approval process of the provincial planning is required to go through nine steps and the same process is applied for amending or supplementing of the planning. This lengthy process is not flexible to accommodate the nature of site clearance process which might be subject to the actual situation and the boundaries of the project development area might need to be changed due to difficulties or the on-site resettlement require development of high-rise buildings or increase the land use coefficient. At the same time, urban planning and transport planning are not yet aligned and

often see the conflict as urban planning requires green area development and height restriction in the city centres. These obstacles cause delays in agreeing and implementing relocation and compensation plans for site clearance. Plus, according to the Land law, the process for preparation, approval and implementation of the land recovery and site clearance also requires nine steps in which there are some lengthy preparatory steps (i.e. notice of land recovery, inventory land and assets on land, prepare a compensation and resettlement plan, etc.) to be taken upon receiving the approval of the investment policy in accordance with the Public Investment Law while some other steps (i.e. land recovery, approval of the detailed plan and organisation of the implementation) can only be progressed once the Investment decision is approved.

Poor coordination and varying regulatory environments across administrative boundaries: Another barrier related to the regulatory environment is the variations and lack of standardisation across administrative boundaries, particularly between province or city district boundaries. This is compounded by the likely need for different models of TOD for different urban realms, including more historical or cultural centres, more modern mixed-use (commercial, residential, etc.) urban areas and less dense peri-urban land that is likely to experience rapid urbanisation in the coming years.

A shortage of suitable land in urban centres for the development of TOD hubs: Existing land-use can be challenging for TOD, and it is important that urban planning systems work effectively to ensure that transit hubs are located appropriately, and denser urban growth can occur without too many negative social or cultural impacts, such as displacement of informal or poorer income groups. There are many more possibilities for TOD in suburban areas, such as outside Ring Road 3 in Hanoi, although currently less demand for denser urban forms in those suburbs. Managing this balance and enabling planning that accommodates forecast urbanisation could be an important factor for TOD success in Vietnamese cities.

Financing constraints and the absence of established public–private partnership (PPP) models on TOD: There is a clear lack of knowledge and capacity in Government of Vietnam, as well as many private sector entities in Vietnam on linking development of TOD to finance transport infrastructure, particularly urban rail. Successful models from the UK and elsewhere require strong collaboration between private sector and government, such as on the Elizabeth Line in London, developed by Crossrail. PPP models such as Build and Transfer (BT) are no longer allowed in the Vietnamese PPP law and Build, Operate and Transfer models are not very well-developed in Vietnam. Furthermore, concepts such as developer contributions to infrastructure development based on expected land value increases, a major aspect in the development of Crossrail, are largely untested in Hanoi and HCMC. Methods of investment need to be clear and enabled by regulations in Vietnam.

LVC is constrained by complex regulatory barriers and lack of clarity on viable solutions: One of the methods of financing transport infrastructure, often deployed in tandem with TOD is LVC. This is still undeveloped in Vietnam and is unlikely to be deployed very fast as its implementation could relate to many stakeholders and decision-makers and may depend on changing many laws, even at the national level, on investment, transport financing, etc. LVC was initially proposed around 10 years ago in Vietnam and its likely success rate in the next three to five years could be questionable. To date, Vietnam doesn't have any regulations on betterment levy, development impact fee, and other value capture fee collected from real estate development. A simpler solution is needed in the shorter term, such as developer contributions based on land value increase, where GCIEP can draw on valuable Crossrail International expertise.

Limited capacity in city governments to address local land ownership, community sensitive approaches and integration of intentional GEDSI design features within TOD. There is a risk that high-density urban areas around transit hubs can become exclusive and premium areas of real estate that exclude the majority of urban residents. While there is a role and a need for a proportion of higher end housing and commercial units to enable commercial models to work in TOD schemes, particularly if they can cross subsidise more affordable housing units, it is important to achieve a sustainable balance. TOD hubs also offer significant opportunities to create well, connected, safe and accessible urban spaces that is integrated with transport infrastructure such as metro lines. However, capacity to implement this in practice is low across Vietnam, due to a lack of prior experience with TOD.

In addition, based on key feedback and contributions from stakeholders at the consultation workshop on developing TOD model held within the framework of the GCIEP study in Hanoi on January 8, 2025, the barriers and challenges in implementing TOD in Hanoi from the perspective of government agencies and the private sector are summarised in the table below:

Table 12: Feedback summary from stakeholders at the Hanoi workshop on 08/01/2025

Aspects	Details
Mobilisation of private capital	There are concerns regarding the mechanisms for private investment in urban rail and TOD projects. Challenges in socialising capital include risk allocation.
Large-scale challenges	MRB faces significant challenges due to the massive scale of projects, overlapping legal frameworks, fluctuating markets, and investment costs. A long-term, flexible legal framework and exceptional mechanisms are necessary to shorten implementation timelines.
Policy, legal and institutional frameworks consistency	Land clearance in TOD projects is particularly challenging, especially regarding land valuation changes under evolving policies, standards and TOD framework need to be established, regulation to use revenue from LVC to reinvest transport infrastructure.
Land use rights	Vietnam currently defines land use rights for surface areas but lacks provisions for underground structures. Regulations for multifunctional land use in TOD zones could benefit from clarification.
Regulation for PPP, private sector participation	Real estate developers face financial pressure due to policy delays. Deferred payment mechanisms could help balance cash flows and reduce property prices.

The implementation of TOD in Hanoi faces multifaceted challenges spanning regulatory, institutional, financial, and societal dimensions as presented in following sections. Insights from global experiences—notably from India, China, the UK, US and Australia- provide valuable context.

6.2. Governance and Institutional Coordination Issues

International experiences showed that TOD implementation requires a strong coordination between stakeholders including governmental entities, developers and communities. TOD implementation in Australia cities showed that TOD requires the participation of many actors and occurs in a fragmented regulatory environment, adding complexity, time, uncertainty, risk and cost to projects. Similarly, TOD implementation in Indian cities showed that lack of coordinated planning and implementation has been resulting in piecemeal and fragmented development as well as local governments neither have a technical/managerial capacity to manage the multiple agencies, stakeholders (often with competing and conflicting interests) nor revenue base to implement the projects. Further issues were explored in the cases of Chinese cities where inefficient TOD public-led governance approaches were observed due to poor coordination between authorities (with different priorities and procedures). Also, a lack of the institutional structure to provide TOD policies that inclusively cover the areas of urban planning, transportation, climate and the environment, and economic development has led to resistance of local residents due to a concern of equity problem with regard to land acquisition. These all insist the utmost important role of governance and institutional coordination.

The existing policies and regulations in Hanoi are not yet conducive to enabling higher coordination of development activities for TOD implementation. This was demonstrated through poor integration between transport and urban planning, leading to the worsening traffic conditions in Hanoi. In addition, coordination among local authorities is generally seen as one of the causes slowing the project implementation, specifically in the infrastructure and urban domains. Although previous studies on TOD in the city showed efforts to suggest an institutional set up for TOD implementation, these are however at the project level and still largely depending on the existing governmental structure which can be foreseen fragmented and insufficient for the complicated process of TOD implementation. For example, in the Project for Studying the Implementation of Integrated UMRT and Urban Development for Hanoi in Vietnam in 2015 (funded by JICA), institutional arrangements were suggested where Hanoi Authority for Urban Planning and Architecture and Hanoi Urban Planning Institute were assigned to integrate the TOD approach into the zone plan under preparation, in order to enhance the role of public transport and to promote land use value. In addition, the Hanoi Department of Transport was assigned to study the bus network to provide feeder bus services for UMRT, and to coordinate with relevant agencies to accelerate road development projects to ensure accessibility to the stations.

Therefore, to facilitate a better institutional setup for TOD management, an institutional organisation with an introduction of a special purpose vehicle (SPV) - company model to existing model (i.e., MRB project management unit) need to establish. This approach has been widely adopted in other cities like Hongkong, Delhi and/or Shenzhen. However, it requires changes the essence of (public) implementer to public business owner. The duties to capture revenues rely upon different authorities and the share/coordination of relevant stakeholders shall support the new model. If the corporate model is chosen, then the detailed regulation such as how SPV capitalised, the governing structure to fit the mandate to protect their equity – through investment decisions, etc. could be clarified.

Also, land clearance responsibilities are primarily handled by district authorities, while project design and approvals are managed by city-level departments such as Planning, Infrastructure, and Finance. This division of tasks creates inefficiencies and delays, particularly as approval processes and regulatory requirements are often overly complex and time-consuming.

The current project development management in TOD areas is burdened by complicated and lengthy procedures to adopt multiple requirements of project adoption, from eligibility of project owners, project scale (A,B,C for public funding or type for others) and purpose (housing or commercial only), which funding sources (PPP or public, private), which land sources (institution, agricultural, free grant, or residential), and to which purpose (commercial, mix use), which create significant barriers for developers.

Moreover, the TOD planning and control processes currently face significant challenges due to complicated planning and design requirements, coupled with a lack of clear transit integration guidelines. These issues can severely slow down and hinder efforts to enhance the accessibility and efficiency of public transport infrastructure and amenities. Currently, Vietnam has not yet established specific criteria for urban planning in TOD areas (areas surrounding transit stations), making it challenging to prepare, assess, and approve urban planning for TOD zones.

Lastly, the current structure of authority institutions in managing project and planning processes within TOD zones is impacted by significant delays due to the concentration of jurisdiction at the provincial level and fragmented procedures across multiple departmental authorities. This inefficiency poses a major challenge for large and complex development projects that require timely and effective handling.

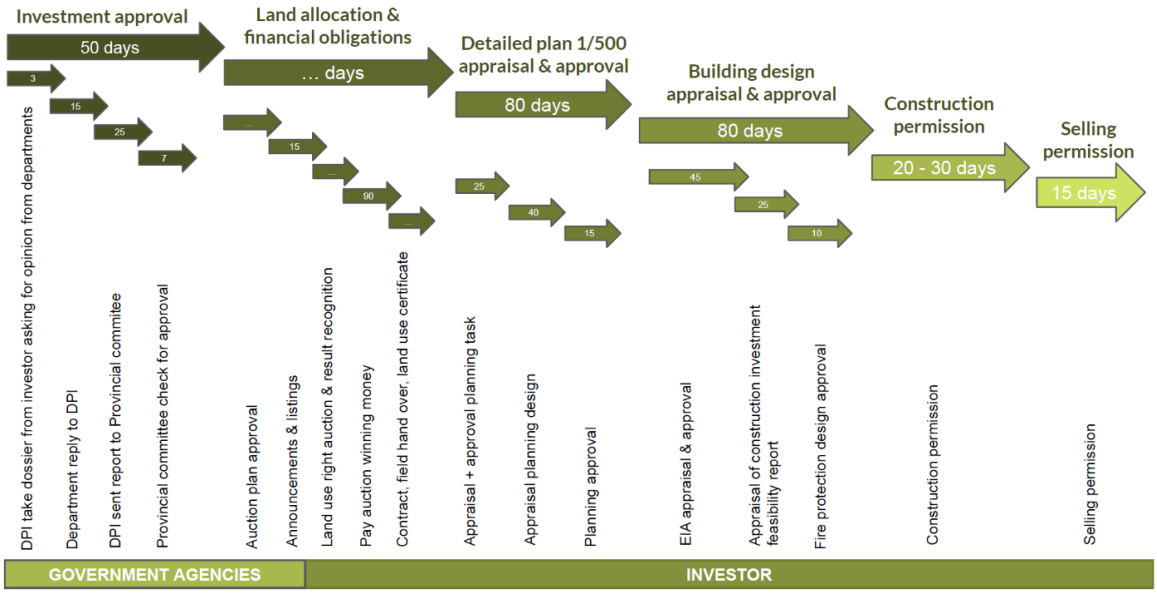


Figure 43: Example of lengthy adoption procedures[81]

[81] GCIEP Team incorporated from various sources

6.3. Urban Planning and TOD Implementation Process Issues

The development of TOD in Vietnam is significantly hindered by the complexities of the current legal framework governing urban planning and management. This complexity primarily stems from a multifaceted regulatory environment where overlapping and sometimes contradictory regulations create confusion. Vertically, there are inconsistencies between legal documents at various levels of government—from national to local—which complicates the implementation of a cohesive urban development strategy. Horizontally, discrepancies among different sectors involved in urban development further muddy the waters, as each sector may have its own set of rules and priorities that do not necessarily align with others.

In addition, according to Vietnam's Planning Law, Urban Planning consists of three levels: general construction planning, zonal planning, and detailed planning. The Planning Law primarily regulates planning activities through three main subjects: the planning entities, the content of the plans, and the management of planning. In some urbanised areas, the process of appraising and approving plans is often prolonged. The zoning plans for inner-city districts of Hanoi, such as Hoan Kiem, Ba Dinh, Dong Da, and Hai Ba Trung, were only announced recently in March 2021[82]. General construction planning serves as the development orientation for regions, while zoning planning determines construction indicators, including construction density for each area. Investors submit detailed plans for development projects to the competent authorities for appraisal to ensure compliance with higher-level plans and to decide on investment licensing.

It is noted that although the Urban Planning Law stipulates that master construction plans and zoning plans are to be reviewed and revised every 5 years, and detailed plans every 3 years, these plans have not been reviewed and revised within the timeframes prescribed by the Law. The reason is the lack of resources, and the prolonged time required to complete approval procedures. Therefore, it is evident that the review deadlines set by the Law are administratively impractical and do not align with real-world conditions.

As urban needs and technologies evolve rapidly, the lengthy cycle of approval procedures often results in regulations that are outdated and misaligned with contemporary urban development needs. This misalignment is exacerbated by additional delays of one to two years in the issuance of necessary Decrees and Circulars, which are critical for the implementation and enforcement of new laws. Such delays contribute to a legal landscape that is in a state of constant flux, creating significant challenges for urban planners, developers, and local authorities in managing and advancing their projects effectively.

Given above existing conditions, efforts to include TOD plan to the existing planning system may encounter difficulties because the concept of TOD plan is not yet introduced and/or integrated in the planning system. While acknowledging TOD plans requires a smooth integration between transportation and urban plans with complicated development objectives, which is different from the existing approved plans, the traditional procedure to introduce/implement TOD plan to the practice of the city can be foreseen not appropriate to help the city to achieve its ambitious goals of the public transport modal shares set by its transportation master plan[83]. Therefore, a new approach for introducing TOD plan to the city is urgently required.

These regulatory challenges not only create operational difficulties but also have tangible impacts on the progress and success of transit-oriented initiatives. The lack of a coherent and timely updated regulatory framework often leads to project delays as developers and urban planners attempt to navigate a maze of shifting regulations. This unpredictability can result in increased project costs, as plans need to be revised and adapted to comply with new or unexpected legal requirements. Additionally, these obstacles can stifle innovation and deter investment. Investors may be reluctant to allocate resources to projects in an environment where the rules can change abruptly, leading to potential financial risks. Such hesitancy can slow down the momentum needed to implement transformative urban projects that align with international best practices in sustainable urban development. Ultimately, the complexity and instability of Vietnam's legal framework for urban development pose significant barriers to realising the full potential of TOD.

[82] Survey on Data Collection for Urban Planning and Development Oriented Towards Public Transportation in Ho Chi Minh City and Hanoi (JICA, 2022)
[83] Decision No. 519/QD-TTg dated March 31, 2016, by the Prime Minister on the approval of the Hanoi Capital Transport Planning up to 2030, with a vision to 2050.

6.4. Financing and Investment Source Issues

Securing adequate funding for TOD projects in Hanoi is a persistent challenge, particularly in areas with limited financial resources and high demand for land. The development of transportation infrastructure and integrated urban spaces requires long-term investment, but local government budgets are often constrained by competing civic projects such as healthcare, education, and basic urban infrastructure. As a result, short-term priorities often take precedence over long-term initiatives like TOD, which depend on sustained financial backing and policy consistency.

The lack of a dedicated funding mechanism for TOD further exacerbates these challenges, making it difficult to establish a stable financial framework for transit-oriented urban growth.

Early-stage projects often face uncertainties about how quickly funds can be generated through mechanisms such as land auctions, leases, or levy revenues to recycle assets and capture value. High upfront capital investment requirements, combined with delayed revenue realisation, deter both public and private stakeholders

The lack of diversified financing options, such as green bonds or dedicated TOD funds, exacerbates these challenges. Developers, burdened by high construction costs, for example, with parking facilities alone accounting for up to 30 of total project cost, often pass these expenses on to consumers, worsening affordability issues.

In addition, the revised land law may not fully support the function of the government on using land fund centres to work as land investors (and developers) that can procure land using pre-emption rights. The alternative solution is using available public developers to procure land for social/affordable housing. Charges or fees under the LVC tools, particularly betterment charge and pre-emption rights require sufficient capacity to manage land value data, which is not yet available until 2026 when the new land value is enacted [84].

The regulatory uncertainty surrounding investment mechanisms further complicates the financial landscape. The suspension and later reinstatement of the Build-Transfer (BT) model in 2022 disrupted developer confidence and highlighted the unpredictability of development regulations. Even with revised policies, frequent legal adjustments and inconsistent regulatory enforcement continue to discourage private sector participation. Additionally, PPP models, which have been successfully used in many global TOD projects (For example, the urban rail and TOD development model in Hong Kong, China, led by the MTRC Corporation, integrates urban rail development with private partners in developing urban areas around stations. Similarly, state-owned enterprises to develop urban rail systems and collaborate private sector to develop urban area around stations in cities like Singapore, New Delhi (India), and Shenzhen (China), etc.), remain underdeveloped in Vietnam due to unclear risk-sharing frameworks and lack of targeted incentives for TOD-specific investments.

Land-based value capture using the State's power for compulsory acquisition is applicable to greenfield projects which typically outside of infrastructure development, such as agricultural or natural land, and leasehold land occupied by institutional State entities. However, capturing land value increases in brownfield redevelopment areas presents significant challenges due to time-consuming and complex valuation processes. While recent land laws have clarified the status of mixed-use land, ambiguities in land allocation persist and space-based charge using FAR has not been implemented, enabled via the current building code, but the valuation of FAR is still challenging. Charging land value increases through a 25 value-added income tax on property sales appears promising but effective land use data management remains crucial. Moreover, downstream financing is capacity-intensive and may not be applicable in the early phases, while high expectations for upstream financing can burden developers. This is because they may need to secure high-interest loans to acquire land through auctions or levies, potentially slowing down development processes.

Financing TOD through such tools would necessitate robust digital infrastructure and clear policy guidance, which are still under development. Additionally, downstream financing mechanisms—such as property-based development fees and impact fees—are capacity-intensive and may not be feasible during the early phases of

[84] Decree 71/2024

TOD implementation. On the other hand, upstream financing places a significant burden on developers, who often secure high-interest loans to acquire land through auctions or levies, increasing financial risks and potentially slowing down the development process.

Official Development Assistance (ODA) is a crucial financial source for implementing TOD projects, especially in the early stages when land-based financing is not yet effective. However, using ODA for TOD faces challenges. As Vietnam has become a middle-income country, ODA loans now have higher interest rates and shorter grace periods. Rising public debt also forces the government to be cautious about borrowing. Additionally, slow disbursement due to bureaucratic hurdles, land acquisition difficulties, and limited project management capacity further complicates ODA use. The lack of coordination between ODA and other funding sources like PPP and Foreign Direct Investment (FDI), along with stricter transparency and anti-corruption requirements from donors, makes attracting ODA more challenging.

6.5. Technical, Infrastructure Provision and Service Integration Issues

Insufficient multimodal connectivity of and limited accessibility to the public transport system can be a problem for TOD implementation in the city. In particular, limited pedestrian access to transit stations and inadequate coverage of feeder bus services are major barriers.

Hanoi public transportation is currently heavily relying on the bus system which has essentially been widely distributed across the entire city, with a total route length of nearly 4,000 km, providing access to 100% of districts, schools, 98% of hospitals, 90% of urban areas, and 86% of industrial zones. The bus route density is relatively high in the inner-city area (43% of the total route length, 9% of the total area) and lower in the suburban area (57% of the total route length, 91% of the total area)[85]. With a strong transformation emphasising on the urban railway system as the backbone of the public transportation system, there is an urgent task to the restructure of the bus network to be feeders of the urban rail system. Although there were efforts to do so, for examples, an increase to 50 bus services connecting to Cat Linh-Ha Dong metro line (metro line 2A) and/or 21 bus stops linking with metro line 3.1, these efforts were insufficient and there also a need of huge funding for the restructure of the bus network.

Additionally, the existing urban layout (long and narrow lanes and spreading high rise apartment building), which is optimised for scooters rather than public transit, exacerbates these challenges. In particular, the road density in Hanoi is 1.09 km/km², which is lower than that of major cities (average 5~6 km/km²)[86]. The road density gradually decreases as one moves toward the suburbs, coupled with the underdevelopment of the transportation system. As a result, riders face longer travel times and increased costs, especially when relying on supplementary modes of transport like motorbike taxis (Grab bikes) at either end of their journey.

Finally, improving pedestrian accessibility may take several years, as it requires the construction of sidewalks and the enforcement of walking space regulations. Expanding feeder bus networks is also a slow process, as these services are typically funded publicly or subsidised by private entities such as Vinbus. Suburban station areas, in particular, face challenges with parking availability for commuters transitioning from private vehicles to public transit. During the early phases of development, when feeder bus coverage is limited and pedestrian access is insufficient, the demand for parking is high due to a longer distance that riders have to travel to reach transit stations. This low ridership may discourage developers from participating in land auctions, buying additional FAR and other LVC mechanisms, ultimately slowing the overall progress of TOD projects.

6.6. Land-Use Management Issues

Land acquisition is complicated, especially in densely populated areas. This reflects challenges seen in Indian cities, where small land parcels are common, and land pooling mechanisms are underused, making it difficult to consolidate land efficiently for large-scale development.

In Hanoi, TOD opportunity areas are often selected based on cost rather than strategic location, undermining cohesive development. Additionally, the absence of a comprehensive legal framework and professional

[85] Proposal of review and reorganize the locations of bus stops, transfer points to facilitate connections between public passenger transport modes and static traffic points with personal vehicles. Hanoi Department of Transport, 2023.
[86] Survey on Data Collection for Urban Planning and Urban Development Oriented Towards Public Transportation in Ho Chi Minh City and Hanoi, JICA 2022.

mediators to facilitate negotiated local initiatives significantly hinders the effective implementation of land readjustment tools. This challenge affects both the primary and secondary layers of the TOD plan zone, limiting the potential for coordinated and efficient land redevelopment.

The development of TOD areas is currently hampered by the lack of a clear TOD zone concept, which is essential for enabling and supporting effective TOD policies, leading to challenges in planning, design, land acquisition and conversion, project adoption, and building permit processes.

There is no proper database maintained for the documentation of the dynamic changes in land use and other parameters like development mix, plot sizes, open lands, open reserve land, etc., which pose difficulty in making policy decisions.

Land management within TOD zones faces significant challenges due to issues in land speculation, corrupted conversions to mixed-use and residential areas, and a lack of responsibility in supporting land reorganisation because of fragmented tenure and inefficient use. Conflicts also arise between various government plans, such as the land use plans from Department of Natural Resource and Environment (DONRE) and Department of Construction (DOC), and the annual land use plan from DONRE, compounded by outdated land valuation practices from Department of Finance (DOF). Additionally, compulsory purchase is limited to non-infrastructure purposes, and negotiation-based approaches suffer from weak authority backing, leading to prolonged land readjustment processes.

6.7. Compensation and Public Engagement Issues to Land Expropriation

According to Hanoi records, by mid-November 2024, Hanoi has 174 projects (101 city-level projects and 73 city budget-supported projects) allocated for the 2024 capital plan facing difficulties and obstacles, many of which are related to site clearance. Among the 101 city-level projects, 77 are encountering issues with site clearance. It is likely that 42 out of these 77 projects will not disburse the full allocated capital of 2,840 billion VND. For the projects using city budget support, all 73 projects reported difficulties and obstacles related to site clearance, and it is anticipated that 17 of these projects will not disburse the full allocated capital of 173 billion VND. These suggest that compensation is obviously an obstacle for TOD implementation in the city.

It is noted that the common approach of the city governor to handle the land clearance issue is to involve the entire political system. The city governor identifies compensation, support, and resettlement works are critical issues directly affecting the rights and legitimate interests of land users whose land is reclaimed. Although land in Vietnam is public-owned land, it is necessary to balance the interests of both government, investors and the people. It is however that, the approach created a requirement on a smooth coordination between numerous governmental entities. In fact, the coordination was not good.

Currently, the Department of Natural Resources and Environment takes the lead in consolidating and advising the Hanoi People's Committee to resolve and address difficulties and obstacles in site clearance, as well as to assess the environmental impact of projects within their authority. The department also advises on matters beyond its authority; and guides the People's Committees of districts, towns, and cities to handle tasks under their responsibilities. Specifically, the department will guide investors and district-level People's Committees in carrying out procedures related to determining resettlement land prices, assessing environmental impacts, resolving site clearance difficulties and resettlement plans. In contrast, the DOC takes the lead in advising Hanoi People's Committee to review and address difficulties and obstacles related to the resettlement housing fund; promptly updates and adjusts the publication of construction material prices and construction price indexes in line with market price levels. Districts, towns, and cities should focus on disbursing the entire allocated capital plan, especially for city-level projects assigned to districts and towns as the main investors.

From the UK experience, eligibility and loss proof create a challenge when compensation is paid to the owners of an interest in land with the objective of covering their loss as much as money can achieve. However, the bonus is on the affected party to reasonably prove their loss, not on the acquiring authority to disprove it. **This requirement can lead to disputes if the affected parties feel that their losses are not adequately recognised or compensated**. Claimants have a duty to mitigate their losses, and compensation cannot be claimed for losses that could have been reasonably avoided, causing disagreements over what constitutes reasonable mitigation and whether the claimant has fulfilled this duty. Moreover, there is no prescribed methodology for assessing disturbance compensation, which includes costs and losses directly incurred due to dispossession. **Lacking a standardised approach can result in varying interpretations**

and assessments, potentially leading to disputes over the compensation amount. Stage payments can be requested, but they are often much lower than the finally agreed figure. This discrepancy can cause cash flow difficulties for claimants and lead to disputes if the final settlement is significantly delayed or differs from initial expectations. Finally, there is a general right to reimbursement of reasonable professional fees, but what constitutes "reasonable" can be subjective and lead to disputes. The absence of a formula for these fees means they usually assessed based on the circumstances of each case, which can vary widely[87].

Also, contractors might employ construction methods that differ from those initially planned by the client**. If contractors use worksites without accounting for compensation responsibilities, several changes in the construction contract can occur**. These changes can include the length of time the worksite is occupied, potentially extending beyond the original schedule and causing prolonged disruption. Additionally, access to property could be restricted for longer periods, impacting the daily activities of property owners and tenants. The levels of construction noise and vibration might also vary, potentially exceeding acceptable limits and causing discomfort or damage to nearby properties. All these factors can significantly impact property compensation liabilities, as affected parties may seek compensation for the extended inconvenience and potential damages[88].

6.8. Community Resistance and GEDSI Issues

Community resistance could be considered as a barrier to the TOD implementation. Several reasons might contribute to such resistance.

First, the awareness of the role of communities in the construction industry was late to the government. The first legal effort to recognise the role of communities was with the Construction Law released in 2003 referring to the planning aspect. At the 37th session of the National Assembly Standing Committee, the Government Inspector General reported that in 2019, complaints and denunciations were still primarily concentrated in the field of land, accounting for 67.7% of the total number of complaints. These mainly focused on issues such as land acquisition, compensation, support, resettlement, disputes in real estate projects.

Second, village culture in Vietnam is a distinctive feature compared to other countries. This is an issue worth noting when implementing TOD. The traditional Vietnamese village is a social cell of the Vietnamese people. It is a community primarily based on neighbourly relations, living together in an area that includes a plot of land for housing and a plot for cultivation, a collection of small families producing and living independently. Through thousands of years of building and defending the nation, whenever the country faced danger, the Vietnamese village has always been a reliable support, a solid rear base for the nation to weather storms and fires. For settlement researchers, the village is where the most enduring roots of the Vietnamese nation are preserved. In the organisation of sustainable settlement over many centuries, communal houses, temples, pagodas, literary shrines, clan houses, village wells, guard posts, banyan trees, water wharves, bamboo groves or the small village gate are the physical structures that represent the cultural origins of Vietnamese villages. At the current situation, a significant amount of agricultural space is located in districts such as Long Bien, Hoang Mai, Ha Dong, Nam Tu Liem, Bac Tu Liem, and even in Tay Ho district – where historic villages specialising in flower cultivation and ornamental plants are still preserved: Nghi Tam, Quang An, Nhat Tan, Phu Thuong… These suggest that the problem of gentrification due to TOD implementation in Hanoi may be more serious than that of in other countries.

In particular, local communities, including professional societies, may oppose increases in density, traffic, and changes to neighbourhood character, particularly in densely populated areas where established ecosystems are disrupted. For example, expanding station plazas may require resettling residents, which often intensifies local resistance and raises significant concerns about disruptions to established lifestyles and community environments. These sentiments echo evidently resistance in Australian cities, where residents are often unreceptive to urban densification, and in Indian cities, where stakeholder consultations are not given due importance, and gentrification displaces lower-income residents without sufficient affordable housing projects being planned along the TOD corridors. Furthermore, speculation in suburban areas before the launch of the TOD development exacerbates mistrust, making consensus-building a formidable task. Also, there is a lack of

[87] Crossrail, Report - Compensation and Public Engagement - Nov 24, page 4/18
[88] Crossrail, Report - Compensation and Public Engagement - Nov 24, page 15, 16/18

supporting regulatory enablers to promote community engagement to implement land readjustment and urban design scheme, particularly the role and capacity of mediators.

In some Chinese cities, middle-class residents often live in areas near transit stations and tend to own cars, preferring to drive rather than use public transport. Meanwhile, larger populations who live in urban villages or informal housing are usually located farther from transit stations, making it difficult for them to access public transportation, even though they rely on it more. This situation creates a mismatch between those who have access to transit and those who need it most. Thus, this situation should be avoided when planning for TOD developments in Hanoi.

In US cities, there are several challenges facing the development of transit-oriented, compact communities. One major issue is NIMBYism (Not-in-My-Backyard), where local residents oppose nearby transit projects and compact developments, such as multi-family housing, fearing they might disrupt their neighbourhood. Additionally, people who use park-and-ride facilities often advocate for more parking spaces near transit stations. This demand for parking can lead to car-focused station areas, which raises concerns among local communities about increased traffic congestion. Furthermore, communities are also worried because there is often a lack of clear and accessible information about how much the value of their properties might increase due to these developments. These factors create significant political and social barriers to implementing effective TOD that Hanoi might consider avoiding repeating same issues.

Integrating Gender Equality, Disability, and Social Inclusion (GEDSI) into TOD can indeed bring about significant social and economic benefits. Here are some of the key challenges that need to be addressed to optimise this integration:

- **Weak mechanism to enforce GEDSI principles and standards:** Although Vietnam emphasises equality, social cohesion, and unity in its laws and policies, existing urban development frameworks often fail to explicitly address gender equality, disability inclusion, or social equity. For instance, many policies lack mandates for universal design standards or gender-sensitive infrastructure in urban development. Additionally, poor coordination among different agencies presents a significant challenge to integrating GEDSI principles effectively. TOD requires the involvement of multiple agencies and stakeholders—such as urban planning, transport, and housing authorities—which often operate in silos. This fragmentation leads to inconsistent implementation of GEDSI principles. International experiences highlight similar challenges; for example, transport authorities may develop accessible transit systems, but housing authorities fail to align social housing projects near these systems. Even where inclusive policies exist, weak enforcement mechanisms often result in poor implementation. This can lead to partially accessible infrastructure, such as incomplete ramps or missing tactile paving. These issues stem from inadequate oversight by management bodies and insufficient engagement of social monitoring agencies, such as the Vietnam Fatherland Front and mass organisations or associations. Strengthening institutional coordination and accountability is therefore crucial to ensuring the successful integration of GEDSI principles into urban development and TOD initiatives.
- **Failed to see the long-term financial and economic benefits:** Private developers often overlook the long-term economic benefits of integrating Gender Equality, Disability, and Social Inclusion (GEDSI) into TOD. They typically focus on initial investments and view GEDSI as non-essential, fearing that these features will not yield immediate financial returns. However, inaccessible TOD systems restrict economic participation, especially for marginalised groups, leading to lower employment rates among individuals with disabilities and women. Additionally, TOD spaces that fail to accommodate families, caregivers, or persons with disabilities miss out on potential customers, reducing profitability. In South Africa, inaccessible transport results in persons with disabilities travelling up to 66% less than those without disabilities. Similarly, poorly lit or isolated transit hubs disproportionately affect women, particularly during off-peak hours, as seen in Nairobi where 46% of women feel unsafe using public transport at night. These deterrents not only reduce ticket sales but also undermine the overall financial sustainability of TOD systems.
- **Weak technical capabilities in GEDSI:** Weak technical capabilities in GEDSI, institutional capabilities to comply with GEDSI principles in design remain limited, often resulting in poorly implemented infrastructure, such as incomplete ramps or narrow pathways, which exclude persons with disabilities. Although disability inclusion policies and the National Technical Regulation on Construction Accessibility (QCVN 10:2024/BXD) of Vietnam emphasise accessibility as a key objective, significant gaps persist in

both the conceptualisation and implementation of accessibility for persons with disabilities. Where accessibility standards are followed, the focus is typically on wheelchair accessibility, addressing mobility impairments but neglecting the needs of individuals with other types of disabilities. Invisible disabilities, such as deafness, intellectual disabilities, or psychosocial disabilities (e.g., mental illnesses, autism spectrum disorder, or dyslexia), are rarely considered. This narrow interpretation of accessibility excludes many groups, reinforcing systemic inequities. In addition, as observed in many countries, urban design in TOD projects is frequently gender-blind, failing to account for the differences and diversity within the population. Urban planners often rely on headcounts rather than disaggregated data, overlooking gender-specific needs. This results in TOD designs that perpetuate safety concerns, such as poor lighting, inadequate surveillance, and isolated transit areas, which deter women from using public transport. Moreover, TOD projects in various countries often fails to address the needs of parents, by allocating insufficient space for strollers, shopping bags, or caregiving-related items. Research from India and other countries highlights that women's travel patterns are characterised by complex "trip-chaining," where multiple destinations are combined into a single trip. Women, who are disproportionately responsible for unpaid domestic and caregiving work alongside paid employment, often take shorter but more frequent trips, requiring them to change routes, make diversions, and interrupt their journeys to pick up children, shop, or run errands. This trip-chaining dynamic makes travel costlier for women, as they frequently pay for multiple single-fare tickets or incur higher transportation costs during such journeys. Failing to account for these patterns in TOD design exacerbates gender-based mobility inequities and restricts women's access to essential services and opportunities.

- **Social and cultural barriers:** In term of social and cultural barriers**,** the design and implementation of TOD are often perceived as technically complex, rendering them seemingly irrelevant for input from ordinary people and minority groups. This perception leads to consultations, even when legally mandated, being superficial and shallow. Insufficient consultation with marginalised groups results in designs that fail to meet their specific needs. Policymakers, developers, and technical staff often lack awareness of the economic and social benefits of inclusivity in urban systems. Developers tend to prioritise aesthetics or cater to high-income demographics, sidelining the needs of marginalised groups. Consequently, planning processes frequently fail to meaningfully engage women, persons with disabilities, and minority groups, leading to unmet needs. For example, the absence of input from caregivers often results in insufficient space for strollers or family-friendly transit systems. This exclusion is exacerbated by inaccessible consultation processes, such as meetings held in locations that are physically inaccessible or conducted in formats or languages that are not comprehensible to all participants.

One key reason for these barriers is the lack of disaggregated data on gender, disability, and income disparities. Many cities do not systematically track how women, persons with disabilities, or marginalised groups use public transit. This absence of data hinders the ability to design targeted, inclusive solutions. Additionally, there are no established benchmarks to measure GEDSI outcomes, such as transit usage by gender or disability status. Accessibility and gender-sensitivity audits for TOD projects are also rarely conducted. This lack of knowledge prevents policymakers and planners from fully understanding the challenges faced by marginalised groups, further contributing to the development of solutions that are inadequate or misaligned with their needs.

7. Key Insights

The analysis and assessment of the current situation, development potential, barriers, and challenges resulted in the identification of eleven key areas which, if put in place, would likely increase the chances of successful TOD model development in Hanoi. These are each outlined in the sections that follow.

7.1. Consistent TOD Policies, Legal and Regulatory Frameworks

Ensure clear TOD objectives and consistent TOD policies (goals, TOD criteria, development control). The master plan intention and its recommendations could be aligned with the guidelines for implementation. TOD guidelines appear to provide higher FAR to promote high-rise development while including many conditions and constraints that make it almost impossible to use the higher FAR. No consistent criteria followed for the provision of higher FAR along the transit corridors.

A special focus on redevelopment policies is needed, as is developing **supporting policies in line with the establishment of TOD policies**. Facilitate the integration of transportation and land use by enabling transport agencies to participate in land use issues.

Developing transparent legal and regulatory frameworks for integrated planning, land acquisition, land value capture, financing, and operational management of TOD is essential to enable multi-level TOD planning to integrate transit infrastructure with urban development. These frameworks should simplify procedures, enhance stakeholder confidence, and be flexible and adaptable to the specific context of each TOD area, rather than applying a one-size-fits-all approach.

Consider practical situations when establishing regulations. Avoid TOD policies where norms are uniformly applicable across all TOD station areas, irrespective of context. The development control regulations ignore the ground realities and propose unrealistic plot sizes for the use of higher FAR. This can be further clarified through the following points. First, TOD policies could focus only on core regulations to safeguard the objectives and principles of TOD development. Overly detailed or rigid regulations might deviate from real-world development practices, potentially disrupting flexibility and diversity in TOD, and possibly creating barriers that limit its growth potential. Second, policy regulations need to take into account the capacity of technical and social infrastructure, the competency of the implementation teams, and the adaptation process of relevant stakeholders, particularly regarding policy impacts. These factors require practical validation during implementation, as well as a strong connection between policy adjustments and their real-world application.

Implement developers' and communities' consultations as early as possible from the establishment of TOD policies. Social campaigns can ensure communities have a clear understanding of TOD regulations. Prioritise urban design and community involvement in TOD planning. Engage local communities through participatory design processes to ensure developments meet local needs and enhance liveability.

7.2. Flexible TOD Planning Practice

Develop dynamic, flexible masterplans that can quickly adapt to changing urban needs. Practical surveys, investigations (especially into urban infrastructure) and phasing are widely considered essential characteristics in TOD planning and are often the focus of supervision of TOD plans' implementation. Ensure these plans include detailed, actionable business, financing plans to guide implementation, as well as planning regulations to prioritise TOD, supporting mixed-use, high-density developments near transit hubs. Avoid master plans that are not based on on-ground realities and do not adapt to demand. The approved plans often lack appropriate finance or business strategies for implementation. Without a clear business plan, master plans will remain largely as vision documents.

TOD planning is a long-term process, often outlasting local government terms, which leads to inconsistent implementation. **Establish a multi-stakeholder governance framework for TOD projects** to ensure continuity and consistency across political cycles. Engage public and private stakeholders early to maintain project momentum and alignment.

Aim for reasonable trade-offs between rapid development and sustainable development. Avoid, as in some Chinese cities, situations where existing regulations favour rapid urban growth over sustainable TOD, lacking support for mixed-use, high-density development.

Establish policies for creating benefits in TOD areas compared to non-TOD areas. Avoid, as in some China cities, situations where no national planning regulations encourage high-density development in the transit area. Prioritise TOD development over non-TOD development

Integrate the TOD plan, urban plan and the master plan. Some US cities often encounter challenges in their TOD systems, such as planning land uses around transit stations without considering their impact on system-wide ridership. Additionally, these cities frequently fail to integrate higher density, diverse land uses and walkable urban forms, which are crucial for successful TOD. Parking around stations tends to be uncontrolled, and inflexible parking standards do not cater to the specific needs of TOD areas. Moreover, building codes often do not differentiate between conventional developments and TODs, leading to unnecessarily high parking requirements. To avoid these pitfalls, Hanoi could ensure that **TOD planning considers broader transit system impacts**, fosters dense and diverse land use, and implements minimum parking space by updating building codes to support TOD systems.

7.3. Legal Definition of TOD Zones or Areas

Define and legalise TOD zones by **simplifying and integrating these four key adoption procedures:** planning and design adoption, land acquisition and conversion (including auction), project adoption (including bidding) and building permit (including infrastructure connection). **Establishing TOD zone boundaries early** in the planning process could facilitate and guide the development of special TOD areas by **capturing increased land value through LVC tools** such as FAR sales (in upstream public space and commercial space), land auctions and pre-emption rights (new and redevelopment buildings), betterment levies and improved amenities fees (downstream). By implementing these changes, the TOD zones would be likely to become more efficient and attractive to investment, leading to sustainable development, increased accessibility, job creation, environmental benefits and enhanced liability through better public transport integration and improved urban amenities.

7.4. Land Assembly and Management

Digitising the land and building data is likely to enhance land valuation and planning. **Guiding the land reorganisation process to ensure flexibility for mixed-use changes**, while maintaining control over building and social amenities, is crucial. **Establishing a legal framework** to support land adjustment tools and FAR sales (vertical readjustment) may also be beneficial. Additionally, implementing **anti-speculation measures**, such as future vacant property taxes and multiple short-term trading property taxes, and **exploring new combinations of administrative tools** (like pre-emption rights and compulsory purchase) **with collaborative tools** (such as land readjustment), could strengthen land management. Implementing these strategies may mitigate land management issues and promote efficient land use.

To mitigate disputes over eligibility and loss proof in the compensation relating expropriation, it is crucial to establish clear criteria and methodologies for assessing compensation claims. This includes defining what constitutes reasonable mitigation and providing guidelines for claimants to document and prove their losses effectively. Developing a standardised approach to disturbance compensation, with clear formulas and benchmarks, can help ensure fair and consistent assessments. Introducing a mechanism for interim payments that better reflects the anticipated final settlement can alleviate cash flow difficulties for claimants. Additionally, setting clear parameters for what constitutes "reasonable" professional fees and providing a framework for their assessment can reduce subjectivity and potential disputes. See the case study below for more information on methodologies for determining eligibility for compensation.

Managing contractor-induced compensation risks is important to address the risks associated with contractor actions. It is essential to **implement robust monitoring and control mechanisms throughout the construction process**. This includes establishing a formal change control process to manage variations in construction methodology and assumptions, ensuring that any changes are agreed upon and documented. Regular audits and inspections can help identify potential issues early, allowing for timely adjustments to minimise compensation liabilities. Additionally, incorporating clauses in construction contracts that hold

contractors accountable for compensation-related responsibilities can incentivise them to adhere to agreed-upon methodologies and timelines, reducing the risk of prolonged disruptions and associated claims.

7.5. Community Engagement and Social Safeguards

Proactive community engagement strategies are critical to building trust and reducing resistance. Provide a **transparent system in estimating TOD values**. Clearly describe the developers' obligations and benefits in participating TOD projects through clear policies as well as the implementation steps. **Transparent communication** about the benefits and trade-offs of TOD projects can help foster public support. Policies could **prioritise affordable housing and prevent displacement** to ensure social inclusivity. To mitigate gentrification, conduct participatory planning could be conducted through public hearings, involve public communities in land readjustment, create urban design schemes, promptly announce information, communication transparently, clearly identify relevant roles, improve the capacity of mediators, and introduce safeguards for low- and middle-income residents – for which the UK case study can be used as a guide.[89] There is also a need for solutions to support affordable housing for low-to-medium-income people living near stations. Another suggestion is to introduce tools to support collaboration and consensus building. Encourage innovation and flexibility in planning, land (re)organisation, and land use adjustments to ensure efficient use of urban spaces

7.6. GEDSI Integration

There are opportunities and solutions for Hanoi to implement inclusive and equitable TOD, particularly given existing legal frameworks that emphasise equality and social inclusion.

- **Increase accessibility:** Incorporating universal accessibility ensures equitable mobility for persons with disabilities, elderly individuals and caregivers. Expanding infrastructure with ramps, elevators, tactile paving and audio announcements enables transit systems to accommodate diverse users. This is in line with the recently approved Circular 06/2024/TT-BXD regarding the National Technical Regulation on Construction Accessibility, which covers various types of facilities, including urban transport infrastructure.
- **Support affordable housing and expand economic opportunities.** Requiring developers to include social housing in TOD zones is essential to minimise gentrification and prevent the displacement of existing residents and businesses. The 2023 Housing Law (Luật Nhà ở năm 2023), introduced Chapter VI, outlines social housing policies. By integrating social housing with market-rate developments along transit corridors, such as metro lines and Bus Rapid Transit (BRT) routes, TOD enhances economic diversity and reduces segregation. Additionally, placing social housing near transit hubs reduces the need for long commutes, thereby decreasing traffic congestion and carbon emissions.
- **Ensure affordable fares.** Transport costs can be a significant barrier preventing low-income individuals, women and persons with disabilities from accessing public transport, thereby reducing the effectiveness of TOD. To address this issue, Hanoi could continue and expand its Guideline No. 1151/HDLS:GTVT-LĐTB&XH, dated 28 October 2024, on the issuance, management and use of free public transport cards for mass transit systems within the city. By removing financial barriers, the policy promotes greater social integration, mobility and access to economic opportunities for vulnerable groups.
- **Increase the institutional capacity in GEDSI.** Hanoi may need to consider establishing new decision-making and management bodies for TOD to incorporate GEDSI considerations into its institutional arrangements. Both Vietnamese and international experiences highlight that the administrative, technical and coordinating capacities of local institutions play a critical role in implementing inclusive TOD. To ensure success, the Hanoi TOD Development Council could include experts and scientists from social, environmental and specialised engineering fields.
- **Increase consultative capacity of TOD stakeholders.** Vietnam's legal framework, including the Law on Grassroots Democracy (2022), the Law on Construction (2014), the Urban Planning Law (2009), and the Law on Planning (2019), provides mechanisms to facilitate community engagement in the planning and implementation of TOD projects. The capability to apply these legal frameworks offers an opportunity to engage diverse community groups during the planning and implementation phases of TOD projects. Notably, feedback collection through neighbourhood organisations (tổ dân phố) or social and mass

[89] Crossrail OSD Collaboration and Property Value Capture

organisations such as the Women's Union and Associations of People with Disabilities is crucial. These organisations, representing the interests of women, persons with disabilities and other vulnerable populations play a pivotal role in ensuring that TOD projects are inclusive and equitable.

- **Finance for GEDSI.** Governments can incentivise private developers to adopt GEDSI principles by providing tax breaks, subsidies or grants. Furthermore, adopting a PPP model facilitates collaboration with private sector entities, allowing them to share costs and risks while ensuring inclusive design. For instance, under the 2023 Housing Law, the state provides public investment capital to support social housing projects, offering incentives such as exemptions from land use and rental fees for the entire project area, as well as eligibility for value-added tax (VAT) and corporate income tax incentives. Beyond domestic financial incentives for social housing in TOD areas, Hanoi could leverage international funding to finance GEDSI-focused TOD projects.

7.7. Infrastructure and Service Improvements

Infrastructure upgrades are necessary to **support the additional population in TOD areas**. Plan infrastructure improvements at both the TOD corridor and city levels to accommodate growth sustainably, ensuring essential services are adequately provided. Develop towards sustainable real estate and prioritise transit service quality.

Investments in infrastructure should prioritise pedestrian pathways, feeder bus networks and multimodal connectivity. High-quality utilities and public services can be integrated into TOD zones to enhance functionality and appeal. Investments in high-quality transit infrastructure and expanded coverage could help to improve ridership and support TOD's viability. Pedestrian-friendly designs and expanded feeder networks may help ensure seamless and attractive transit options for users. Prioritise infrastructure/facilities of green transport modes.

7.8. Financing Strategies and Public-Private Collaboration

Innovative financing mechanisms, such as LVC, PPPs, green bonds, crowdfunding and phased funding strategies can address financial barriers. Implement maximum approach for parking issues to reduce costs for parking facilities and optimise land-use policies to reduce development costs. **A dedicated TOD fund with transparent and flexible mechanism** (e.g., funding allocation, loan standards, supervisions)could serve as an effective source of financing.

In terms of PPP, Hanoi can establish a reasonable risk-sharing mechanism between the government and developers. From the Indian and Chinese case studies, it seems that there is a tendency to put most of the risks with private agencies while establishing unclear rules for cooperation between public and private sectors, resulting in low participation and failures. It is also necessary to **provide a special PPP mechanism** for TOD while waiting for the overall improvement of the PPP regulatory framework; in doing so, priority should be given to transit agencies, such as eminent domain and joint development agreements. Lastly, careful consideration of the approach that **separates infrastructure from rolling stock ownership, operations and maintenance in association with strict fare cap regulation**. A flexible fare cap regulation may be applied to deal with potential risks for private sectors. The example of restructuring Singapore SMRT's sixteen-year history from 100% state-owned to a company listed on Singapore's stock exchange and back to a fully state-owned corporation reveals weaknesses in the vertically separated PPP model. It is also important to foster government partnerships with private developers through transparent bidding processes, joint ventures and partnership agreements in order to attract private investment, leverage private sector expertise, share risks and accelerate project delivery.

Ensure all TOD area selections are based on their development potential through the evaluation of three values (node value, location value and market value). Node value reflects a station's significance in the public transit system, determined by its passenger traffic volume, its role in connecting different modes of transport, and its central position within the network. Place value refers to the appeal and quality of an urban area, shaped by factors like the availability of amenities, schools and healthcare; the style of urban growth; how easily everyday needs can be met on foot or by bike; the character of the surrounding urban environment, especially its walkability, compact block sizes, and dense network of interconnected streets that foster lively communities; and a diverse mix of land uses. The potential market value represents the untapped economic value of station areas, determined through an analysis of market demand and supply. These values are

essential to sustain the LVC tools because **they provide an important basis for judging suitable LVC tools applied in each of TOD areas.**

LVC helps to minimize reliance on public funding while promoting more efficient and equitable urban development. LVC efforts **focus on granting development rights, development charges, freezing and acquiring high-potential land for conversion, and increasing mixed-use land allocations with appropriate FAR charges.** Enhanced efforts in **valuing land and FAR using building information modelling and advanced data management** are essential. **Utilising existing taxing tools**, such as the 25 VAT, and identifying appropriate financial vehicles to alleviate the high-interest burden on developers for site acquisition are crucial. Besides, speeding up the adoption process is vital to reduce financing costs for developers. Implementing these strategies could help simplify valuation and taxation, enhance financial efficiency and facilitate more effective redevelopment and urban growth, leading to more vibrant and economically sustainable TOD areas.

7.9. Institutional Arrangements

A dedicated TOD development agency is essential to accelerate the implementation of the TOD model. International lessons show that the organisational structure of such agencies varies in terms of public–private collaboration, ranging from fully state-owned to fully private, or a partnership between the public and private sectors – either with separate investments in rail and urban development or an integrated investment approach for both. During the planning, investment, implementation and operation phases of railway and TOD projects, the public sector is primarily responsible for developing railway infrastructure, issuing regulations, establishing legal frameworks for planning and development, and implementing LVC mechanisms. Meanwhile, the private sector is responsible for developing real estate projects around station areas.

The TOD central entity can be fully state-owned, to ensure the strategic development goals in public transport development in the city or can collaborate with the private sector to leverage specialised expertise and diverse financial resources. In cases where a state-owned enterprise is responsible for developing the railway system and TOD (such as DMRC in Delhi or Crossrail International in London), significant investment is required from the national budget, loans or financial institutions. For Hanoi, this model is suitable for the short term (or in existing developed areas); however, it is essential to implement land value capture strategies to generate investment capital for railway development and operations. An option that could be taken into account for Hanoi in the short term is setting up an interdisciplinary TOD Council - a coordinating body under the People's Committee (PC), chaired by the PC Chairman (or Executive Deputy Chairman), with key members from all departments and senior professionals, to ensure close coordination among agencies in implementing TOD projects, appraising master plans and projects, and proposing policies and technical standards or guidelines for TOD implementation. In parallel, a TOD office - a new agency could be established or an existing one assigned to assist this coordinating body (or TOD Council) in the oversight of TOD implementation. This agency is responsible for day-to-day activities in order to streamline procedures, strengthen stakeholder coordination, avoid process delays, and maintain focus on TOD key principles and strategies. In the long term, the public–private joint venture model (as seen in MTRC Hong Kong), which integrates both railway and real estate development, is a sustainable approach because it generates revenue from property development to cover the costs of railway construction and operations. However, this model requires strong management capacity and expertise within TOD entity. This approach is suitable for Hanoi in Phase 2 (or in newly developed areas) once sufficient management capacity and experience have been gained from the initial railway projects.

Institutional rearrangement is necessary to enhance both capacity and coordination methods. It is essential to **improve collaboration among key functional departments** (DAE,[90] DOF[91] and DOC[92]) by establishing a new form of advisory institution to streamline provincial decision-making processes. Additionally, **delegating authority to subordinate entities**, such as district and appropriate authorities, can expedite decision-making by addressing comprehensive technical issues in parallel. **Organising sub-provincial authorities** to

[90] The Department of Natural Resources and Environment (DONRE) was merged with the Department of Agriculture and Rural Development (MARD) to become the Department of Agriculture and Environment (DAE).
[91] The Department of Planning and Investment (DPI) was merged into the Department of Finance (DOF).
[92] The Department of Planning and Architecture (DPA) was merged into the Department of Construction (DOC)

efficiently process standard projects on a ‘green’ path allows provincial authorities to focus on the ‘yellow’ path, where custom planning and project decisions are needed. **Empowering an authorised institution to operate as a one-shop model** can comprehensively help developers, efficiently handle regular proposals and promptly address new initiatives or unprecedented issues. **Establish training programmes** to satisfy the manpower need of the TOD implementing teams. Implementing these measures may help reduce delays, improve efficiency and optimise the capacities of each government tier, fostering a more conducive environment in TOD areas.

7.10. Project Development and Management

Integrate planning and project adoption procedures, concentrating authority within TOD bodies to better support developers. This involves creating a ‘green’ channel for routine issues and a ‘yellow’ channel for decisions that require tailored solutions. Additionally, **delegating the authority** to make routine decisions through standardised templates and roadmaps can accelerate the processing of typical projects, while connecting relevant city-level authorities is necessary for handling custom projects. By **combining project and planning procedures**, the overall adoption process can be significantly expedited. Implementing these measures may help streamline project development, reduce delays and enhance efficiency, making TOD areas more attractive for investment and fostering faster, more sustainable urban growth. In addition, it is important to prioritize sustainability by incorporating energy-efficient building designs, reducing transport-related emissions, and promoting eco-friendly modes of mobility. These efforts can contribute to achieving global sustainability goals, enhancing urban quality of life, and ensuring the long-term success of TOD initiatives

7.11. Development Control

Creating effective guidelines that **integrate existing development control tools** such as zoning plans, urban design and area regulations, and **developing flexible control tools** is essential to accommodate diverse development situations and meet TOD requirements across various zones and layers. By **integrating and combining this development control tools with TOD plans and adopting a smart form code approach**, rather than a traditional land-based approach, the planning process can become more adaptive and efficient. Implementing these measures could streamline planning and control processes and boost the effectiveness of TOD systems, ultimately leading to more accessible, efficient and liveable TOD areas. Last but not least, developing a system for continuous monitoring and evaluation of TOD projects is essential. This enables timely adjustments, tracks progress toward goals, and promotes transparency throughout the implementation process

Appendix 1: List of Urban Development Related Laws and Regulation

No.	Name of Law	Policy number	Related content
1	Law on Organisation of the Government	47/2019/QH14	- Procedures for approving investment policy and simultaneously approving investors - Issuing Investment Registration Certificate - Recognising Investors of urban area construction investment projects
2	Law on Investment	61/2020/QH14	Encourages public–private partnerships (PPPs) essential for large-scale urban projects, offering incentives such as tax breaks and reduced land-use fees for projects aligned with sustainable urbanisation plans. The law streamlines investment procedures, reducing bureaucratic delays and facilitating efficient project execution. Additionally, it emphasises sustainable development, ensuring urban projects adhere to environmental standards, thus promoting integrated, sustainable urban growth through TOD principles.
3	Decree on guiding implementation Law on Investment	31/2021-ND-CP	Regulates activities related to urban development investment, including Urban planning; formation and announcement of plans for implementing urban development areas; implementation of construction investment and operation, exploitation and transfer of urban development investment projects.
4	Decree to amendments to some articles of decrees in field of State management of the Ministry of Construction	35/2023/NĐ-CP	Amending and supplementing a number of clauses of Article 14 of Decree No. 37/2010/ND-CP dated April 7, 2010 of the Government on the establishment, appraisal, approval and management of urban planning, which was amended and supplemented in Decree No. 72/2019/ND-CP dated August 30, 2019 of the Government amending and supplementing a number of clauses of Decree No. 37/2010/ND-CP dated April 7, 2010 on the establishment, appraisal, approval and management of urban planning and Decree No. 44/2015/ND-CP dated May 6, 2015 detailing a number of contents on construction planning.
4	Law on Bidding	22/2023/QH15L	Enhance the transparency and efficiency of the bidding process for public procurement and investment projects. It introduces measures to streamline procedures, reduce corruption, and increase competitiveness among bidders. By setting clear guidelines for the selection of contractors and service providers, the law ensures fair competition and optimal use of state resources. It also incorporates provisions to support the participation of small and medium enterprises and encourages the use of technology in the bidding process. This legal framework is designed to improve the overall quality and effectiveness of public investment projects in Vietnam.
5	Decree on implementing the Law on Bidding on selection of investors to implement	115/2024/NĐ-CP	Elaborates on the selection of investors for executing investment projects that involve land use. It aims to enhance transparency and fairness in the investor selection process, ensuring that projects align with national planning and land use regulations. The Decree sets out detailed criteria and procedures for evaluating and selecting investors, emphasising competitive bidding and public disclosure to prevent conflicts of interest and

No.	Name of Law	Policy number	Related content
	investment projects using land		corruption. It also supports efficient land use and sustainable development by prioritising projects that meet environmental and socio-economic objectives. This legal framework is intended to optimise land resource use in investment projects across Vietnam.
6	Law on Public Investment	20/VBHN-VPQH/ 2024	Providing a comprehensive framework for managing public investment activities. It seeks to improve the efficiency and effectiveness of public investment by setting clear principles for planning, approval, and implementation processes. The document emphasises transparency and accountability in the allocation and use of public funds, aiming to enhance socio-economic development and infrastructure growth. It outlines criteria for project selection, prioritising those that align with national and regional development goals and ensuring sustainable and balanced economic growth across the country.
7	Law on Investment under the PPP method	64/2020/QH14	Establishes a legal framework for implementing investment projects through PPPs. It aims to attract private sector investment into essential infrastructure and public services by defining clear procedures and standards for PPP projects. The law outlines the rights and obligations of both public and private partners, ensuring balanced risk-sharing and mutual benefits. It includes provisions for project selection, contract management, and dispute resolution, promoting transparency and efficiency. This framework is designed to enhance infrastructure development and improve public service delivery across Vietnam.
8	Law on Housing	27/ 2023/QH15	Provides a comprehensive legal framework for the development, management, and use of housing. It aims to improve housing quality and accessibility, with a focus on social housing to support low-income groups. The law outlines regulations for housing construction, transactions, and ownership, ensuring transparency and legal protection for stakeholders. It encourages investment in sustainable and modern housing projects, promoting urban development and better living standards. Additionally, the law sets forth policies to enhance the management of housing funds and resources, fostering a stable and efficient housing market in Vietnam.
9	Law on Real Estate Business	29/2023/QH15	Enhance market transparency and stability. It sets clear guidelines for real estate transactions, including sales, leases, and transfers, ensuring legal protection for buyers, sellers, and investors. The law promotes ethical business practices and requires real estate enterprises to meet specific conditions for operation, including financial and professional qualifications. By fostering a fair and competitive environment, the law seeks to attract investment into the real estate sector, supporting sustainable urban development and economic growth in Vietnam.
10	Law on Construction	62/2020/QH14	Streamline construction processes and enhance regulatory efficiency. It introduces simplified procedures for project approvals, particularly for small-scale projects, to reduce bureaucratic delays. The law emphasises quality management, safety standards, and environmental protection in construction

No.	Name of Law	Policy number	Related content
			activities. It also strengthens the roles and responsibilities of stakeholders, including contractors and regulatory bodies, to ensure compliance and accountability. By improving transparency and efficiency in the construction sector, the law supports sustainable urban development and infrastructure growth across Vietnam.
11	Decree on Urban development investment management	11/2013/NĐ-CP 04/VBHN-BXD-10/2024	Regulate activities related to urban development investment including Urban planning; forming and announcing plans to implement urban development areas; implementing construction investment and operating, exploiting and transferring urban development investment projects.
12	Decree on Detailed regulations on some contents on construction investment project management	15/2021/NĐ-CP	Detailed regulate on construction investment project management including project establishment, appraisal, approval, construction design; construction survey; construction permit issuance and construction order management; construction of special works and implementation of construction investment projects abroad; management of construction operation capacity; forms of construction investment project management.
13	Law on Urban Planning	30/2009/ QH16/ VBHN-VPQH	Elaboration of Urban Plans
14	Law on Architecture	40/2019/QH14	Promote sustainable and culturally relevant urban development. It outlines standards for architectural design, emphasising the importance of preserving cultural heritage and environmental sustainability. The law defines the roles and responsibilities of architects and architectural organisations, ensuring professional qualifications and ethical practices. It also encourages innovation and the integration of modern technologies in architectural projects. By fostering high-quality architectural practices, the law supports the development of aesthetically pleasing and functional urban spaces in Vietnam.
15	Law on Land	31/2024/QH15	Provides a comprehensive framework for land management and use, aiming to enhance transparency and efficiency in land-related transactions. It outlines procedures for land allocation, lease, and transfer, ensuring the protection of land use rights for individuals and organisations. The law emphasises sustainable land use planning and development, balancing economic growth with environmental protection. It also introduces measures to improve land valuation and compensation processes, addressing issues related to land acquisition and resettlement. By promoting equitable and efficient land management, the law supports socio-economic development and urbanisation in Vietnam
16	Decree on the implementation of some articles of the Law on land	102/2024/NĐ-CP	Specifies procedures for land allocation, lease, and use rights transfers, aiming to streamline administrative processes and reduce disputes. The Decree emphasises transparent land valuation and compensation, particularly in land recovery and resettlement scenarios. It also addresses land use planning and environmental protection, ensuring sustainable development.

Appendix 2: List of International Benchmarking Case Studies

A. Singapore

1. Process of Planning and Implementing TOD Projects

Planning and Designing Stages

For the TOD planning, Singapore has a well-structured Planning Framework Model that allows for collaboration between different planning sectors and enables flexibility between long-term and short-term goals[93]. The Planning Framework Model has been broken down into three steps:

- **Step 1 - The Concept Plan** is a strategic land use and transportation plan that guides Singapore's development over the next 40-50 years. Reviewed every ten years, the Concept Plan outlines the strategies to provide the physical capacity to sustain a high-quality living environment.
- **Step 2 - The Master Plan** is a statutory plan that guides the development over 10 to 15 years. It translates the broad, long-term strategies of the Concept Plan into detailed plans for implementation by specifying the permissible land uses and densities. It is reviewed once every five years. The planning strategies to achieve the vision for Master Plan are presented through six key focuses: housing, transport, economy, recreation, identity and public spaces. The Land Transport Authority prepares and updates the Land Transport Master Plan, which informs the Master Plan.
- **Step 3 – Land Clearance** for development is carried out through the Government Land Sales (GLS) programme which releases state land for development by private developers. To facilitate timely development of new, selected large-scale areas, Urban Redevelopment Authority (URA) also works with other government agencies to ensure that basic infrastructure and utilities are provided.

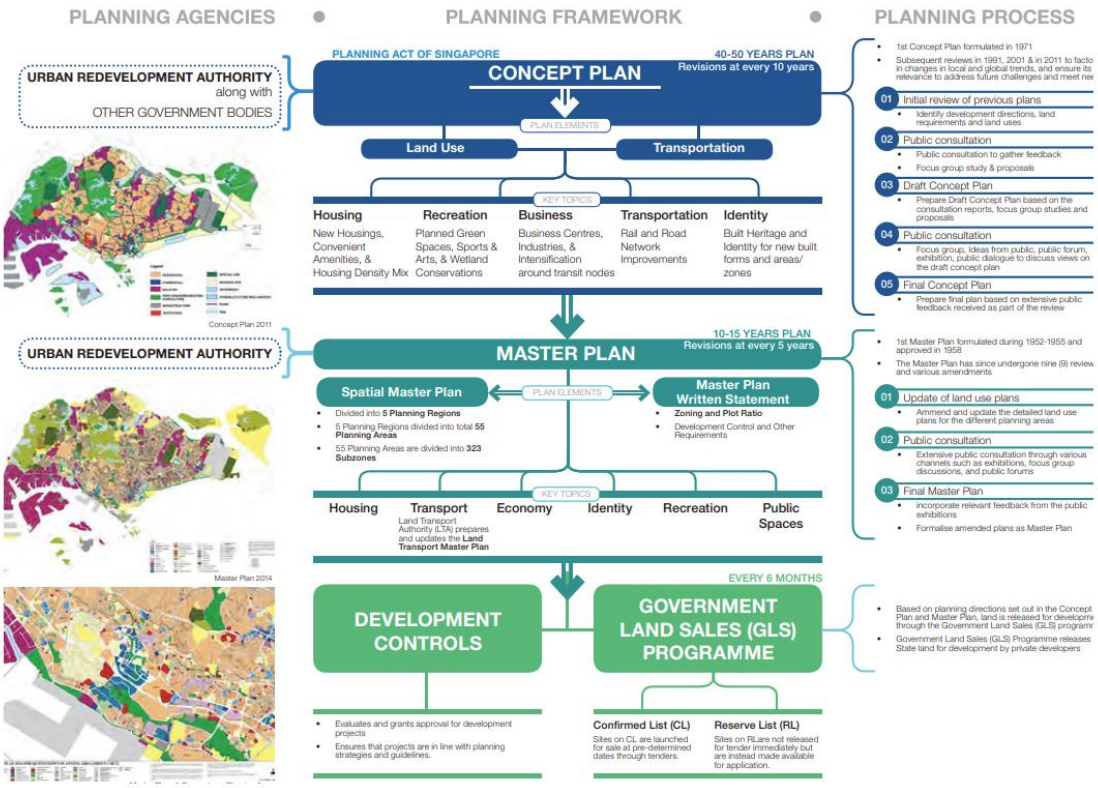


Figure 44: Planning agencies, planning frameworks and planning process in Singapore's TOD

[93] Transit – Oriented Development Implementation Resources, page 213/690

Financing and Operating Stages

The government finances Land Transport Authority (LTA)'s budget including rail projects **from its general budget** and there is therefore no direct link between urban rail financing and LVC.

In 2016, The **New Rail Financing Framework (NRFF)**[94] was agreed upon between SMRT and the Land Transport Authority (LTA) in Singapore. Under this framework:

- **LTA takes ownership of all rails operating assets** - such as trains, signalling systems, and maintenance equipment which were previously owned by SMRT and SBS Transit. This includes over 60,000 items and a total asset value of about **$991 million** (or $1,060 million including GST).
- **LTA assumes responsibility** for the buildup, replacement, and upgrading of these assets to align with ridership demand and commuter expectations. SMRT and SBS Transit, on the other hand, are freed from heavy **capital expenditure** requirements.
- While **LTA owns the assets**, SMRT remains responsible for the **maintenance** of the rail system.

This shift in asset management aims to enhance rail operations by allowing the government to control and optimise investments for the long-term sustainability of Singapore's public transportation network.

2. Roles and Responsibilities of Stakeholders in the Process of Planning and Implementing TOD Projects

Interactive relationships among key relevant players

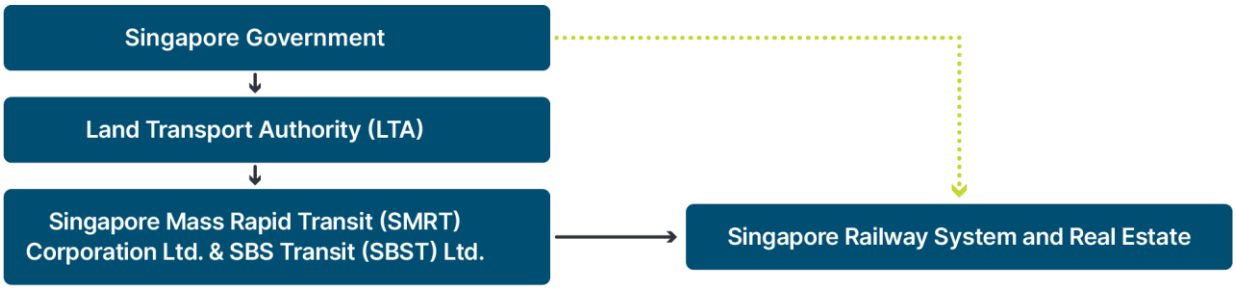


Figure 45: Interaction Between the Government, SMRT, and the Public Transit System

The Singapore Government is responsible for planning and directing policies, which lays the foundation for SMRT to operate and develop the public transport system (particularly the MRT). In addition to the rail system, the government and SMRT work together to develop real estate in new towns, leveraging MRT connections to drive economic growth

1. Singapore Government

- Has guided the physical development in Singapore and provided the basis for the integration of railway and property development.
- **The Ring Plan:** put the high-density housing, industrial areas and urban land uses in a ring around the urban centre. This provided the background for the development of new towns and the provision of MRT to connect them together.
- Government's promotion of high-density development, coupled with the various restraint policies on vehicle ownership and usage, are the key reasons explaining the popularity of public transit in Singapore

2. Land Transport Authority (LTA)

- The Land Transport Authority (LTA), **a Ministry of Transport agency**, plans, finances, builds and owns the rail infrastructure
- The LTA plays a role in long-term planning for the public transportation system, including the planning of rail lines, while also ensuring financing and executing infrastructure construction projects such as the MRT system

[94] INNOVATIVE TOD STRATEGY ON PPP & FINANCING STRUCTURE, PAGE 14/62

3. SMRT

- Central piece of the process of TOD implementation
- In addition to the railway, it currently also provides complementary feeder and mainline bus services, a downtown shuttle system, light rail, taxi service, convenience stores, and newspaper
- SMRT was established by gathering personnel from government organisations. Specifically, a group of senior officers from MTRC (the predecessor of LTA) were transferred to SMRT to form the core team responsible for operating the newly built subway system. Initially, both SMRT and MTRC were under the same executive director, before SMRT became an independent company in 1995 when MTRC became part of LTA[95]
- Later on, SMRT was privatised. Although the SMRT is privately owned, the major shareholder is a government investment company
- The MRT has also worked as a strong catalyst for retail development
- It appears that the SMRT remains committed to its rail and road operation and does not seem to have engaged aggressively in property development businesses, apart from within its own stations

4. SBST[96]

- SBS Transit is one of the leading bus and rail operators in Singapore, serving millions of passengers daily and focusing on enhancing both the journey and destination through technology and training.
- **Formed in 1973 through the merger of three private bus companies** and listed on the Stock Exchange of Singapore in 1978 as Singapore Bus Service (1978).
- Renamed DelGro Corporation Limited in 1997, with a subsidiary listed separately, and adopted the name SBS Transit Ltd in 2001 when it became a bus and rail operator.
- Became part of the ComfortDelGro Group in 2003, leveraging the group's resources and expertise to enhance service and comfort.
- Operates close to 200 bus services with over 3,000 buses, the Northeast MRT Line, the Light Rail System in Punggol and Sengkang, and the 42km Downtown Line, Singapore's longest underground line.

SBS Transit and SMRT are the primary operators of Singapore's public transport system, which includes buses and the mass rapid transit (MRT). SMRT oversees the North-South Line (NSL), East-West Line (EWL), Circle Line (CCL), Thomson-East Coast Line (TEL), and Bukit Panjang Light Railway Transit line. SBS Transit manages the Northeast Line, the Light Rail System in Punggol and Sengkang new towns, and the Downtown Line. Both companies work closely with the Land Transport Authority (LTA) to ensure the public transport system operates consistently and efficiently (SMRT's network, SBST's network)

3. Laws and Regulations Guiding TOD Planning and Implementation

Singapore's framework for TOD is supported by various laws and regulations that facilitate effective urban planning and community engagement. Here are some key sources that outline these foundational elements:

1. The Concept Plan 1971, revised 1991, 2001, 2011

- **The Concept Plan 1971:** This plan laid the foundation for Singapore's urban development, focusing on building housing towns, industrial estates, transport infrastructure, and recreational spaces. A "ring" structure of satellite towns was created around the central water catchment, and the central business district (CBD) was established.
- **1991 Review:** The vision evolved towards balancing work and play, culture and commerce, with proposals for cultural and commercial corridors and decentralisation of jobs through a hierarchy of commercial centres. Technological corridors and Jurong Island were also developed to support high-tech industries and petrochemical growth.
- **2001 Review:** The focus was on transforming Singapore into a world-class city with diverse housing options and reinforcing its identity through an Identity Plan and a Parks and Waterbodies Plan. Public consultation shaped the plan, aiming to enhance quality of life and establish Singapore as a global financial hub.

[95] Global Infrastructure magazine - SMRT
[96] SBS Transit

- **2011 Review:** This review responded to future challenges, supporting a projected population for 2030 with strategies for economic growth and maintaining a high-quality living environment. The Land Use Plan emphasised affordable housing, integrated greenery, transport connectivity, and sustainable economic development, feeding into the 2014 Master Plan for future development.

2. Rapid Transit System Act 1995: regulates the construction and operation of the MRT system, which is central to Singapore's TOD strategy. This legislation ensures that transport infrastructure is developed in conjunction with land use planning, promoting seamless connectivity
3. Planning Act 1998: This Act governs land use in Singapore, allowing for zoning changes that support TOD initiatives. It facilitates the designation of areas for higher-density and mixed-use developments, ensuring alignment with urban planning objectives
4. Underground Master Plan 2019**:** The 2019 Master Plan laid out a number of key initiatives to transform the way Singaporeans are going to live on the island in the future, with a focus on urban sustainability. These include creating greener and more sustainable neighbourhoods as well as creating jobs closer to homes. The master plan also called for the increased usage of subterranean spaces through an "Underground Master Plan". The idea is to use the space beneath for infrastructure such as pedestrian walkways, rail lines, utilities, warehousing and storage facilities. This way, the land above can be freed up for housing, community uses and greenery.
5. State Lands (Amendment) Act 2015 and Land Acquisition (Amendment) Act 2015: In 2015, the State Lands Act and Land Acquisition Act were amended to facilitate the use and development of underground space by clarifying the extent of underground ownership and the introduction of strata powers for the acquisition of a specific stratum of space. The amendment clarified that surface landowners own the underground space up to 30 metres under the Singapore Height Datum (SHD). Land deeper than 30m SHD will belong to the State. The Singapore Height Datum is a level fixed across the whole of Singapore from which height measurements take reference. It is pegged to Singapore's historical mean sea level. Generally, basements of developments in Singapore extend to about 15 metres underground.
6. Urban Redevelopment Authority (URA) Guidelines: The URA provides comprehensive planning guidelines that promote high-density, mixed-use developments around public transport nodes. These guidelines ensure that new projects are integrated with existing transit networks, fostering sustainable urban growth and enhancing connectivity

Recently, the Land Use Plan 2030 and the Land Transport Master Plan 2040 provide the vision for Singapore's TOD zones. The plans aim to create high-density, TOD that minimise reliance on personal vehicles while promoting public transportation and active mobility (e.g., cycling, walking).

- Public Transport Council (PTC) Regulations 2016: Public Transport Council (Bus or Train Fare Evasion) (Amendment) Regulations: These regulations aim to improve the management and operation of the public transport system

- Land use plan 2030: MND's Land Use Plan 2030 aims to ensure a high-quality living environment for Singaporeans, including the development of additional MRT stations

- Land Transport Master Plan 2013 and Land Transport Master Plan (LTMP 2040): Announced by the Land Transport Authority (LTA), the plan aims to develop a sustainable and efficient public transport system, including expanding the MRT network and enhancing connectivity between TOD areas.

4. Principles for Determining Development Boundary for TOD Areas

Land Transport Master Plan 2013[97] and Land Transport Master Plan 2040[98] by LTA provide sheltered walkways between MRT stations and bus stops to schools and healthcare facilities **within 200m of our public transport nodes**. To improve the walking experience, we have launched a new Walk2Ride programme that will significantly extend this sheltered walkway network to connect:

[97] Land Transport Master Plan 2013, page 27/58
[98] Land Transport Master Plan 2040, page 50/68

- MRT stations to trip-generating hubs, such as schools, healthcare facilities, public amenities, offices and residential developments **within 400m of the stations**.
- Bus interchanges and Light Railway Transit stations to developments **within a 200m radius**.
- Selected bus stops with very high usage to trip-generating **hubs within a 200m radius**.

The Land Transport Authority (LTA) spearheads land transport developments in Singapore. LTA do these roles, which include defining the MRT zone:

- Plan, design, build, and maintain Singapore's land transport infrastructure and systems.
- Aspire to strengthen Singapore's land transport connectivity and integrate a greener and more inclusive public transport system complemented by walk and cycle options.
- Harness technology to strengthen our rail and bus infrastructure and develop exciting options for future land transport.[99]

5. LVC tools

Singapore government is the largest landowner and auctions land/leases land to private developers periodically through its government land sales programme. Singapore operators did not have access to transit-oriented real estate development opportunities.

The public sector captures the land value increment largely through fee-based LVC including property tax and development charges (i.e. land betterment charges). Land sales revenues are channelled to a specific fund - "past reserves", and reserves are not permitted to be used to finance the current government's expenditure without the permission of the President. The reserves are invested and 50% of net investment returns. is taken into the government's general budget for spending. The government finances LTA's budget including rail projects from its general budget and there is therefore no direct link between urban rail financing and LVC[100].

Land betterment charge[101]: The Land Betterment Charge (LBC) in Singapore is a tax on the increase in land value arising from a chargeable consent, such as planning permission, given in relation to the development of any land.

Chargeable Consent:

- Variation of a restrictive covenant on the use of land
- Approval of a development with different use(s) and intensity.
- Computed the difference in valuation of the land between the last approved development and the new proposed use of the land
- Generally, set at 70% of the increase in land value arising from the grant of consent for development proposals. However, on an exceptional basis, 100% is charged

Calculation Methods:

- Table of Rates Method: Uses predefined rates per square metre for various land uses, updated biannually by the Singapore Land Authority102.
- Valuation Method: Used when the Table of Rates is not applicable or when all taxable persons elect to use it. The Chief Valuer of the Inland Revenue Authority of Singapore directly ascertains the LBC through valuation of the increase in land value[103].

Fare regulation

Transit fares (for both rail and bus) are regulated by the Public Transport Council (PTC) - an independent public agency. Since 1998, the PTC has used a price cap formula to regulate fare increases of transit

[99] Land Transport Authority (LTA) – Who We Are

[100] INNOVATIVE TOD STRATEGY ON PPP & FINANCING STRUCTURE, PAGE 13/62
[101] Land Betterment Charge, Page 12/21
[102] Details in Land betterment charge, page 15-18/21
[103] Details in Land betterment charge, page 19-20/21

operators. However, transit operators are still required to submit annual fare revision applications to the PTC each year, with the PTC having the discretion to approve the amount and structure of the increase.

6. Mechanism of Cooperation and Contribution of Private Enterprises in the Process of TOD Implementation

Private sector enterprises has roles of setting Standards of Efficiency and Quality[104]: The private sector is encouraged to be involved in TOD as it often sets the standard for efficiency, quality, and competitiveness. This involvement helps in benchmarking and maintaining high standards in urban development

Through concession agreements where private operators like SMRT and SBS Transit managed operations while the government owned the assets.

Initially, SMRT was privatised and operated the MRT system under a 30-year concession agreement, taking on farebox revenue risks and capital-intensive asset ownership. Over time, this model shifted to a more asset-light structure, with the government owning infrastructure and operating assets while operators were paid a service fee tied to performance metrics. The farebox risk was eliminated in the redesigned PPP model, and the government retained ownership of non-fare businesses like advertising.

The initial PPP model failed due to escalating costs, insufficient farebox recovery, and declining service quality, leading to SMRT's re-nationalisation in 2016. **The revised PPP structure (asset-light, performance-based contracts) has proven more sustainable**, reducing risks for private operators and increasing government oversight, addressing earlier failures.[105]

Table 13: Comparison of initial and revised PPP model

Aspect	Initial PPP Model	Revised PPP Model
Asset Ownership	Private operators (e.g., SMRT) owned and maintained operating assets	The government owns all infrastructure and operating assets
Farebox Revenue Risk	Operators bore the risk, relying on ridership and regulated fare revenue	The government retains fare revenue; operators receive fixed service fees
Contract Duration	Long term (e.g., 30 years)	Shorter term (e.g., 9 years) for flexibility and better performance review
Performance Incentives	Limited mechanisms for enforcing high service standards	Service fees tied to KPIs, such as reliability, customer satisfaction, and efficiency
Non-Fare Businesses	Bundled with operations under the operator's control	Unbundled; awarded through separate contracts to improve efficiency
Financial Sustainability	Operators faced financial strain due to high costs and insufficient farebox recovery	More sustainable due to government handling of capital-intensive investments
Service Quality	Declining over time, with frequent disruptions and maintenance issues	Improved due to government oversight and performance-linked incentives

The main characteristics of the model for constructing and operating the MRT system in Singapore can be identified as follows:

- Asset Ownership Matters: Transferring ownership of capital-intensive assets like rolling stock and infrastructure to the government reduces financial strain on private operators and ensures timely maintenance and upgrades.

[104] Volume 3, Benchmarking Transit Oriented Development, Page 45/128
[105] Sustainable strategies for Mass Rapid Transit PPPs, Page 9/21

- Mitigate Revenue Risks: Retaining farebox revenue risk with the government allows operators to focus on service quality rather than revenue generation.
- Shorter Contracts Enable Flexibility: Short-term contracts allow for regular performance reviews and adjustments to address evolving conditions and challenges.
- Performance-Based Incentives Drive Quality: Linking operator compensation to key performance indicators ensures accountability and encourages continuous improvement.
- Unbundle Non-Core Activities: Separating non-fare businesses (e.g., advertising, retail spaces) from operations simplifies management and improves overall efficiency.
- Government's Role is Crucial: Greater government involvement in financing and regulatory oversight ensures long-term sustainability and service reliability.

7. The Effectiveness in Implementing the TOD Model in Singapore

- Reduced Car Dependence: An emphasis on public transport and pedestrian-friendly design has encouraged inhabitants to rely less on automobiles for their daily commute because of which a decrease in traffic congestion and cutting down of carbon emissions has been observed. Thus, helping Singapore achieve its ecological goals
- Enhanced Quality of Life: TOD complexes provide unprecedented convenience to residents, with transport, facilities, and services all within walking distance. This integrated approach to urban living encourages individuals to live healthier lifestyles while also instilling a sense of belonging and community
- Economic Opportunities: Singapore's TOD zones encourage investment and economic activity, providing chances for enterprises, entrepreneurs, and job seekers. TOD projects' proximity to transit hubs makes them appealing locations for commercial firms, increasing their viability and liveliness106
- Integrated Urban Planning and High-Density Development: Singapore has successfully promoted high-density development through the Urban Redevelopment Authority within the Ministry of National Development. This has enabled efficient land use and urban planning, with about 90% of land owned by the city-state
- Encouragement of Public Transport Usage: The implementation of the Certificate of Entitlement (COE) system and the Electronic Road Pricing (ERP) scheme has effectively controlled vehicle growth and usage. This has led to a significant reduction in traffic congestion and vehicular emissions, with 71% of trips in Singapore being completed in less than an hour
- Promotion of Walkability: The Walk2Ride programme has significantly extended the sheltered walkway network, connecting MRT stations to key trip-generating hubs. This has improved pedestrian experience and urban permeability
- Environmental Improvements: Singapore has preserved open spaces, natural parks, and greenery despite its high-density urban areas. Early implementation of sound environmental policies has conserved natural resources and addressed environmental pollution effectively
- Quality of life delivered through environmental improvements: Total of 46,000 squatters have been relocated, of which over 26,000 families were resettled into public housing constructed by House Development Board (HDB). Nearly 5,000 hawkers were relocated into food centres built by Ministry of the Environment and over 2,800 cottage industries were also moved, most of them into industrial estates built by the HDB and Jurong Town Corporation.[107]

8. Lessons Learned on TOD Model Development for Vietnam

Singapore's Success Factors[108]

- **Perseverance and long-term planning (50-year strategy):** Infrastructure, public transport and development, implemented as a long-term strategic objective based on the overall planning, efficiency, competition, clustering and cost benefit analysis, followed by medium-term zoning plans (10-15 years) with periodic revisions.

[106] Rethinking The Future - Singapore: TOD Development

[107] Volume 3, Benchmarking Transit Oriented Development, Page 46/128
[108] Volume 3, Benchmarking Transit Oriented Development, Page 45/128

- **Focused, dense development along transport nodes:** Planed new residential centralities to coincide with the improvement and extension of the public transport system, promoting high floor area ratios at nodes.
- **Policies and approaches targeted to reduce private car ownership:** Determine approaches to generate high transit ridership to reduce private vehicle numbers, reduce congestion and improve average journey times.
- **Support of diversification of economy through provision of varied commercial centres:** Create centralities with mixed-use and commercial content to take pressure off traditional central areas and diversify the economy, all supported by public transport.
- **Improve quality of life with smart open space strategy policies:** Consider storm-water drainage as potential park and green space systems, and as conduits for road and utility infrastructure. Combining access, services and communications routes while retaining flood attenuation capacity
- **Private sector involvement:** Encourage the role and involvement of the private sector, as it often sets the standard of efficiency and benchmarking of quality and competitiveness.
- **Efficient land management and government oversight in transport infrastructure development:** Transport infrastructure is managed by the transport authority, ensuring alignment with national priorities. The government controls development to meet national goals, while the confirmed and reserve lists for land use improve the efficiency of land allocation, addressing both immediate and future needs.[109]
- **Realis real estate system:** it is a subscription-based web tool for private developers and citizens to engage with live and daily updated real estate market data. This system enables develop an open-source real estate information system, allow citizens and private developers to subscribe and receive updates on market trends.[110]
- **Focusing on the 3V framework for TOD:** (1) **Node Value**: the level of access offered by a mass transit station (2) **Place Value:** the attractiveness of the area in terms of diversity and accessibility of community spaces (3) **Market Potential Value:** the prospects of the community in the future.[111]

B. Hong Kong, China

1. Process of planning and implementing TOD projects

Figure 46: Typical implementation flow Diagram for R+P

[109] TOD Institutional Issues, Singapore Case Studies, Slide 53/68
[110] Transit – Oriented Development Implementation Resources & Tools, Page 124/690
[111] Innovative Tod Strategy on Ppp & Financing Structure, Page 16/62

Implementation process for Railway + Property (R+P) projects in Hong Kong includes the following steps[112]:

- **Property Master Planning:** Establish overall development goals and basic project requirements
- **Station/Depot Planning:** Plan stations or depots to align with the master plan and operational needs.
- **Integrated Design Feasibility:** Assess the feasibility of integrated design, considering technical, financial, and legal factors
- **Integrated Property and Railway Requirements**: Integrate property and railway requirements to ensure no conflicts
- **Property Development Design:** Create detailed plans for buildings, infrastructure, and other facilities.
- **Railway Design:** Develop detailed plans for railway lines, stations, and related infrastructure.
- **Resolve Design Interface:** Ensure smooth integration of property and railway design elements.
- **Property Project Implementation:** Construct buildings and infrastructure as per approved designs.
- **Railway Property and Construction Works:** Build railway lines, stations, and related infrastructure.
- **Resolve Construction Interface:** Ensure smooth execution of construction work for both property and railway
- **Property Completion:** Inspect and accept completed property constructions
- **Railway Opening:** Inspect and accept completed railway constructions, ensuring readiness for operation

Rail plus Property (R+P) development is a core part of MTR Corporation's business model, capturing real estate income to finance the capital and running costs of new railways through public–private partnerships (PPPs). Under the R+P programme, the government grants exclusive development rights to developers on land plots of station through MTR. MTRC ensure seamless design of stations with adjacent or above station land uses fully integrated facilitating a compact liveable density. The property sales and rental profits cover capital investments of the railways and fare incomes covers the operating costs.[113]

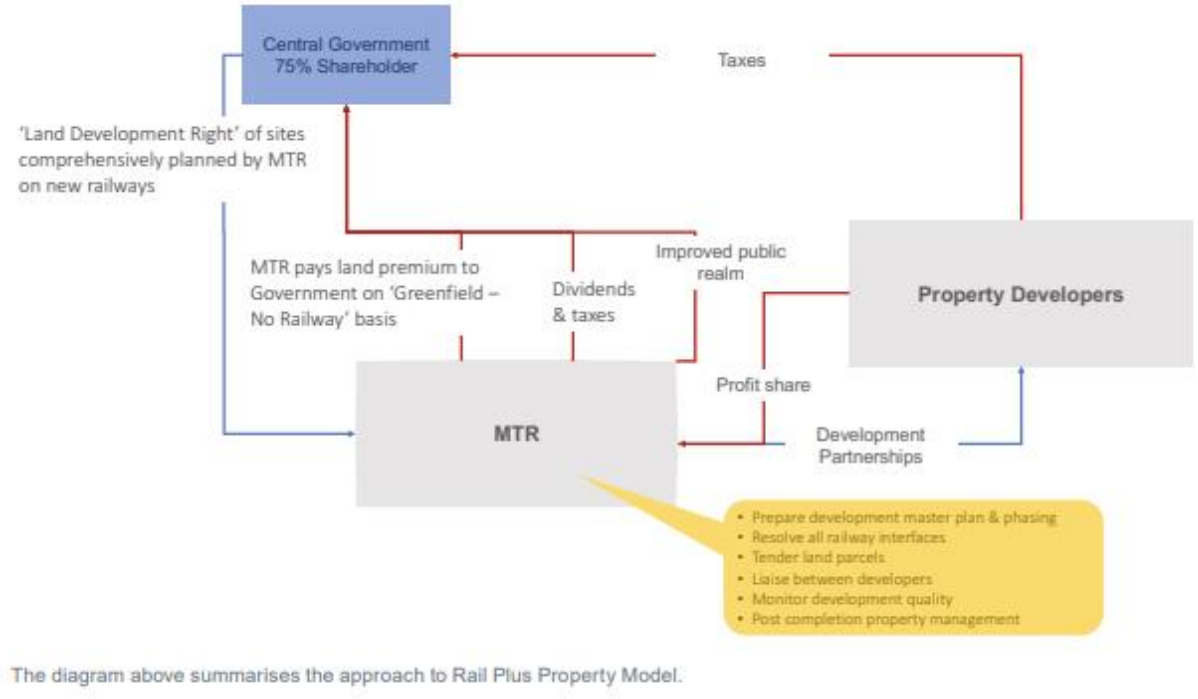


Figure 47: Investment cycle of R + P strategies

[112] Volume 3, Benchmarking Transit Oriented Development, Page 55/128
[113] Volume 3, Benchmarking Transit Oriented Development, Page 53/128

2. Roles and Responsibilities of Stakeholders in the Process of Planning and Implementing TOD Projects

Roles and Responsibilities of Government

MTRC would pay full market price (on a green field basis) to the Government for a specified parcel of land surrounding the proposed station/s. MTRC would contracts with private developers to develop and sell the property (on completion of construction) surrounding the proposed station/s. The Government, through this arrangement, would transfer all the associated commercial risks arising from market fluctuations and rail operations to MTRC.

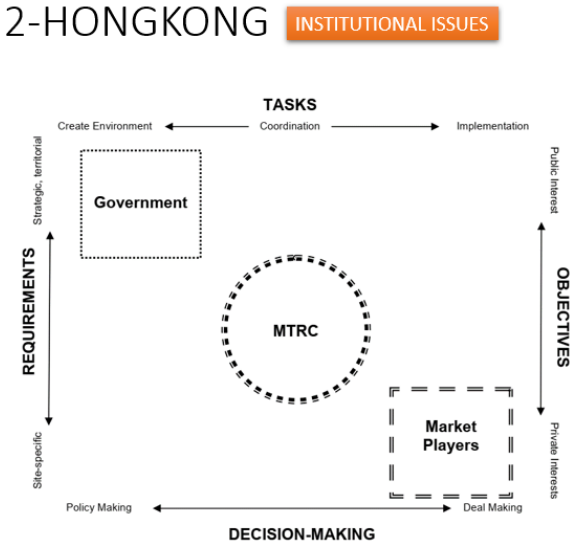


Figure 48: Interactions of Government, the MTRC and Market Players

The Hong Kong government creates a conducive environment for TOD by developing strategic and territorial frameworks, site-specific policies and broader strategic regulations, setting guidelines that the MTRC and market players need to follow.

The government is responsible for policy-making that influences TOD, focusing on public interests. Key government agencies include:

- **Land Development Corporation (LDC):** negotiated in length with owners to acquire land and to demonstrate that it was acquired in a fair and reasonable manner before applying to the Secretary for Planning, Environment and Lands for compulsory land resumption. The LDC was replaced by the URA in 2001.
- **Urban Renewal Authority (URA) - statutory government agency:** URA was established under the Urban Renewal Authority Ordinance, to replace the Land Development Corporation, as the statutory body to undertake, encourage, promote and facilitate urban renewal of Hong Kong, with a view to addressing the problem of urban decay and improving the living conditions of residents in old districts.
- **Hong Kong Housing Society**[114]: The Hong Kong Housing Society is the second largest provider of public housing in Hong Kong. It is a major urban renewal agency and initiated the Urban Improvement Scheme (UIS) in 1974. Under this scheme, dilapidated buildings in urban areas are acquired/taken over and redeveloped into modern housing estates.

[114] Case Studies Compilation of Good and Innovative Practices, Page 21/180

Market Players' Role

Market players are involved in deal-making, negotiating terms with the government and MTRC while considering their profit margins and market viability

Market players are responsible for implementing the TOD projects by handling real estate and infrastructure developments. Their involvement is more business-driven, focusing on private interests, but they must also comply with site-specific requirements set by the government.

MTRC's Role

Playing as a central piece of the process of TOD implementation, to "construct and operate, under prudent commercial principles, an urban metro system to help meet Hong Kong's public transport requirements"; MTR was re- established in 2000 as MTR Corporation Ltd. MTR Corporation is involved in businesses outside of transportation, including residential and commercial development, property leasing and management, advertising, telecommunication services and international consultancy services

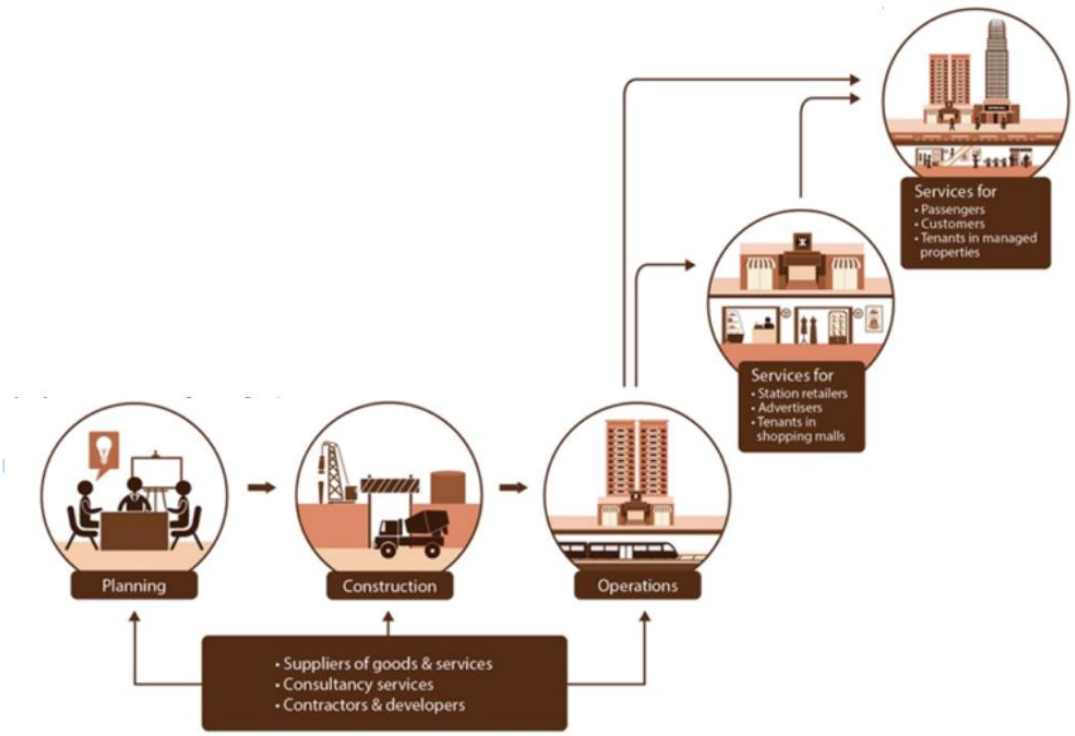


Figure 49: Value chain for MTR Corporation[115]

MTRC facilitates ongoing coordination, ensuring that both sides (government and market players) meet their objectives. This includes working closely with the developer, community and the urban planning authorities and balancing public interests (government) and private interests (market players). Also plays special attention towards the development parameters such as area size, building densities, floor uses and site designs.

MTRC will pay the Government at market rates (based on vacant land value) for a specific plot of land around the proposed station(s). MTRC will contract with private developers to develop and sell real estate (after construction is completed) around the proposed station(s). Under this arrangement, the Government transfers all related commercial risks arising from market fluctuations and railway operations to MTRC.

[115] Value Chain - Sustainability Report, Page 2/14

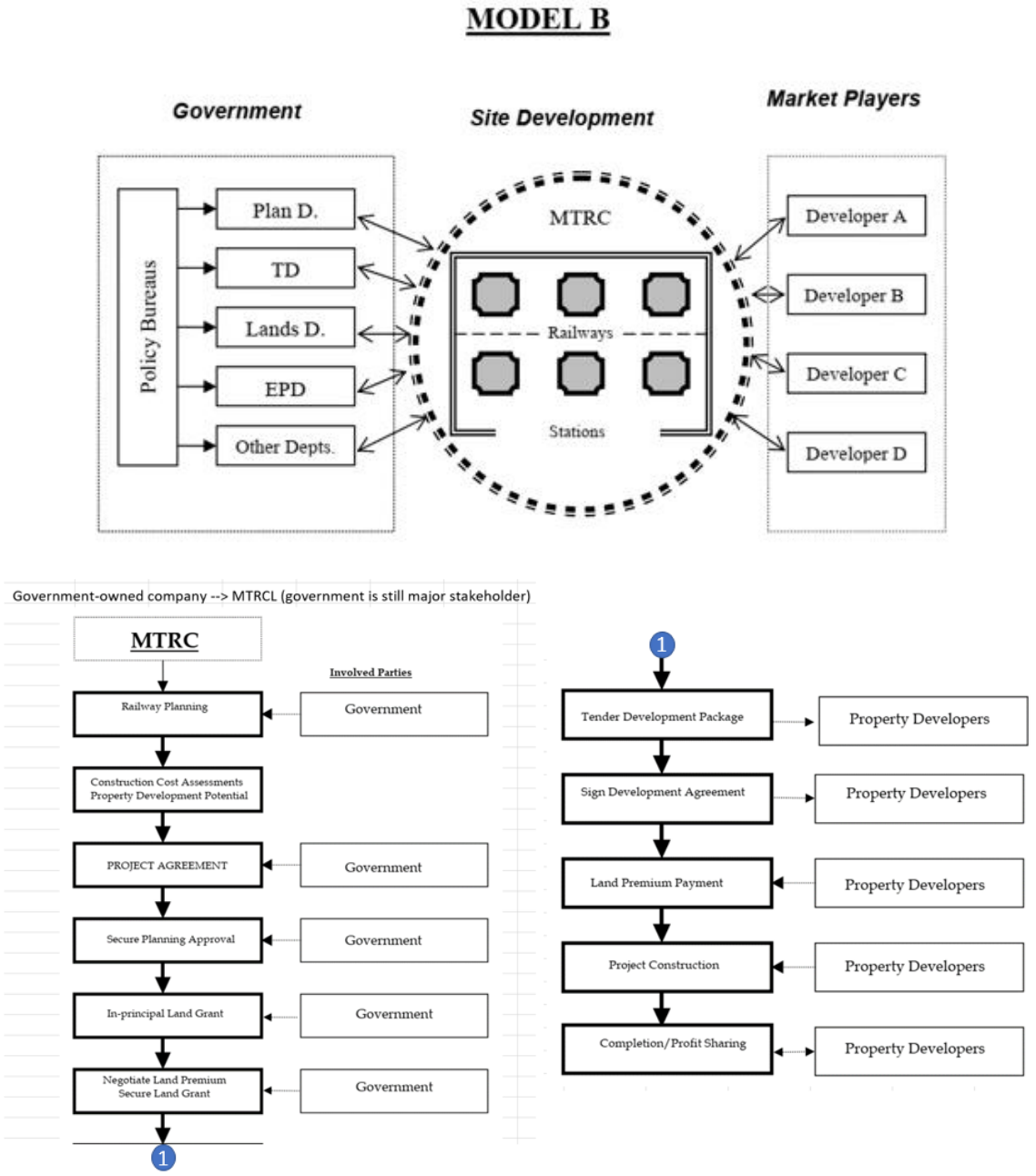


Figure 50: The involvement of Government, MTRC, Property Developers in the TOD process

MTRC coordinates with both government and private enterprises in the planning and implementation of TOD projects, specifically:

With government

- Railway Planning: MTRC coordinates with the government to plan railway infrastructure, identifying areas for potential development
- Construction Cost Assessments and Property Development Potential: MTRC assesses the construction costs and evaluates the potential for property development around the planned railway stations
- Project Agreement: A formal project agreement is signed between the MTRC and the government outlining the railway and related property development
- Secure Planning Approval: MTRC seeks approval for the project from the government's planning authorities

- In-principal Land Grant: The government provides an initial agreement (in-principle) to grant land rights for property development adjacent to the railway
- Negotiate Land Premium and Secure Land Grant: MTRC negotiates the land premium (cost of land) with the government and officially secures the land grant for development

With property developers

- Tender Development Package: MTRC prepares and offers development packages through a tender process to private property developers
- Sign Development Agreement: The selected property developers sign a development agreement with the MTRC, formalising their role in the project
- Land Premium Payment: Property developers make land premium payments (the agreed cost for land development) to the government
- Project Construction: The property developers begin the construction of the development projects in coordination with the railway infrastructure
- Completion/Profit Sharing: Upon completion, profits are shared between the MTRC and the property developers according to the terms of the development agreement

MTR's governance is sophisticated and includes high-level government involvement. The non-executive directors include Secretary for Financial Services and the Treasury, Secretary for Transport and Housing, Permanent Secretary for Development (Works), Commissioner for Transport. Risk management within the company is highly evolved and is subject to a continuous improvement.

The management of the MTR Corporation is overseen by a chief executive officer and an executive committee. They report to a Board headed by a non-executive chairman and made up of local business and community leaders and government representatives.[116]

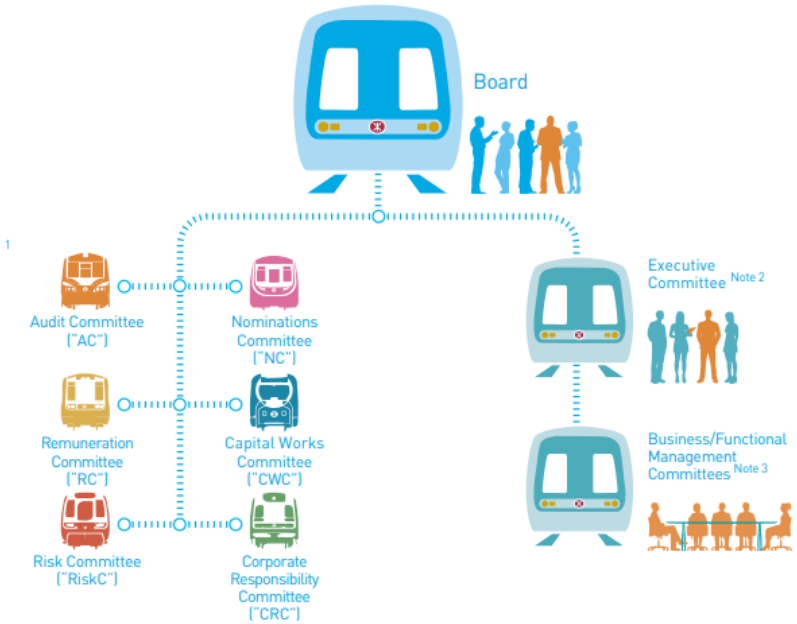


Figure 51: MTR Governance (MTR Annual Report, 2016)[117]

The MTR (Mass Transit Railway) is not newly established; it was empowered from an existing agency. The MTR Corporation Limited (MTRC) was established in 1975 as a government-owned statutory corporation to

[116] Business Overview, MTR Corporation, Page 2/13
[117] Volume 3, Benchmarking Transit Oriented Development, Page 53/128

oversee the construction and operation of an urban metro system in Hong Kong. The first line, the Kwun Tong Line, opened in 1979.

In 2000, the MTRC was privatised and became MTR Corporation Limited, a publicly traded company. In 2007, the MTR Corporation Limited merged with the Kowloon-Canton Railway Corporation (KCRC), which was another existing railway operator in Hong Kong, further expanding its operations and services. This merger combined the operations of the two major rail systems in Hong Kong under the MTR brand.

3. Laws and Regulations Guiding TOD Planning and Implementation

Mass Transit Railway Bill

- **Franchise Granting**: The bill grants a franchise to MTR Corporation Limited (MTRCL) to operate the Mass Transit Railway (MTR) and any extensions for 50 years. This includes constructing any extensions (Clause 4).
- **Regulation of Operations**: It sets regulations for safe and effective railway operations, including maintaining proper service, keeping records, and providing information to the Secretary for Transport. The Chief Executive in Council can impose penalties for non-compliance (Clauses 9-14).
- **Safety Provisions**: It establishes the appointment and powers of railway inspectors to ensure safety and allows the Secretary to require MTRCL to address safety risks (Clauses 26-28).
- **Financial and Transition Provisions**: The bill describes the financial aspects, including share allotment to the Financial Secretary Incorporated, taxation, and exemption from certain stamp duties. It provides for the transition of MTRC's assets and liabilities to MTRCL and the eventual dissolution of MTRC (Clauses 42-52).
- **Regulations and Bylaws:** The Secretary can make regulations, and MTRCL can create bylaws related to railway operations and passenger conduct (Clauses 33-34).
- **Compensation and Arbitration:** Provisions for compensation to MTRCL for any use or damage to railway property by the government and for arbitration in case of disputes overcompensation (Clauses 23-25).
- **Suspension and Revocation of Franchise**: The franchise can be suspended or revoked in cases of substantial breakdown, emergency, or default by MTRCL. The government can take over railway operations if necessary (Clauses 15-19).
- **Transport Interchanges**: Provisions are made for delineating and managing transport interchanges to facilitate interchange between the railway and other transport modes (Clauses 31-32).
- **Appeals and Miscellaneous Provisions**: Right of appeal against decisions of the Secretary, exemption from certain laws, and provisions for the general transition and operational continuity (Clauses 53-64).

Other regulations

Railway development strategy 1994: The "Railway Development Strategy" is Hong Kong's first proposal for future railway development, published by the Transport Department of the Hong Kong Government in 1994. The various railway plans proposed in this document are based on the results of the "Railway Development Study" proposed by the Transport Department in March 1993

Railway development strategy, 2000: This is the second Railway Development Strategy to be prepared for Hong Kong (based in Second Railway Development Study). The strategy provides the planning framework for further expansion of Hong Kong's railway network up to 2016. The further decision to build individual railway projects will follow on detailed engineering, environmental and financial studies relating to these projects. Public consultation will be undertaken prior to the implementation of any railway projects

Railway development strategy 2014: This strategy sets out plans for the development and expansion of the rail system through 2031, including TOD projects around new stations

Town Planning Ordinance, 2023: This document is to promote the health, safety, convenience and general welfare of the community by making provision for the systematic preparation and approval of plans for the layout of areas of Hong Kong (as well as for the types of building suitable for erection in those areas) and for the preparation and approval of plans for areas within which permission is required for development, including making provision for the enforcement of this Ordinance and for related matters

Land (Compulsory Sale for Redevelopment) Ordinance, 2021: The Ordinance to enable persons who own a specified majority of the undivided shares in a lot to make an application to the Tribunal for an order for the sale of all of the undivided shares in the lot for the purposes of the redevelopment of the lot; to enable the Tribunal to make such an order if specified criteria are met; and for matters incidental thereto or connected therewith

Hong Kong 2030+: Long-range planning sets out a long-term urban and transport development strategy, with the aim of encouraging efficient land use around public transport hubs

Other supporting legal frameworks for planning and implementation of TOD projects include:

Key enabling policies and legal framework used in support of transit and property development[118]

	Policy: Land Development[9]	Key Features
1	Grant of exclusive property development rights of the station areas to MTRC in exchange for its commitment to provide and improve mass transit railway as an essential mode of public transportation.	Incentive-based approach to encourage the corporation to plan and develop sites in a financially viable manner by "internalizing" benefits from rail and property development; Eliminates the costs associated with land banking and acquisition
2	Established MTRC as an independent corporation with government as a major shareholder to strengthen the role of transit agency as the single entity to serve as the master planner, property developer and property manager as well as generate revenues to sustain the transit service.	Government's commitment to remain as the majority shareholder of the MTRCL after the privatization for at least 20 years and own no less than 50% of shares and votes of the MTRCL; Lower transaction costs with single entity as opposed to multiple agencies
3	Permit joint ventures in real estate development with private sector investment in TODs	
4	Use of Transfer of Development Rights combined with commitment to encourage redevelopment of existing areas rather than allowing for suburban development	

Table 1: *Source:* IBI Group

Figure 52: Land Development Policies and Their Key Features Support Transit and Property Development

The supporting public transportation system policies that have enabled TOD projects to flourish in Hong Kong's case include:

[118] Case Studies Compilation of Good and Innovative Practices, Page 21/180

Policy: Land Development[6]	Key Features
Limiting private car ownership and usage	Initial registration tax ranging from 35% to 100% of the vehicle cost.
	High fuel tax
Transit service coordination and protection (1980s)	White Papers on transportation policy
	Prohibited direct competition by other PT/feeder modes along the rail routes
Service proliferation and competition (1990s)	Railway Development Strategy, which set out development plans for four new rail lines or extensions.
	White Papers on transportation policy
Service rationalization and consolidation	Public transport interchanges are a required component of new railway stations to facilitate inter-modal feeder services
	Increase the proportion of rail-based public transport journeys from 33% in 1997 to 40–50

Table 2: *Source:* IBI Group

Figure 53: Land Development Policies and Their Key Features to support TOD projects

4. Principles for Determining Development Boundary for TOD Areas

- **Rail Village Area:** The connection between areas of destination and the station, which determines accessibility and the willingness of users to walk to the station. This area typically varies between 500 and 1,200 metres
- **Catchment Radius:** The urban design and elements that define the radius and pedestrian route, making the walk to and from the station enjoyable. This radius can range from 400 to 800 metres or even 2 km for the influence of each transit benefits, depending on the city[119]

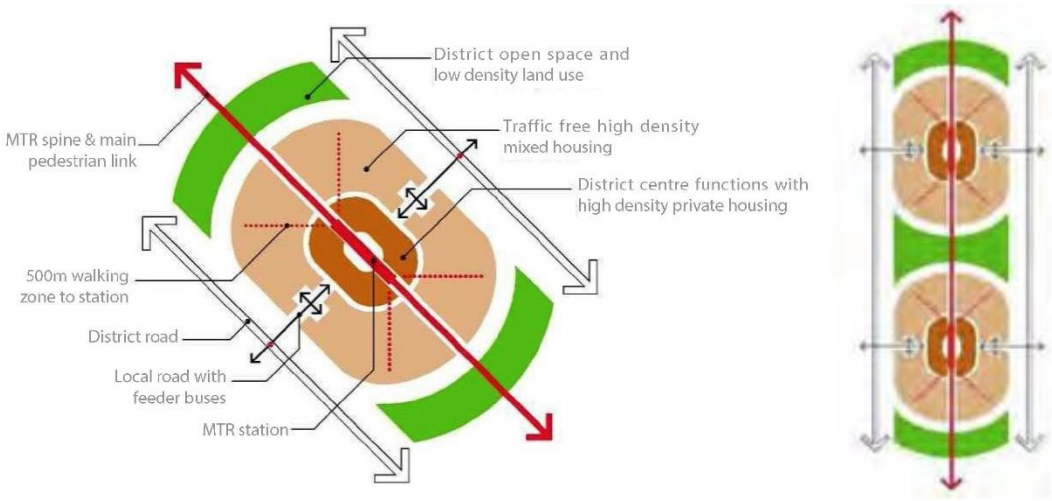


Figure 54: Overview of MTR's concept of R+P Development

5. LVC tools

The R+P model highlights the need for an autonomous transit agency that combines multiple functions planning, design, land acquisition, construction, operation, and asset management beyond traditional engineering roles. A diverse team, including real estate experts and urban planners, is crucial for success.

Effective LVC initiatives require updated land-use maps and valuations. Selecting suitable LVC mechanisms depends on:

- Government authority to assess land value and levy taxes

[119] LVC and TOD as a Way of Funding Railway Systems: The Case Of Hong Kong Rail + Property Model, Page 29/41

- Ability to acquire land at favourable prices
- Capacity to act as a knowledgeable business partner in land development.

Local governments lacking land ownership can explore alternatives like land readjustment and selling air rights. Additionally, distributing FAR can serve as a market incentive for development[120]

LVC instruments

Development-based LVC:

- The government transfers land development rights to the MTR at pre-transit prices, which the MTR then sells to private developers at post-development market rates. These developers are granted permission to exceed the typical FAR in exchange for funding public amenities like parks, pedestrian pathways, or station improvements. In order to protect the public interest from granting too much land, any excessive capital grant is reimbursed to the government. Also, HK has the mechanism to auction of development rights: places development opportunities and values associated with a new transit facility or line to sale via open auction

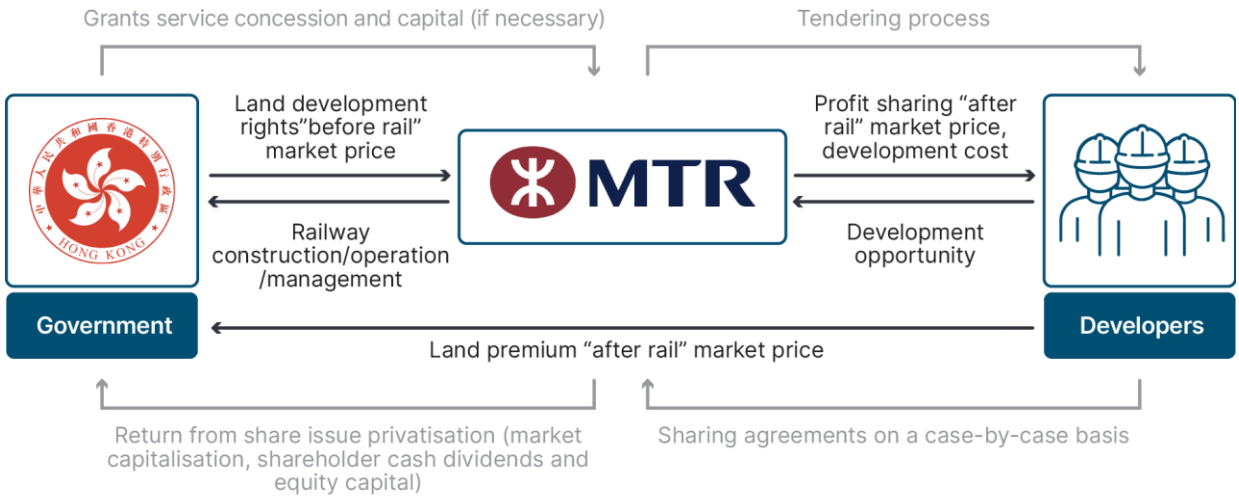


Figure 55: Framework of R+P model

- After the land is acquired, the **MTRC acts as a landlord and subdivides and leases the land to private developers,** selected from a list of qualified bidders, through public auctions. The selection of the private developer is based on the attractiveness of the proposal, experience, management capabilities and financial health. This has also allowed the preference towards large property groups and the elimination of smaller competitors. As the land is not sold to private developers, the MTRC partners with them instead and remains in full control of the land and leases of the units. To minimise direct risks, developers typically cover all development costs and assume all project risks. In compensation, the MTRC negotiates with developers three mechanisms for gaining benefits: (1) profit sharing in agreed proportions from the property sale or lease (after development costs deduction); (2) sharing of assets in-kind; or (3) receiving upfront payments case-by-case. The selection of one of these mechanisms depends on the evaluation of the market conditions and Land value capture and transit-oriented development as a way of funding railway systems 14 long-term value of development. In addition, the MTRC also engages several developers per station area (up to 13 developers) to manage risks and address various market needs

This method has been instrumental in financing the expansion of Hong Kong's rail network, with the MTR raising over USD 1.5 billion annually through property development. The R+P model achieves multiple objectives: it enhances urban connectivity, ensures sustainable transport funding, and promotes high-density,

[120] LVC And TOD as a Way of Funding Railway Systems: The Case of Hong Kong Rail + Property Model, Page 21/41

mixed-use development near transit hubs. As a result, it has become a globally recognised model for leveraging land value to finance large-scale public infrastructure projects.

Air Rights Transfers and FAR Bonuses

- Another mechanism for collecting FAR fees in Hong Kong is through air rights transfers (similar to Tokyo). In specific planning districts, developers can purchase air rights, which allow them to transfer unused FAR from one site to another. This is particularly useful in areas where certain buildings have not fully used their FAR potential, enabling a more flexible distribution of building densities across the city.
- Additionally, **FAR bonuses are offered to developers who contribute to public amenities.** Developers are allowed to build beyond the allowable FAR in exchange for public infrastructure contributions, such as constructing open spaces, improving pedestrian pathways, or building public plazas. This helps offset the impacts of high-density development and ensures that public infrastructure keeps pace with the growing population

Fee-based LVC

Hong Kong also subject these tax, special fees and levies to **finance its operation** (1) Property taxation, (2) Stamp Duty which are depending on the valuation assets; (3) government disposal; (4) The fee for changing the terms of a lease

- **Property taxation:** Property taxation is based on the net assessable value of such land or buildings. Rating assessments and collection are a function of central government. Individuals who let or sub-let property are also subject to property taxes. Property tax in Hong Kong is 15% on the net assessable value (NAV) of land or buildings, which is the rental income minus rates paid and a 20% allowance. Properties used by the owner are exempt from this tax. Property formula

NAV = (Rental Income - Irrecoverable Rent - Rates paid by owner(s)) * 80%

Property tax = NAV * 15%

Table 14: How Property Tax is Computed

[A]	Rental Income
[B] Less:	Irrecoverable Rent
[C]	Assessable Value (A-B)
[D] Less:	Rates paid by owner(s)
[E]	(C-D)
[F] Less:	Statutory allowance for repairs and outgoings (E x 20%)
	Net Assessable Value (E-F)

- **Rates paid by owner(s)**: Only rates agreed to be paid and paid by owner is deductible. Do not claim deduction for rates already offset by rates concession. Government rent charged with rates under the same quarterly "Demand for Rates and/or Government Rent" is not deductible for property tax purposes. Make sure not to include the amount of government rent in the claim for deduction of rates so as to avoid an incorrect claim. According to Chapter 112. Inland Revenue Ordinance: the deduction can be allowed when calculating the NAV are (i) **where the owner agrees to pay the rates** in respect of the land or

buildings or land and buildings, those rates paid by him; and (ii) an allowance for repairs and outgoings of 20% of that assessable value after deduction of any rates under subparagraph (i)

- **Stamp Duty:** Stamp duty is paid on the sale of properties – there is a sliding scale of charges **depending on the value of the assets.** Stamp duty is also payable on a **new lease**, the amount depends on the term of the lease and the rent payable. Individuals who let or sub-let property are also subject to property taxes. Stamp duty currently has one type which is the Ad Valorem Stamp Duty (AVD). The AVD is payable by: Buyers, Permanent residents, non-permanent residents, and Purchases registered to companies. Hong Kong's stamp duty scheme at a glance, the rates are transparent and easily calculated once vendors and purchasers know where they slot in

Table 15: Stamp duty scheme

Price	Applicable to: - Permanent resident buyer - Second home buyer - non-permanent resident buyer - Purchasers registered to companies
Up to HK$3 million	HK$100
HK$3,000,001 to HK$3,528,240	HK$100 + 10% of excess over $3M
HK$3,528,241 to HK$4.5 million	1.5%
HK$4,500,001 to HK$4,935,480	HK$67,500 + 10% of excess over $4.5M
HK$4,935,481 to HK$6 million	2.25%
HK$6,000,001 to HK$6,642,860	HK$135,000 + 10% of excess over $6M
HK$6,642,861 to HK$9 million	3%
HK$9,000,001 to HK$10,080,000	HK$270,000 + 10% of excess over $9M
HK$10,080,001 to HK$20 million	3.75%
HK$20,000,001 to HK$21,739,120	HK$750,000 + 10% of excess over $20M
Over HK$21,739,121	4.25%

- **The fee for changing the terms of a lease/ Lease modification:** In Hong Kong, the fee for modifying the terms of a lease or conducting a lease modification is primarily determined by the land premium. This premium is calculated as the difference between the value of the land under its existing lease terms and the enhanced value resulting from the lease modification or land exchange. This typically applies when a landowner seeks to alter the terms of the lease to optimise land use, for example, changing the allowed building usage or increasing development intensity. For industrial buildings, a pilot scheme introduced in 2021 allows for the calculation of lease modification premiums based on standard rates. These rates vary by geographical region and the intended future use of the land (e.g., residential, commercial, or industrial).The premium formula generally follows:

$$\textbf{Premium} = A \times B - C \times D$$

Where:

- A = the maximum gross floor area (GFA) after the modification
- B = the standard rate for the intended land use after modification
- C = the GFA before modification

- D = the standard rate for the previous land use.

This approach ensures transparency and certainty for developers while supporting the redevelopment of older buildings. In cases not covered by the standard rates, the traditional approach is used, where premiums are assessed on a case-by-case basis by the Lands Department.

6. Mechanism of Cooperation and Contribution of Private Enterprises in the Process of TOD Implementation

Roles and contributions of private sector include (i) Funding and Investment: Private developers, particularly the MTR Corporation, invest heavily in real estate projects around new MTR (Mass Transit Railway) stations. This investment generates significant revenue that helps finance transit infrastructure, reducing the need for public funding (ii) Risk Sharing: The R+P model allows private developers to share financial and operational risks with the public sector, making large-scale investments more feasible and sustainable**.**

PPP schemes are generally considered successful in Hong Kong, as MTRC operates under a vertically integrated design-build-finance-operate-maintain-transfer (**DBFOMT**) model. This model represents a high degree of transfer of tasks, control, and risks to the private sector partner. The success of the MTR in Hong Kong can be attributed to several factors[121]:

- **Rail plus Property Strategy:** The MTR Corporation employs a 'Rail plus Property' strategy, which facilitates synergies and cross-subsidisation of rail operations from land value capture. This strategy has been instrumental in ensuring the financial sustainability of the MTR system
- **Regulated Monopoly:** The MTR operates as a regulated monopoly provider, which allows it to maintain a stable and predictable revenue stream while also being involved in real estate development. This dual role helps in offsetting the costs associated with rail operations
- **Government Ownership and Private Sector Involvement:** While the government owns the metro system, the involvement of the private sector in financing, maintaining assets, and operating train services has proven beneficial. This model allows for efficient management and operation while leveraging private sector expertise and capital
- **Risk Allocation:** Appropriate mechanisms for the allocation of financial and revenue risks have been key determinants of the long-term financial sustainability of the MTR system. The clear delineation of responsibilities and risks between the public and private sectors has contributed to the success of the PPP model in Hong Kong

7. The Effectiveness in Implementing the TOD Model in Hong Kong

Summary of the sustainability benefits of Rail + Property Model in Hong Kong[122]

- **Low Public Spending:** Development right granted by Government minimises public spending on rail infrastructure, with sustainable long-term rail construction model
- **Safe and Healthy Community:** Segregation of vehicles and pedestrians to create a safe and healthy living environment
- **People – Oriented:** Seamless connection between railway station and property development provides maximum convenience and achieves time efficiency
- **Modern and Efficient City Living:** Better land use and reduction of road traffic

8. Lessons Learned on TOD Model Development for Vietnam

Value Capture for Financing: Hong Kong's experience shows that integrating transit with land use can generate the financial resources needed to support TOD. The concept of "Value Capture" effectively capitalises on the increase in land value generated by transit infrastructure. This method is particularly effective in dense, congested areas, where the demand for improved accessibility is high.

[121] Sustainable strategies for Mass Rapid Transit PPPs, page 2, 13, 15, 18/21
[122] Innovative Tod Strategy on PPP & Financing Structure, Page 32/62

Positive Impact of Transit on Property Development: Studies confirm a strong relationship between property development and transit ridership, particularly with the MTR (Mass Transit Railway):

- Higher population densities lead to increased ridership.
- Private housing near MTR stations boosts ridership more than public housing.
- Mixed land use, compact environments, and lively street-level activities further enhance ridership.
- New developments with attractive designs, commercial amenities, and well-planned pedestrian connections along rail corridors increase ridership and property value.

Rail-Property (R+P) Model: Hong Kong's R+P programme, led by the MTR Corporation, has been a cornerstone of its successful rail system development. The programme allows the MTR to leverage real estate income to finance railway construction and operational costs, while simultaneously increasing transit use by creating walkable, high-density areas around stations.

Three Key Concepts for Success[123]

- **Financial Sustainability**: Rail investments should achieve a targeted rate of return, factoring in government support (such as land rights or subsidies) to ensure financial viability
- **Market-Driven Approach**: Planning for development along rail lines should consider market demand, location characteristics, and institutional capacity, involving multiple stakeholders
- **Risk Management**: By engaging private developers and using PPPs, MTR can transfer significant commercial risks to external parties, reducing the burden on the railway company

Hong Kong's Success Factors[124]

- **Innovative implementation and financing model:** Hong Kong, adopted innovative and unconventional models of implementing and financing mass transit at city scale, through its R+P model
- **Focused design model based on "3Ds"**: Hong Kong case also demonstrates how high-density liveable communities could be created through capitalising on transit stations and focus on designing stations as places through 3Ds: Density, Diversity and Design
- **Continuous review of the typologies and approaches:** The constant evolution and effort in planning TOD is also evident. In the last decade, MTR has evolved from developing stand-alone station and adjacent development to more comprehensive models and produced specific station typologies that promote TOD growth.
- **Healthy lifestyle supported by planning and TOD policies:** Special policies, station focused public realm design encouraging walking and cycling.

[123] Case Studies Compilation of Good and Innovative Practices, Page 32/180
[124] Volume 3, Benchmarking Transit Oriented Development, Page 53/128

C. New Delhi, India

1. Roles and Responsibilities of Stakeholders in the Process of Planning and Implementing TOD Projects

There are 3 key players: (1) DDA - Delhi Development Authority; (2) CA - Competent Authority; (3) D - Developer Entity

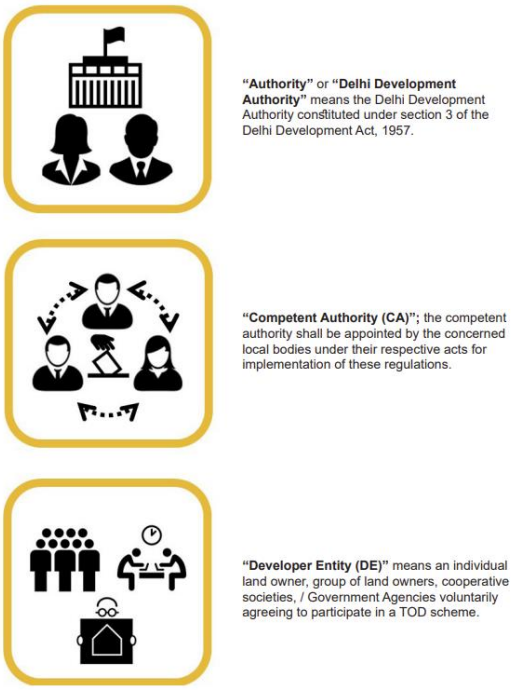


Figure 56: Key stakeholders in New Delhi TOD

DDA's roles or responsibilities

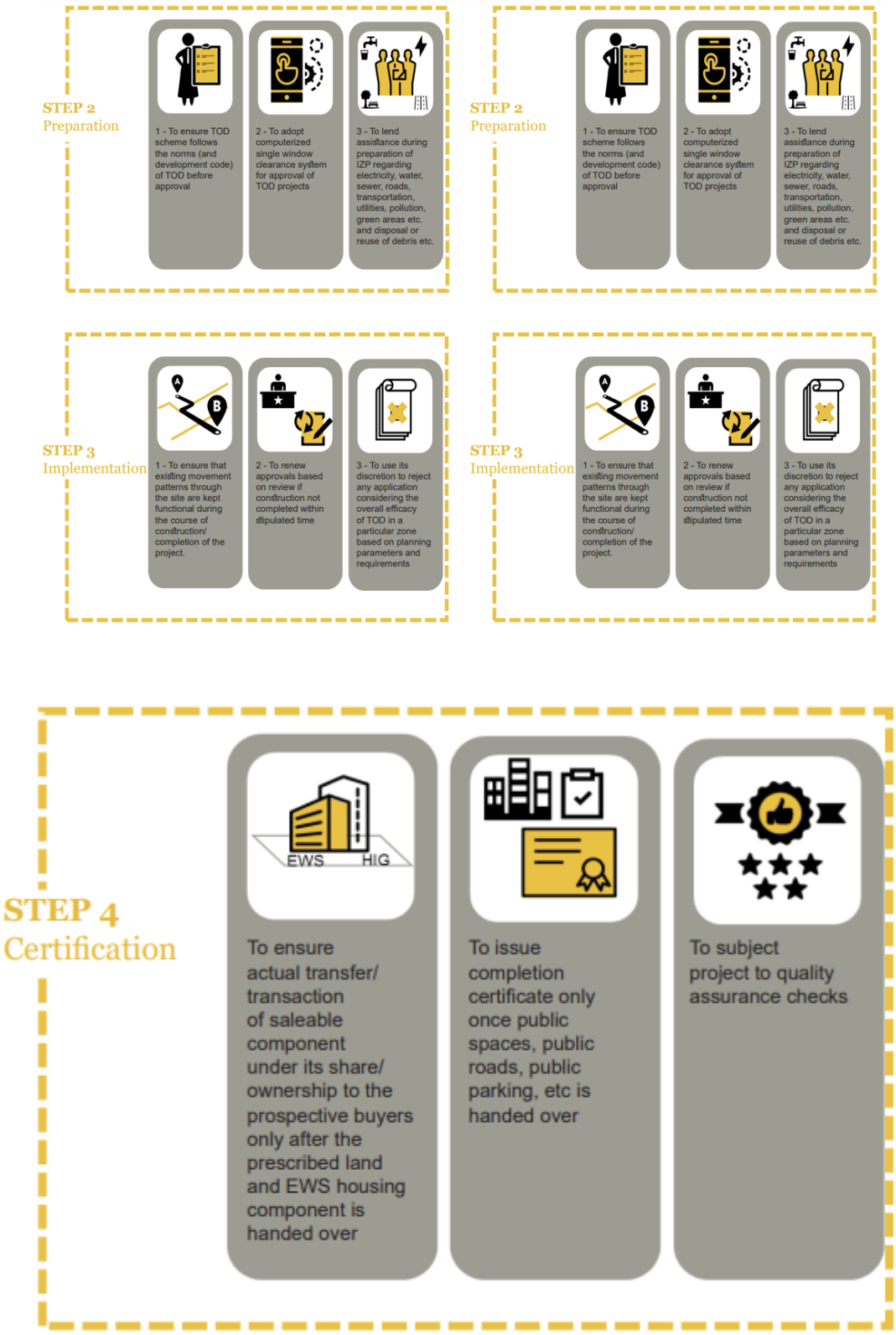
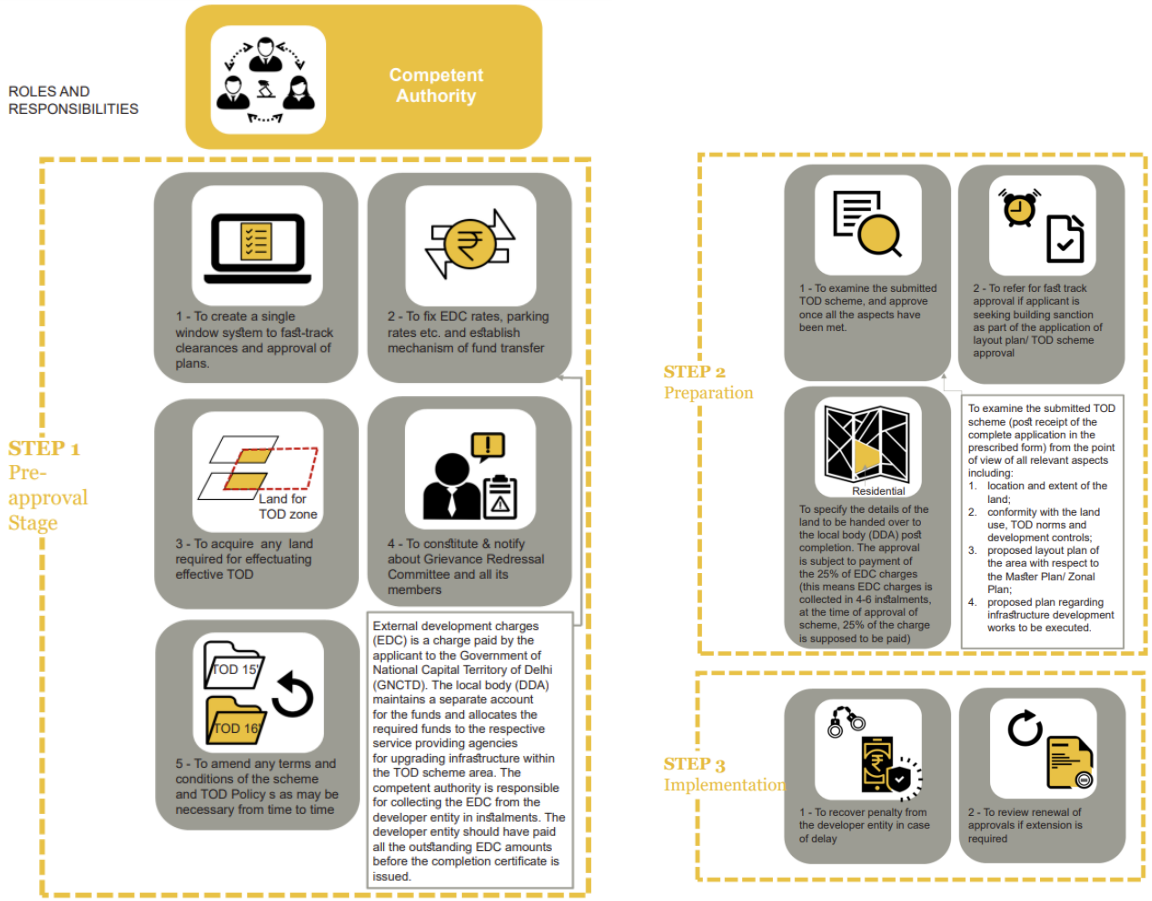


Figure 57: DDA's roles or responsibilities

CA’s roles or responsibilities



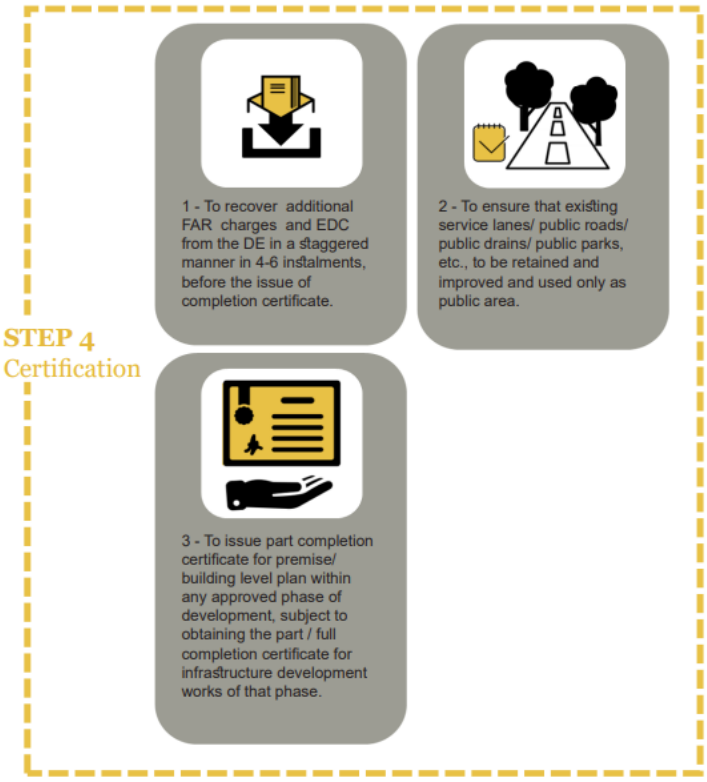


Figure 58: CA's roles or responsibilities

CA components

CA shall be under the Chairmanship of the Head of the Department of Planning of the concerned local body. All concerned stakeholders from the following departments shall be part of the CA for approval of TOD schemes, including (but not limited to) the following:

a. Engineering Dept, (concerned local body)
b. Delhi Urban Arts Commission
c. Dept. of Urban Development, GNCTD
d. Dept. of Transport, GNCTD
e. Planning Dept, DDA
f. Land Management, DDA
g. Delhi Jal Board
h. Delhi Fire Services
i. Dept. of Power, GNCTD
j. Airport Authority of India (AAI)
k. Delhi Urban Shelter Improvement Board, GNCTD
l. Public Works Dept. GNCTD
m. National Monument Authority
n. Others as necessary

The DDA sets up a TOD fund to be used exclusively for maintaining and upgrading services within the TOD scheme area. The CA is responsible for collecting EDC from the DE in instalments and ensuring that all outstanding EDC amounts are paid before issuing the completion certificate. Additionally, surplus funds received by the local body through EDC charges, FAR charges, auction of advertisement rights, and donations for upgrading amenities are invested in high interest yielding government securities, and the

accrued interest is used locally for the creation, upgradation, and maintenance of public amenities within the TOD zone[125]

DE's roles or responsibilities

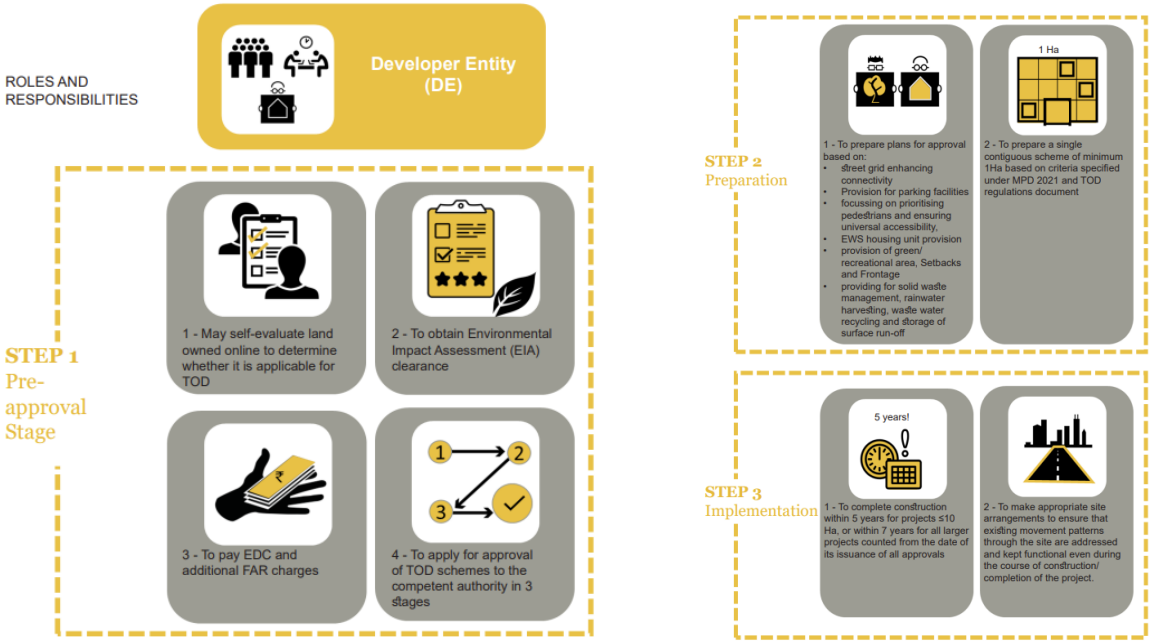


Figure 59: DE's roles or responsibilities

Interaction mechanisms of players, stakeholders are shown as the Figure 60.

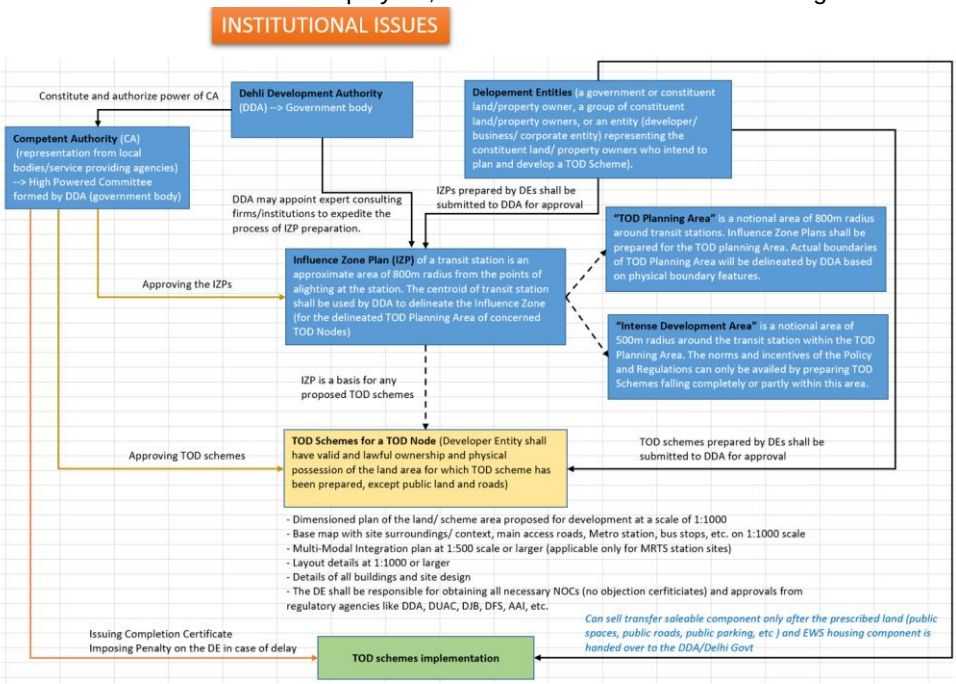


Figure 60: Interaction mechanisms of players, stakeholders flow

[125] TOD Manual, page 38/80 – Step 20; page 28/80

2. Laws and Regulations Guiding TOD Planning and Implementation

The legal framework and regulations guiding the planning and implementation of TOD in India include:

- The Delhi Development Act, 1957 has undergone several amendments since its enactment. These amendments have been introduced to address evolving urban planning needs, regulatory requirements, and administrative changes in the context of Delhi's development. Some notable amendments and associated regulations include: The DDA (Validation of Disciplinary Powers) Act, 1998; The Repealing and Amending (Second) Act, 2017; The DDA (Election of Representative of Delhi Municipal Corporation) Rules, 1958; The DDA Rules, 1958; The Delhi Development (Master Plan and Zonal Development Plan) Rules.[126]
- The Metro Railways Act in India has undergone several amendments since its inception. The primary acts and amendments include:
  - The Metro Railways (Construction of Works) Act, 1978: An Act to provide for the construction of works relating to metro railways in the metropolitan cities and for matters connected therewith
  - Metro Railways (Operation and Maintenance) Act, 2002: An Act to provide for the operation and maintenance and to regulate the working of the metro railway in the National Capital Region, metropolitan city and metropolitan area and for matters connected therewith and incidental thereto
  - The Metro Railways (Amendment) Act, 2009: This amendment further modifies the provisions of the 1978 and 2002 acts to address new developments and requirements
- The National TOD Policy 2017, provides guidelines and principles for implementing TOD across India. However, it is important to note that this policy itself does not constitute an enacted law. Instead, it serves as a guiding document to encourage and support states and cities in adopting and implementing TOD principles within their own regulatory and planning frameworks

It combines land usage and transport infrastructure, with the intent to create sustainable urban growth centres. These centres would have walkable and liveable communities, with mixed land-usage policies, to sustain a high density of population. Under this plan, citizens will have easy access to open green areas, public amenities and transit facilities. In other words, a TOD will bring people, activities, buildings and social infrastructure together. The document establishes the vision, objectives, needs and principles of the policy, describes the approach for TOD implementation, Value Capture Financing for TOD, statutory framework, and communications and outreach

- **Delhi Master Plan (2021)**[127]**.** It has been amended to include the provisions of the TOD policy. At the core of the policy is the aim to promote high-density development within a 500-metre radius that translates into a walking environment around a metro station.
- The TOD policy promotes sustainable mobility, efficient land use, and integration of transport and urban planning. It defines TOD Nodes, Influence Zones, and TOD Schemes, encouraging compact, mixed-use development focused on public transit and non-motorised transport (NMT).
- The policy supports higher FAR, infrastructure upgrades, and green building standards to reduce congestion and emissions. TOD Schemes must cover at least 1 hectare, with flexible land use. The DDA identifies TOD Nodes and guides improvements through Influence Zone Plans (IZPs). Development norms include a maximum FAR of 500, affordable housing provisions, parking requirements, and sustainability measures.

3. Principles for Determining Development Boundary for TOD Areas

TOD zone in Delhi is defined as an area **within a 500-metre radius** on both sides of the centreline of the existing and planned/approved mass rapid transit system (MRTS) corridors. This area is designated as the "influence zone" and is identified in the respective Zonal Development Plans

The scheme for the Development / Redevelopment of the influence zone shall be prepared on the basis of the following:

[126] Refer to page 1 or 2 at this source
[127] TOD policy is the section 20, page 298 – 302

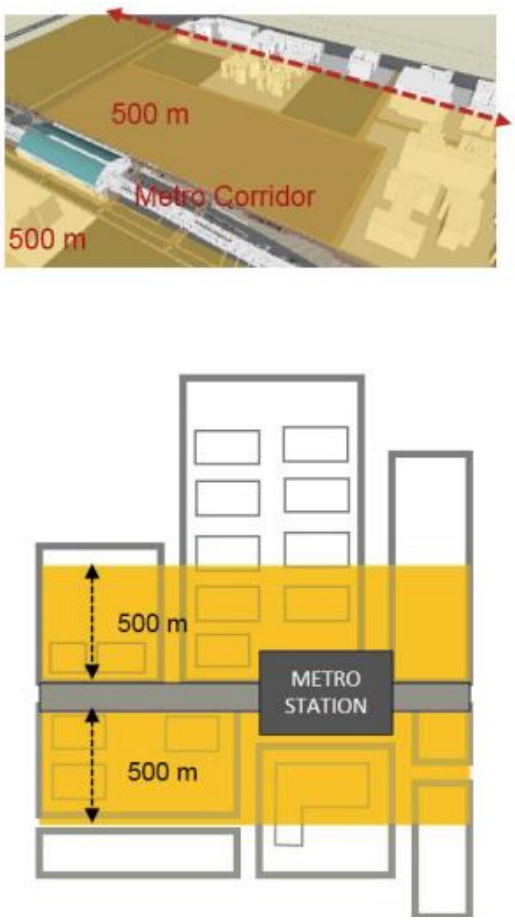


Figure 61: Illustration of designated as influence zone

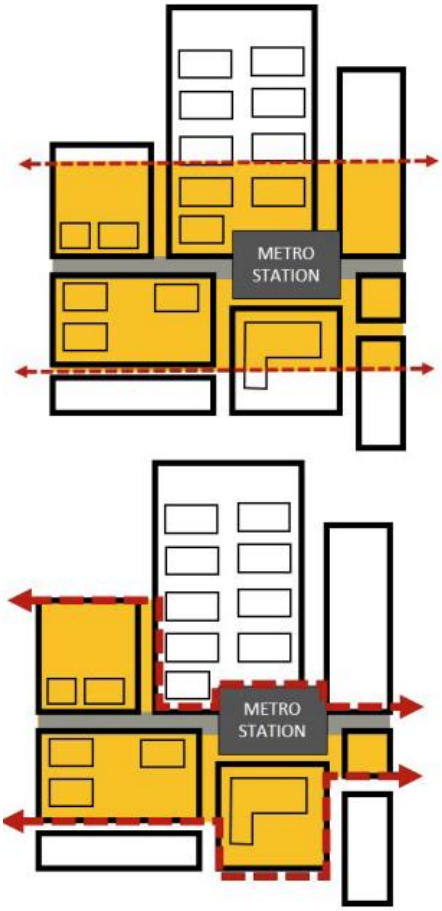


Figure 62: TOD influence zone Illustration around a metro station

i) About 500m. wide belt on both sides of centre line of the existing and planned/ approved MRTS Corridors is designated as influence zone which has been identified in the respective Zonal Development Plans, along with stations, except for the exclusions mentioned in para (vi) below. The same will be updated by DDA from time to time.

ii) The entire approved plan of a TOD-integrated scheme will be included in the zone if more that 50% of the plan area falls inside the influence zone. The TOD-integrated scheme to be submitted by DE will be of the area under his ownership/ entitlement and not of the adjoining area.

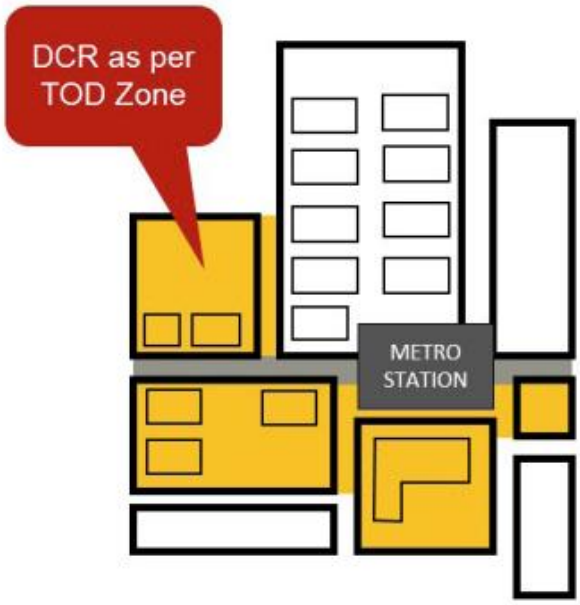


Figure 63: TOD Zone Development Controls Illustration

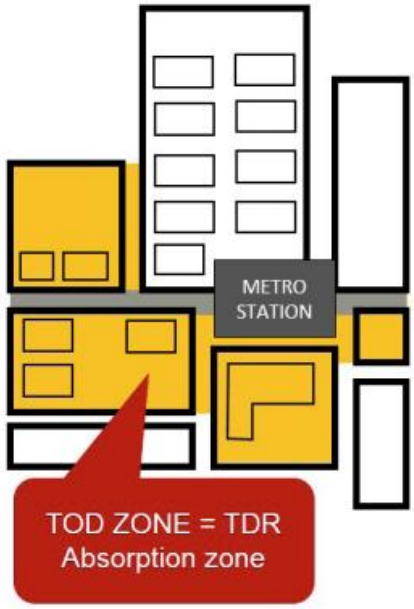


Figure 64: TOD Zone and TDR Absorption Illustration

iii) Development Controls applicable will be as permissible under TOD Zone specified in Delhi Master Plan 2034.

iv) This TOD zone may be also used as TDR absorption zone and the TDR regulations for the same will be prepared by DDA.

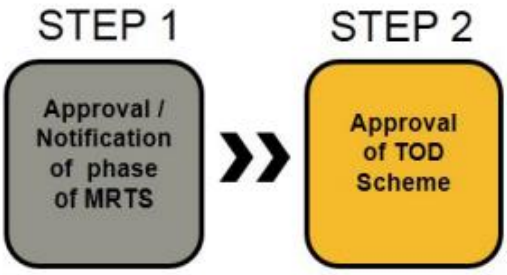


Figure 65: TOD Scheme Approval Process Illustration

Figure 66: TODIS FAR and Height Regulations Illustration

v) The approval of schemes will be granted after the approval/notification of the respective phase of MRTS

vi) Higher FAR and height can be availed through the preparation and approval of comprehensive TOD-integrated scheme. Wherever height is restricted by any regulatory authorities like AAI, NMA; to enable the DE to use the permissible FAR, a relaxation in ground coverage and setbacks, without compromising the green public open space viz 20%, in such TOD-integrated scheme shall be allowed subject to the clearance from Fire department as per Delhi Fire Services Act.

The DDA is responsible for defining and updating the Influence Zones in the Zonal Development Plans.

4. LVC tools

The LVC tools considered for application in India include:

Tax and fee-based LVC tools:

- Delhi used the **EDC** which is a fee levied on developers or landowners to offset the costs of infrastructure improvements required to support a TOD project.
- **EDC:** The developer entity is required to pay EDC in instalments to the Government of National Capital Territory of Delhi (GNCTD). The local body (DDA) manages these funds in a separate account and allocates them to service agencies for infrastructure upgrades within the TOD scheme area. The developer must ensure all EDC payments are completed before the completion certificate is issued.
- **Additional FAR Charges**[128]: Developers must submit additional FAR charges and balance EDC to obtain completion certificates. The concept of additional FAR charges is well established in India. When developers want to build beyond the allowed FAR, they are required to pay an additional FAR charge, which is determined by local authorities. These fees act as an additional revenue source for urban public infrastructure development and improvement. The premium is calculated based on the market value of land in that particular area, allowing the government to capture the increased land value due to higher construction potential. In India, the **Model for Flexible FAR** is designed to provide flexibility in using urban land optimally by allowing adjustments to the maximum **FAR** based on specific design and location factors:
    - **Permissible FAR**: Typically, a maximum FAR is specified for different land uses in a city's Master Plan. Minor adjustments (up to 5%) are sometimes allowed with penalties to accommodate construction deficiencies.
    - **Additional FAR Charges**: Over time, as city plans are updated, additional FAR might be permitted. Developers are required to pay **additional FAR charges**, which help recover costs related to upgrading essential city services (like roads, sewage, etc.).
    - **Factors for Granting Additional FAR**: Additional FAR is granted based on a site's **"Additional FAR Factor"**, which takes into account both:
        - **Creativity**: Design aspects such as urban form, parking, pedestrian safety, provisions for emergency evacuation, and the impact on essential services and the environment.
        - **Context**: Locational attributes like land use, accessibility, congestion levels, and proximity to heritage buildings.
        - Formula for Additional FAR Factor:

Taking into account the creativity and context the Additional FAR Factor of a site can be expressed as:

$$\text{Additional FAR Factor} = \text{Creativity x context}$$
$$= \text{design parameters x locational attributes}$$
$$= \left(\frac{a+b+c+d+e}{x+y}\right) \text{ m.n.o.p. } \ldots\ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where:
a = Parking provision value
b = Disaster emergency provision value
c = Urban Form value
d = Pedestrian Safety value
e = Induced informal activities value
x = Impact on essential services value
y = Impact on environment value
m =Land Use value
n = Accessibility (Right of way of the approach road) value
o = Congestion (Mobility index in terms of travel speed) value
p = Heritage Value

[128] URDPFI Guidelines Vol I, page 393-9.3.2.2

Figure 67: Calculation method of additional FAR factor

- This model ensures that any additional FAR does not negatively affect the city's infrastructure, services, or environment while also encouraging thoughtful, context-sensitive urban design.

- **Purchasable FAR or Premium Floor Space Index (FSI)**[129]: Purchasable FAR is an additional amount of building space that can be bought to increase the size of a building on a plot of land, applied in Group Housing, Commercial, Institutional, Industrial, Sport and Amusement Complexes, Recreational Greens, and Low-Density Sports plots. The plot must be on a road that is at least 24 metres wide (or 18 metres for institutional and industrial plots)**.** *(details of conditions can be found in the source).* This model is to sell to real estate developers to **allow them to build a larger floor area than the current regulations permit**. **Developers must pay a fee for these rights**, and the funds collected will be used to develop public infrastructure. Note that **p**urchasable FAR is not a right but a provision that may be granted. The authority may restrict purchasable FAR in certain zones based on traffic, infrastructure, and proximity to protected or heritage sites. If mixed uses are permitted in a plot, the FAR for each use will be calculated separately but must comply with the overall permissible FAR.

The cost of purchasable FAR is based on the additional land required for the extra built-up area. The formula used is:

Equation 3: Formular of purchasable FAR cost

$$C = Le\ x\ Rc\ x\ P$$

C=Charge

Le=Proportionate Land required against purchasable FAR, i.e. Fp x 100/FAR

Fp = Allowed Additional covered area (sq.mt.) as per purchasable FAR.

FAR=Permissible floor area ratio as per Building Regulations.

Rc= Prevailing sector rate or allotment rate of related plot (on the basis of auction/sealed bid) whichever is higher.

P=Value of purchasable Factor is as follows:

Group Housing =0.40

Commercial =0.60

Institutional /Institutional green* =0.30

Industrial =0.30

Green/sport/recreational Areas =0.20

- **Property tax:** This tax is calculated based on the value of the property, which can be the current market value, the annual rental value, or the unit area value. The tax calculation methods include: (i) Capital market value method: Based on the current market value of the property (ii) Annual rental value method: Based on the annual rental value of the land and buildings (iii) Unit area value method: Based on the classification of areas with uniform land values within the city and taxed based on factors such as location, land use purpose, type of construction, and the age of the building.
- **Stamp duty:** Stamp duty in India is applied when ownership of land and property is transferred to another party (Conveyance of immovable properties, Gifts, Usufructuary Mortgage). This tax is calculated based on the value of the property being transferred and is usually 1% of that value (the State Government of Maharashtra amended the Maharashtra Municipal Corporations Act in 2015).

Development-based LVC:

[129] URDPFI Guidelines Vol I, page 395-9.3.2.2

- **Transfer of Development Rights (TDR)**[130]: Transfer of Development Rights (TDR) is another mechanism used by Indian cities to manage FAR and urban growth. Through TDR, developers can transfer unused development rights from one area to another, allowing them to build beyond the allowable FAR in the receiving area. This system not only facilitates controlled development but also generates revenue for the city through development charges. TDR been tried in cities like Bengaluru, Chennai, Mumbai, and places in Rajasthan. However, TDR can have downsides if too many of these rights are used in one place. It can mess up the city's design, crowd public spaces, or interfere with transportation planning. That is why places like Karnataka and Rajasthan have set up rules to make sure TDR is used carefully to avoid these problems.
- **Betterment levy**[131]**:** Betterment levy is applied when the value of land increases due to public development projects such as the construction of roads, bridges, or other infrastructure. This tax is calculated based on the increase in land value after the project is completed, aim to recover part of the costs of public projects from those who directly benefit from the increase in land value. Although there are legal provisions, the betterment levy in Mumbai Metropolitan Region has not yet been implemented due to difficulties in determining the land value increase for a specific project, along with the multidimensional factors affecting land prices and legal hurdles that prolong the revenue recovery process
- **Developer exactions**[132]: Developer exactions are applied in India to fund infrastructure when there is a change in land use or construction within the city. In most states, these charges are set at fixed values (Rs/m^2), but Maharashtra calculates them as percentage of the official land rates.
- **Lease of public land**[133]**:** Mumbai Metropolitan Region Development Authority (“MMRDA”) used a model of leasing land to private developers for area development, while simultaneously raising funds for other infrastructure projects. MMRDA switched from open auction method of bidding to minimum price method. For the bidding process, the minimum price is decided by surveying the current market price in the area for sale transactions. If the bids received are not in line with the expectations, the bidding process is carried out again when the real estate market conditions are more suitable. Since 2010, Maharashtra has applied rates of 2% for residential properties, 4% for commercial, and 3% for industrial. The Maharashtra government allows cities to increase these charges by up to 100% to fund important urban transport projects. Official land prices are updated annually by the State Government, and a regularly updated land price database is essential for levying development charges
- **Land Readjustment**[134]**:** Land readjustment is a tool used to redistribute land in newly developed or redeveloped areas. This process involves acquiring land from current owners, redistributing it after infrastructure development, and returning the land to the original owners with smaller but higher-value plots

5. The Effectiveness in Implementing the TOD Model in New Delhi

- Urban Growth and Metro Network: Delhi has witnessed rapid urban expansion, with its metropolitan region growing from 685 sq. km to 1114 sq. km between 1991 and 2011. The population surged from 8.7 million to 16.3 million, largely driven by migration from smaller towns due to job opportunities in newly developed areas on the outskirts of the city (Gurgaon, Noida, Ghaziabad, and East Delhi). A key achievement in facilitating this growth has been the establishment of the **Delhi Metro Rail Corporation (DMRC)** in 2002, which has significantly improved urban mobility. As of 2018, the metro network spanned 332 km with 8 lines and is used by 2.6 million commuters daily.

- **Phased Expansion of the Metro**: (i) Phase I (2002-2006): 65 km of metro lines and 58 stations were developed, limited within Delhi's borders (ii) Phase II (2008-2011): Expanded to 124.63 km with 85 stations, connecting Delhi to adjacent cities like Gurgaon, Noida, and Ghaziabad, and bringing the network to a total of 189.63 km (iii) Phase III: Added 11 extensions and new lines (Pink and Magenta), including 28 underground stations, extending the network to 167.27 km. (iv) Phase IV (expected completion in 2021): Planned to add 100 km.

130 URDPFI Guidelines Vol I, page 74-9.3.2.2
131 Report on land value capture tools applicability, page 41/123
132 Report on land value capture tools applicability, page 46/123
133 Report on land value capture tools applicability, page 55/123
134 Report on land value capture tools applicability, page 61/123

6. Lessons Learned on TOD Model Development for Vietnam

The following key takeaways should be derived from the Delhi example, (according to Compilation of good and innovative practices[135])

- The TOD policy in Delhi prescribes strict norms to follow and is, therefore, a comprehensive approach to planning TOD.
- Delhi is trying to provide affordable housing in TOD but with the strict percentage, it can restrict the market to participate.
- With regards to parking, Delhi is adopting a one-size fits-all approach even with various TOD typologies: city centre TOD, suburban TOD, commercial TOD, Residential TOD.
- Even though Delhi has stringent TOD policies and urban design guidelines, there is still a lack of clarity in terms of the implementation process.
- New Delhi has integrated TOD into its 2021 Master Plan, emphasising low-carbon, compact development with mixed land use along transit corridors. This approach aims to optimise development around metro stations, increase densities, and accommodate a variety of uses, including housing for different segments of the population.
- Majority of the TOD principles are to provide convenient, safe and environmentally friendly travel by transit.
- An awareness of the land identification as a unique attraction for TOD zones.
- An awareness of Mixed Income/Mixed use/Density.

Regarding TOD implementation process:

- To effectively implement a TOD in India, it is essential to establish a specialised agency like a CA to oversee and manage the process.
- A key element is the development of an Influence Zone Plan (IZP) to ensure proper planning around transit hubs.
- The TOD proposal, submitted by a Developer Entity (DE), requires approval from the CA.
- A new EDC is introduced, levied on developers or landowners to cover infrastructure costs associated with TOD projects.
- The implementation also requires a comprehensive database system for efficient management, and penalties are imposed for project delays.
- A completion certificate must be obtained upon the project's conclusion.
- The TOD scheme encompasses both saleable and unsaleable components, such as public infrastructure and social housing.
- Unsaleable components must be handed over to public authorities before any transactions on saleable components are allowed.

Additionally, TOD-related charges include EDC, FAR charges, advertising fees, and even donations.

D. Guangzhou, China

1. Process of planning and implementing TOD projects

Process of planning and implementing TOD projects in Guangzhou include 4 key steps:

[135] Case Studies Compilation of Good and Innovative Practices

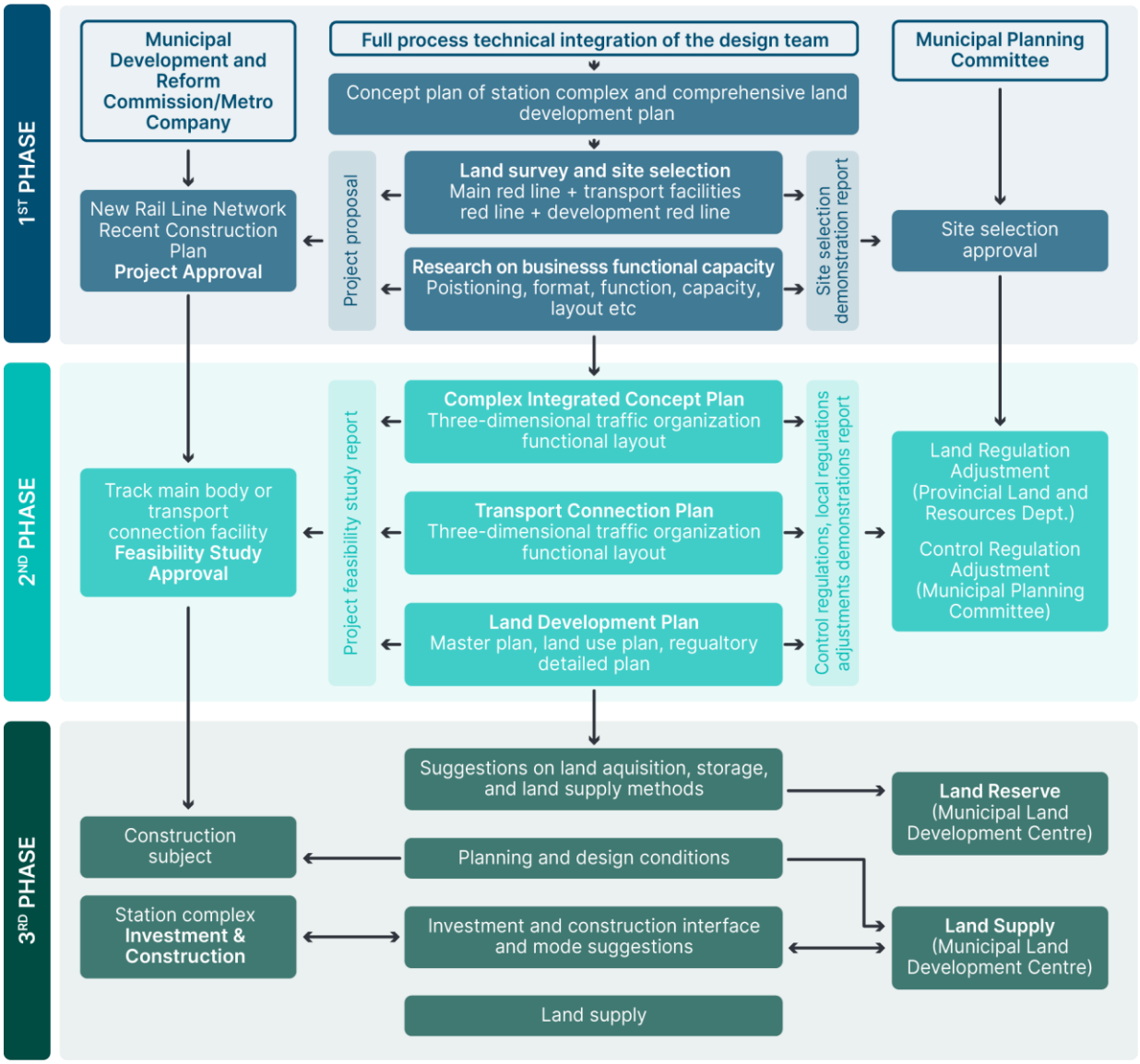


Figure 68: Process flow of TOD in Guangzhou during three phases[136]

[136] Guangzhou Metro TOD 30 Years Practice and Thought, page 19/52

- **Phase 1 & and 2: Planning and Designing:** see the chart above
- **Phase 3: Financing:** New line projects are financed through a mix of grants from the People's Government of Guangzhou Municipality (45%) and loans from banks (55%). This mixed financing approach helps manage the financial burden and supports the development of new metro lines
- **Phase 4: Operating** (i) Vertical and Horizontal Integration: Ensure vertical integration across design, construction, operation, and resource development, as well as horizontal integration across multiple subway lines for centralised management (ii) Smart Operation Platforms: Deploy intelligent platforms like Suiteng OS and the 360 System to enhance equipment monitoring and reduce maintenance costs

2. Roles and Responsibilities of Stakeholders in the Process of Planning and Implementing TOD Projects

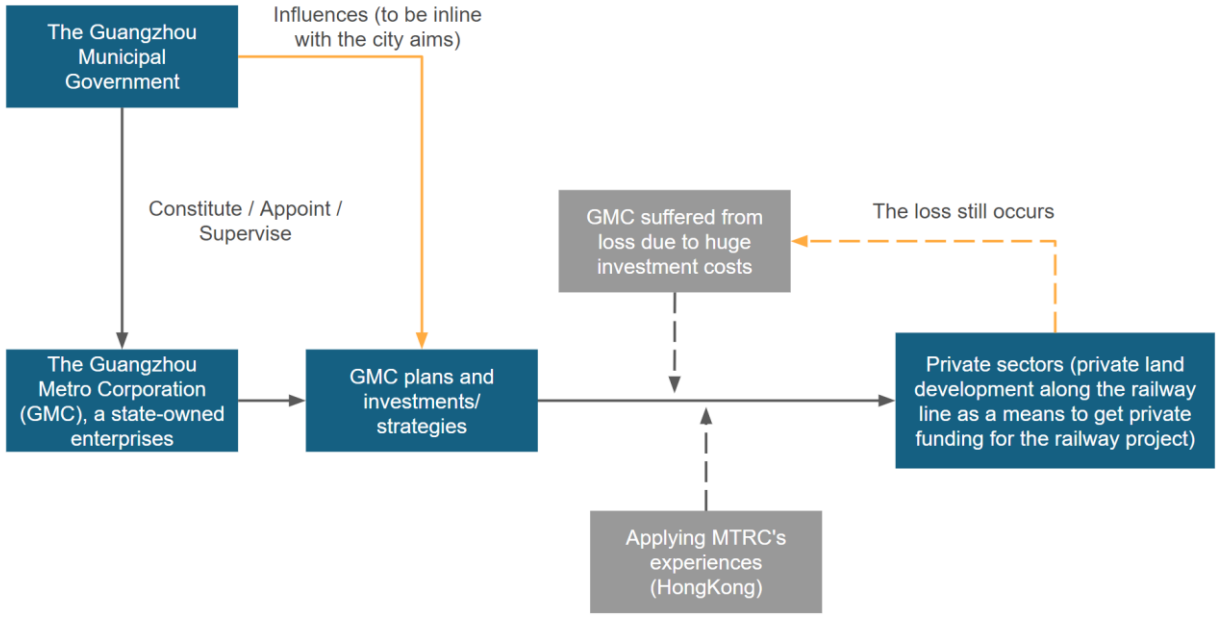


Figure 69: The correlation of key players in TOD implementation and their relationship[137]

Guangzhou Metro (GMC/ GMG) Established in 1992 as a state-owned government under the name GMC. Later on, GMC is privatised and become Guangzhou Metro Group (GMG). GMG oversee the overall operations, financing, and management of the metro system in Guangzhou and plays a key role in planning, investment, and construction projects. The group's responsibilities extend beyond just operating the metro—it also handles urban development projects related to the metro system, including property and real estate developments. GMC become the subsidiary of GMG and responsible for day-to-day metro operations, including train service management, maintenance, and infrastructure upkeep.

GMC now have employees of over 4,660 (in 2002); comprised a number of divisions including property, marketing, communication, project management, advertising, design and research. A Resources Exploitation Division has been established to look after the company assets and it includes various departments including real estate, advertising, property management, commercial leasing, guest house and training centre.

Guangzhou Metro Group (GMG) is the consist of seven functions[138]:

- Engineering Management Department
- TBM Management Department

[137] TOD Institutional Issues
[138] Integrated Practice of Guangzhou Metro Dedicated to Sustainable Urban Rail Transit

- Land Acquisition and Resettlement Office
- Equipment Department
- Technology Department
- Safety and Quality Department
- Operations Preparation Department

Roles of GMC/ GMG include (i) Land Assembly and Management: GMC is responsible for assembling the necessary land parcels for the project, including compensating and relocating affected residents (ii) Demolition and Redevelopment: GMC undertakes the demolition of existing buildings and prepares the areas for redevelopment (iii) Financial and Administrative: GMC faces significant financial burdens due to high compensation costs and complex administrative tasks related to the project (iv) Real Estate Development: GMC is also involved in developing real estate projects related to the metro line, despite facing challenges due to high land costs and a declining real estate market.

The CEO and Vice General Manager at Guangzhou Metro are appointed by People's Government of Guangzhou Municipality. Although this may impact GMC's autonomy, the arrangement provides Guangzhou Metro with strong ties to the People's Government of Guangzhou Municipality, who own 100% of GMC and who are ultimately responsible for GMC's financial sustainability.[139]

3. Laws and Regulations Guiding TOD Planning and Implementation

Guangzhou Urban Masterplan 2010 - 2020: The document outlines a comprehensive strategy to enhance Guangzhou's public transportation system, focusing on integrating TOD with urban growth. Key initiatives include the expansion of the railway and metro systems, with 23 planned metro lines totalling 1,025 km, and the improvement of major railway hubs. The Bus Rapid Transit (BRT) system will also be expanded to create a more efficient transit network. Additionally, the document emphasises improving public transportation accessibility, including the bus network, taxis, and water transport, while implementing policies to prioritise public transportation and manage traffic demand

- **TOD | Clause 3.4.2, 3.4.25:** Emphasising the importance of integrating transit facilities with urban development to create a more efficient and accessible public transportation network. This includes the development of subcentres and the coordination of land use with transit planning to support TOD
- **Railway and Metro System Improvements | Clause 3.4.28, 3.4.6:** The document outlines a comprehensive plan for expanding and improving the railway and metro systems. This includes the planning of 23 metro lines with a total length of 1025 km and 481 stations, as well as the development of a regional rail network to enhance connectivity within the city and with neighbouring regions. Specific railway projects mentioned include the construction of new lines, the improvement of existing lines, and the development of major railway hubs such as Guangzhou South Station, Guangzhou Railway Station, and Guangzhou East Station
- **Bus Rapid Transit (BRT) Systems | Clause 3.4.23:** The document discusses the expansion of the BRT system to improve public transportation efficiency. This includes the development of dedicated BRT corridors and the integration of BRT with other modes of public transportation to create a seamless transit network
- **Enhancing and Encouraging Public Transportation | Clause 3.4.25, 3.4.26, 3.4.27, 3.4.23:** The document highlights several strategies to enhance and encourage public transportation usage, include: (i) Expanding the coverage of the conventional bus network to ensure accessibility across urban and rural areas (ii) Improving the quality and efficiency of taxi services through the use of information technology (iii) Developing a modern water transportation system with diverse routes for commuting and tourism (iv) Implementing policies to prioritise public transportation and manage traffic demand effectively.

Guangzhou Urban Masterplan 2017 - 2035: The document outlines a strategic vision for urban development focused on three key areas: a railway and metro system, public transportation, and TOD. It aims to build a 2,000-kilometre urban rail network by 2035, with the Guangzhou railway hub handling over 3.97 billion passenger trips and 0.77 billion tonnes of freight annually. The plan emphasises optimising urban layout

[139] Operators Story Guangzhou Final

through a multi-layered network of ecological and transportation spaces, alongside constructing a world-class air, sea, and rail hub. Additionally, it promotes a "hub-type network city space structure" to integrate transportation infrastructure with urban development for a more connected and efficient city.

- **Railway and Metro System[140]:** The document mentions the construction of a comprehensive urban rail network, aiming to build around 2000 kilometres of urban rail by 2035. It also highlights the goal for the Guangzhou railway hub to handle over 3.97 billion passenger trips and more than 0.77 billion tonnes of freight annually by 2035
- **TOD[141]:** The document outlines the development of a "hub-type network city space structure," which focuses on integrating transportation infrastructure with urban development to create a more connected and efficient city

Overview on China's 14th Five-Year Plans in the Transport Sector: This paper aims at providing a comprehensive overview of the 14th Five-Year Plans (FYPs) relevant to the development of China's transport sector until 2025 and beyond. The paper summarises the key elements, priorities and goals of the plans and draws a picture of the general development direction of transport in China

- **Infrastructure:** Until 2025, China aims to expand its high-speed rail (HSR) network from 38,000 km to 50,000 km (with more than 95% coverage in cities with 500,000 or more residents), the urban rail network from 6,600 km to 10,000 km and to increase the number of civil transport airports from 241 to more than 270.
- **Transport services:** Until 2025, China aims to build an integrated digital travel network with the promotion of electric tickets and intelligent passenger transport hubs as its emphasis, increase the access rate of express delivery services in villages from 50% to > 90% and equip 3,400+ high-speed trains with seats for disabled people.
- **Transport technology:** Until 2025, China aims to increase the number of sales of New Energy Vehicles (NEVs) to reach about 20% of total sales and the percentage of NEVs in urban bus, rental car and logistics distribution from 66.2%, 27% and 8% to 72%, 35% and 20% respectively, and to increase the application rate of the Beidou Satellite Navigation System in key areas from ≥60% to >95%.
- **Green and low-carbon transport:** The carbon dioxide emission per tonne kilometre of transport aviation will be reduced from 0.928 to 0.886 kg and the average annual growth rate of combined rail-water container transport volume shall be 15%.

Technical Standards for Urban and Rural Planning in Guangzhou**:** The document outlines guidelines for urban transportation, highlighting the need for urban rail transit to include control protection zones and accessible metro stations. It mandates designated spaces for Bus Rapid Transit (BRT) corridors and stations and emphasises that new or reconstructed roads should incorporate public transport bay stops, with bus terminals on separate land and stops near pedestrian crossings when feasible

- **Metro System and Public Transportation | Clause 47[142]:** The planning and construction of urban rail transit should include the delineation of control protection zones and integration into urban and rural planning. Additionally, metro stations should facilitate pedestrian crossing and include accessible facilities
- **BRT System | Clause 46.9:** This specifies that sections of the bus network planned to include BRT lines should reserve space for BRT corridors, stations, and ancillary facilities according to the planning requirements
- **Public Transportation Enhancements | Clause 46.8, 48.2:** This states that new or reconstructed primary and secondary roads should, in principle, simultaneously set up public transport bay stops. This indicates that bus terminals should generally be located on independent land outside urban roads, and bus bay stops should be set up near pedestrian crossing facilities where conditions permit

Besides, there are some planning policies include: Guangzhou Urban Planning Regulations (**广州市城市**规划条例) which focus on urban planning within Guangzhou, ensuring sustainable development and efficient land

[140] Page 6/7
[141] Page 2/7
[142] Page 25/60

use and Regulations on Urban and Rural Planning in Guangzhou (广州市城乡规划条例) which aim to strengthen the management of urban and rural planning, optimise spatial layouts, and improve living environments

4. Principles for Determining Development Boundary for TOD Areas

From the Notice of the General Office of the Guangzhou Municipal People's Government, the TOD strategy aims to create urban functions that integrate transportation, commerce, culture, education, and residential zones w**ithin an 800-metre radius (approximately a 15-minute walk) centred on the railway transit station complex**[143]

5. LVC tools

- **Land Sales and Development:** The land reserve plan, based on policy, determines the timing and location of land sales, estimating project investment and returns. Land within an 800-metre radius of rail stations is acquired from residents, assembled, and developed with necessary facilities. Revenue is generated from land sales
- **Joint Development:** A Comprehensive Development Plan, under the TOD strategy, outlines property development timing and types. Negotiations with developers estimate project investment and returns. Properties are developed mainly on top of stations and depots within an 800-metre radius of rail stations. Land is acquired through competitive bidding at low prices, and revenue is collected from sales, rentals, and management of real estate[144]

6. Mechanism of Cooperation and Contribution of Private Enterprises in the Process of TOD Implementation

Private sector enterprises play crucial roles in investment, expertise, and management in TOD implementation. Private sector enterprises are involved in the "metro + real estate property" development model. This model includes the development of property around metro stations and depots. Although the private sector brings robust financial capacity and lower profit expectations, which are crucial for the successful implementation of TOD projects, as well as expertise and skilled staff, PPP has not been a favoured model for the Guangzhou Metro's development. The primary reasons include incremental borrowing costs and available fiscal space.

7. The Effectiveness in Implementing the TOD Model in Guangzhou

Guangzhou Metro has made significant strides in developing its metro system over the past two decades[145]

- Rapid development of the metro system: Over the last 20 years, Guangzhou has seen rapid growth in its metro network, effectively meeting the transportation needs of its population
- Standardisation of trains: The Guangzhou Metro has standardised its trains into three types - A, B, and L, optimising the use and management of its rolling stock
- Staffing innovation: Since 2013, GMC has introduced multifunctional station staff, increased work efficiency and reducing the time needed to fix common faults
- Maintenance skills training: GMC has developed a comprehensive training package of 52 maintenance skills for all maintenance staff, providing a clear career progression pathway
- Improving customer experience: GMC has implemented strategies to enhance the quality of travel, including developing smart stations and offering retail facilities at stations

The implementation of TOD in Guangzhou has faced significant failures. These factors have collectively hindered the city's ability to effectively cope with increasing passenger needs and optimise its transit infrastructure[146]

[143] Implementation Rules, Article 4
[144] A Systemic Model for Implementing Land Value Capture to Support Urban Rail Transit Infrastructure Projects, page 23/70
[145] Operators Story Guangzhou Final, page 13/16
[146] Operators Story Guangzhou Final, page 13/16

- Misjudged Demand: When constructing lines 1 and 2 with Type A trains in the 1990s, the demand was lower than anticipated. This led to designing lines 3, 4, 5, and 6 with smaller Type B cars, creating capacity constraints as demand rapidly increased
- Locked into Low-Capacity Design: The system became locked into using smaller train cars on lines designed for lower capacity, resulting in difficulties meeting the rising demand later on
- Divided Staffing Model: Before the introduction of multifunctional staff, the "divided" staffing model required more personnel and reduced efficiency as non-essential specialised functions were not needed.

Failures of metro line 1 development in Guangzhou[147]

- Supervision and Autonomy: The GMC operates under the direct supervision of the Guangzhou Municipal Government and lacks autonomous decision-making.
- Financial and Administrative Burden: The complexity of tasks related to land assembly, compensation, and redevelopment created significant financial and administrative challenges for the GMC.
- High Land Premiums: To cover high compensation costs, the GMC charged high land premiums, which affected the financial viability of property projects and deterred developers.
- Urban Planning Conflicts: The overall urban planning by the government conflicted with the interests of the GMC, impacting project success.
- Uncontrolled Redevelopment: The government failed to control the redevelopment of nearby land parcels, leading to competition with GMC projects.
- Rapid Land Acquisition and Clearance: Quick land acquisition and clearance removed population mass along the railway line, potentially affecting ridership.

8. Lessons Learned on TOD Model Development for Vietnam

The implementation of the URT system in Guangzhou offers several valuable lessons for enhancing transit efficiency and success, some key experiences for international countries need to keep in mind include[148]:

- Adopting a method of relieving the high demand placed on the bus and road systems existing along the corridor were a necessary adaptation to improve the efficiency and success of their transit system.
- Exemplifies modal connectivity and encourages active transportation as a supplementary mode, with updated cycling and pedestrian infrastructure that is both safe and of world-class design.149
- Developing Design Standards for Networks: The lesson is to develop consistent design standards to ensure the scalability and coherence of the metro system.
- Forecasting and Designing for Future Demand: Designing metro lines with lower capacity than predicted has led to limitations in meeting rising demand. Accurately forecast future demand and design systems with scalability in mind to avoid being “locked” into low-capacity designs.
- Innovating Staffing and Enhancing Skills: Introducing multifunctional staff and maintenance skills training has increased work efficiency and created career progression pathways. Continuously innovate and enhance staff skills to meet evolving job requirements.
- Improving Customer Experience: Developing smart stations and providing retail facilities at stations have improved the travel experience for passengers. Focusing on service quality and customer experience to increase satisfaction and attract more passengers.
- Integrating Technology and Data: Using data from fare gates and signalling systems to provide real-time information has helped passengers make informed travel decisions. Integrating technology and data into management and operations to enhance efficiency and service quality
- Need for stability in city plans: Changes in city plans can cause many problems for the metro system.

Lessons learned from failures of metro line 1 development are:

- Supervision and Autonomy: Project management agencies need a certain level of autonomy to make quick and effective decisions while still being subject to necessary government oversight.

147 TOD institutional issue presentation, slide 9-10
148 Operators Story Guangzhou Final, page 13/16
149 Case Studies Compilation of Good and Innovative Practices, page 47/180

- Financial and Administrative Burden: Managing complex tasks such as land consolidation, compensation, and redevelopment requires thorough financial and administrative preparation to avoid imposing too great a burden on the management agency.
- High Land Premiums: Innovative financial solutions are needed to cover compensation costs without excessively increasing land premiums, which would impact the viability of real estate projects and discourage developers.
- Urban Planning Conflicts: Urban planning needs to be implemented in a coordinated and consistent manner with development projects to avoid conflicts of interest and ensure the success of the projects.
- Uncontrolled Redevelopment: Strict measures are needed to control the redevelopment of adjacent areas to avoid creating unhealthy competition and affecting key projects.
- Rapid Land Acquisition and Clearance: Land acquisition and clearance need to be carried out carefully and with planning to maintain population density and ensure passenger traffic for the public transportation system

E. Shenzhen, China

1. Process of planning and implementing TOD projects

The planning, designing, financing, and operational management of TOD and railway projects in Shenzhen involve a comprehensive and multifaceted approach. Here is a step-by-step process to implement a TOD project[150]:

Planning Stage:

- Three Levels of Planning include: (i) Metropolitan/Strategic Level: This includes the Economic and Social Development Plan and the Land Use Plan. These plans are designed to set strategic goals and provide guidance for the future development of the city (ii) Sub-metropolitan Level: This level involves the Cluster/Sub-metropolitan plan and Planning Standards and Guidelines. These plans are more detailed and focus on specific clusters or sub-metropolitan areas within the city (iii) Local Level: At this level, the focus is on Urban Design, Special Plans, Statutory Graphic Standards, and Layout Plans. These plans are highly detailed and cover specific local areas within the city.
- Five Stages of Planning include (i) Economic and Social Development Plan: This plan outlines the overall economic and social development goals for the city (ii) Land Use Plan: This plan details how land within the city will be used, including zoning and land allocation for various purposes (iii) Master Plan: This is a comprehensive plan that includes details on land use layout, transport systems, infrastructure, and services. It serves as a platform for integrating all infrastructure sectors in the urban development process (iv) Cluster/Sub-metropolitan Plan: These plans cover smaller geographic areas within the city and include similar information to the master plan but on a more localised scale (v) Special Plans and Urban Design: These plans focus on specific projects or areas within the city, providing detailed designs and guidelines.
- The process ensures compliance with Economic and Social Development Plans (ESDPs) by following temporal horizons of 20 years for long-term plans, 10 years for medium-term plans, and 5 years for short-term plans. Long-term and medium-term plans set strategic goals, while short-term plans outline specific interventions and projects to achieve these goals. For cities like Shenzhen, masterplans must pass a mandatory review by the central government. The planning process involves horizontal integration, where municipal bureaus review and provide input to ensure synchronisation of planning documents across different sectors.

[150] Technical Summary Series - Shenzhen

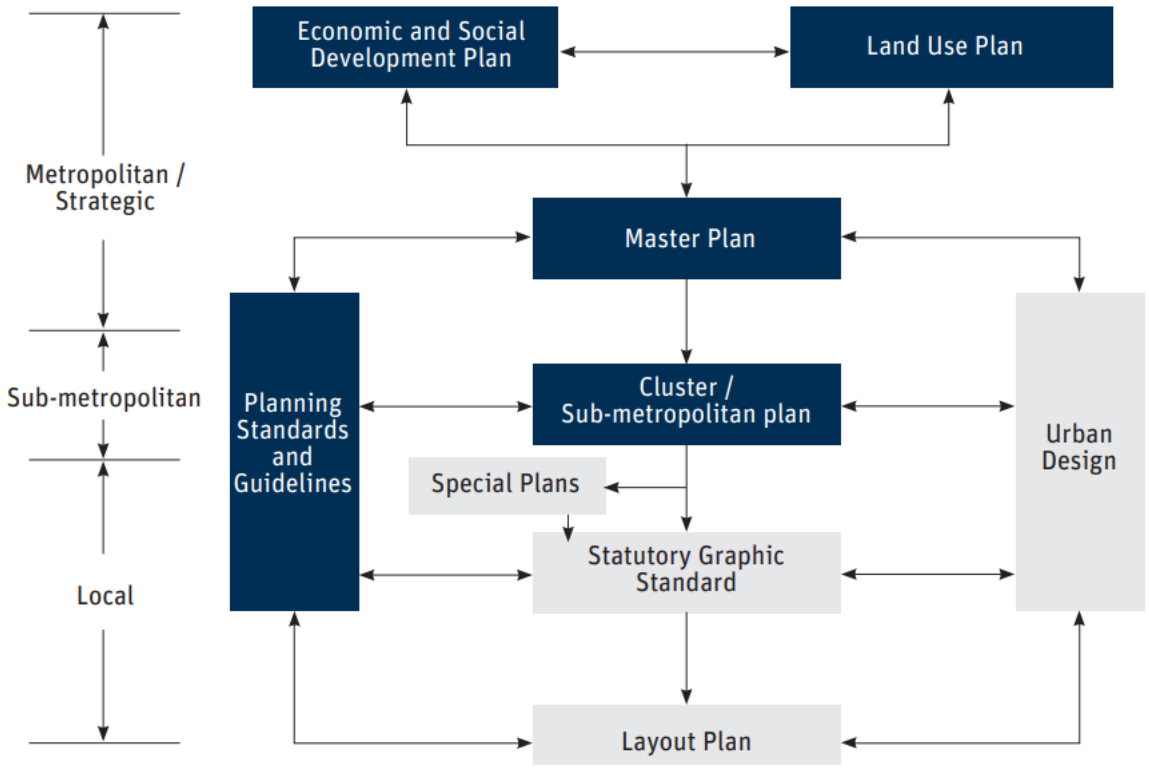


Figure 70: Three-level and five-stage urban development planning in Shenzhen[151]

Designing Stage:

- **Integration of Urban and Transportation Planning:** The project aimed to integrate Shenzhen's existing urban and transportation plans with advanced TOD experiences from both domestic and international sources. This integration was crucial for identifying macro-level issues and devising plans for the improvement of TOD in the city.
- **Pilot Projects:** The Bainikeng neighbourhood was selected as a station area pilot to demonstrate how TOD could elevate the value of urban spaces. This pilot project explored innovative approaches to using land resources efficiently and served as a model for other areas.[152]
- **Public Participation:** A flexible and continuous public participation mechanism was established. This included regular resident surveys, workshops, expert consultations, and feedback collection through WeChat public accounts and the TOD data information platform. The feedback was used to support the formulation of the TOD strategy.
- **Expert Involvement:** Experts in urban planning, transportation planning, public policy, investment, and the environment were invited to form an expert think tank. This group provided technical guidance throughout the process and created a benchmark resource for urban sustainable development projects.
- **Organisational Coordination:** The Shenzhen Development and Reform Commission coordinated the project, working closely with other stakeholders. Clear responsibilities were assigned to each member unit, and operational mechanisms such as major project meetings, departmental coordination, and daily group discussions were set up to ensure smooth implementation.
- **Technical Teams:** Technical teams from the Shenzhen Branch of the China Academy of Urban Planning and Design and the Shenzhen Urban Transportation Planning and Design Institute were involved in conducting TOD planning work at both the city and station levels. They supervised the progress and ensured the alignment of the project with the overall TOD strategy.[153]

[151] Shenzhen, China Rail + Property for Transit-Oriented Development, page 17/55
[152] Technical Summary Series - Shenzhen, page 11/40
[153] Technical Summary Series - Shenzhen, page 34/40

- **Sustainable Development Goals:** The project incorporated the TOD model into the long-term urban development strategy of the city and its current and prospective rail transit stations. This approach aimed to achieve comprehensive improvement and sustainable development driven by TOD.

Financing Stage

The main funding sources for rail transit construction in Shenzhen had been government investment, land financing, and social capital. However, with the slowing of Shenzhen's economy, public financing has been decreasing, making it challenging to raise construction capital. To diversify financing channels, the technical team promoted joint investment in construction by municipal and district governments and enhanced the use of the PPP. Besides, innovations include a model for land valuation as a capital contribution, which balances the gap between rail transit construction and operation.

Shenzhen's financial model[154] for its metro-led TOD revolves around the innovative Rail + Property (R+P) funding approach. This model encourages both state-owned and private metro companies to participate in TOD projects by using innovative land-use rights transactions to overcome barriers in the land-leasing system, the scheme helps to reduce costs and risks for private companies and the government. A build-and-transfer (BT) arrangement minimised construction risks and held private stakeholders accountable.

This financial model includes Three-Phased Financial Scheme:

PHASE	TIME	NO. OF LINES	LENGTH (KM)	TOTAL INVESTMENT (100 MILLION USD)	TOTAL AMOUNT OF LAND FOR R+P	TOTAL SCALE OF LAND DEVELOPMENT (HA)	TOTAL FLOOR AREA (10,000 M²)
Phase 1	1998–2004	2	22	12.8	None	None	None
Phase 2	2006–2011	4	155	107.7	7	129	339.1
Phase 3	2011–2016	5	254	132.1*	7	156	477.6

*Investment total includes only Lines 7, 9, and 11.
Source: Interview with Shenzhen Development and Reform Commission (2015); Shenzhen Urban Planning and Land Resource Research Center (2013)
Notes: Phase 1 began in 1998 with a total investment of 1.28 billion RMB in two lines that went into operation in 2004 (Figures converted from RMB to USD with the average exchange rate in 2000). Phase 2 began in 2006 and included three new lines (2, 3, and 5) and extensions of two existing lines (1 and 4) (Figures converted from RMB to USD with the average exchange rate in 2008). Phase 3 includes a total of five lines (6, 7, 8, 9, and 11), of which 7, 9, and 11 were undertaken by the Shenzhen Metro Group and Line 6 was a joint venture between Shenzhen Metro and the MTR (Figures converted from RMB to USD with the average exchange rate in 2013).

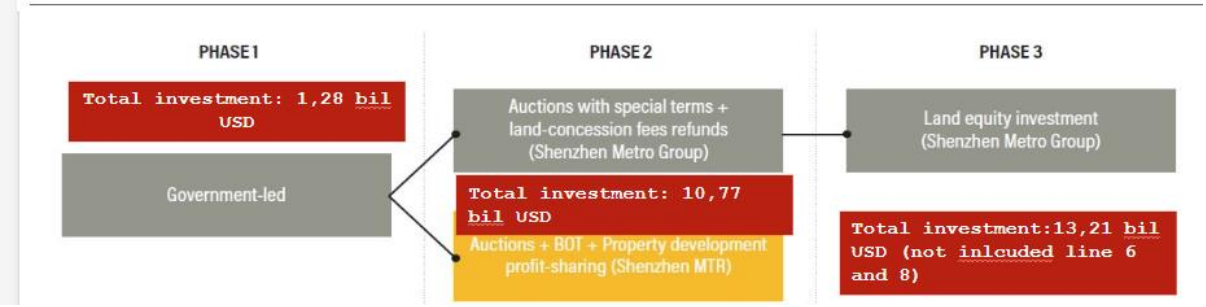


Figure 71: Three-Phased Financial Scheme of Shenzhen Metro

[154] Case Studies Compilation of Good and Innovative Practices, page 37/82

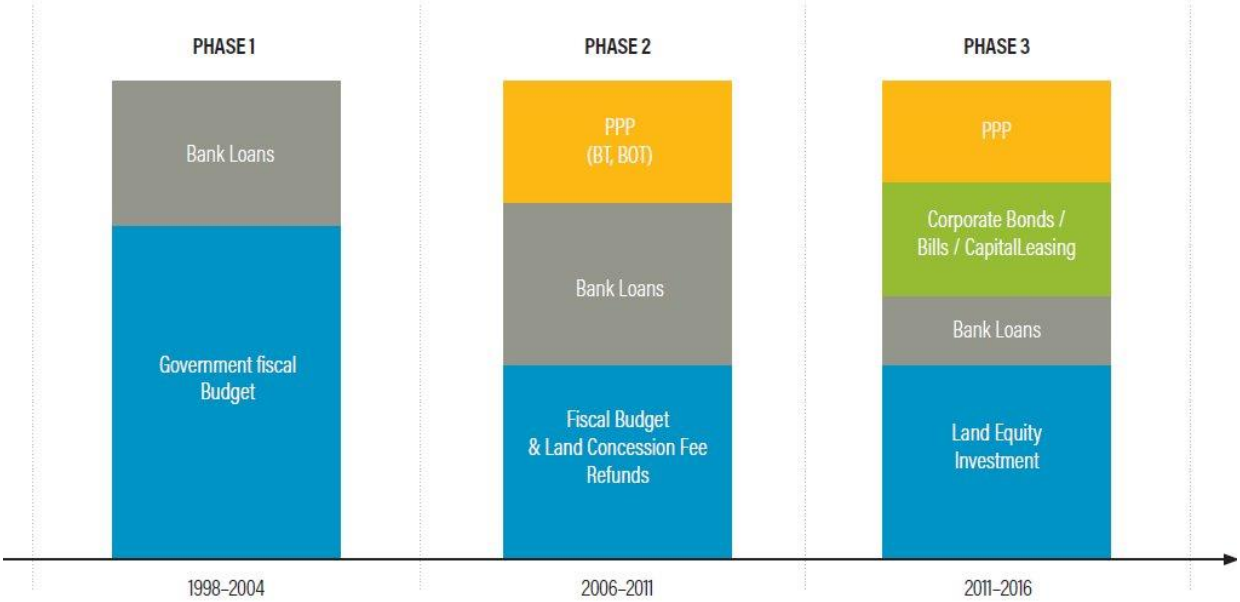


Figure 72: The development process of the financial arrangement model for investment and management of the Metro system in Shenzhen[155]

- Phase 1: Government-Led Capital Investment: Initially, the government reduced its investment in capital costs from 70% to 50%, pushing the metro company to use bank loans and property development to cover the difference.
- Phase 2: Special Land-Use Rights Auctions and Land Concession Fee Refunds - As capital requirements grew significantly, the government recognised the potential of joint development for financing metro construction. The capital needs increased dramatically, making it clear that relying on Soley on government investments was unsustainable. The government transferred land to the subway company through special auctions and refunded land concession fees to improve the financial status of the metro company.
- Phase 3: Government's Land Equity Investment - This phase introduced land equity investment to fund infrastructure projects, replacing traditional capital investments. The government granted undeveloped land to the subway company, which could use the land equity as collateral to raise funds. This method reduced transaction costs and improved profitability.

Operating (Operational Management)

The Shenzhen Public Transit-Oriented Development Information Data Online Management System helps government departments reflect on existing policies, evaluate the current situation, adjust statutory planning, develop coordinated strategies, and determine the direction of government funds

2. Roles and Responsibilities of Stakeholders in the Process of Planning and Implementing TOD Projects

In Shenzhen, the development, implementation and operation of the metro system involve a collaborative effort among various key players[156]

- **Shenzhen Metro Group (SZMC):** Founded in 1998, SZMC is responsible for the planning, construction, and operation of the metro system, as well as develop TOD. SZMC **is a state-owned enterprise 100% owned and directly supervised by the State-owned Assets Supervision and Administration Commission of the Shenzhen Municipal People's Government**[157] . They collaborate with other

[155] Strategic Urgency and International Experience, slide 22
[156] Case Studies Compilation of Good and Innovative Practices, page 38/82
[157] Technical Summary Series, page 16/40

governmental departments and private stakeholders to ensure the successful implementation of the metro system. They also play a role in the joint development of land around metro stations.

- **Municipal Planning Committee:** Led by the mayor of the city, this committee is responsible for the final approval of route plans and zoning proposals. They deliberate on the draft route plans and zoning proposals submitted by the planning institute and other stakeholders.
- **Planning Institute:** Conducts market analyses and land-use surveys to identify vacant lots with high development potential. Collaborates with SZMC and other governmental departments to shortlist land lots for joint development and discusses zoning of these properties with stakeholders.
- **Governmental Departments:** Various departments are involved in the planning and implementation process. They work together with SZMC and the planning institute to ensure the integration of transit planning, land use planning, and financial planning.
- **Private Stakeholders:** Participate in the joint development of land around metro stations. They are incentivised by the increase in land value due to the metro system and collaborate with SZMC and governmental departments in the development process.

3. Laws and Regulations Guiding TOD Planning and Implementation

- Shenzhen Rail Transit Network Planning (2016-2035): The basic year of planning is 2016, and the long-term planning period is 2035, which is consistent with the period of the Shenzhen Urban Master Plan (2016~2035) being compiled. This planning document aim to: (1) Clarify strategic goals for rail transit development to support Shenzhen's goal of becoming a sustainable and innovative global city. (2) Propose a rail transit network layout plan based on the city's latest spatial layout and comprehensive transportation system requirements. (3) Guide the formulation of phased implementation plans for the rail network, ensuring a balanced approach to near-term and long-term construction[158]
- Shenzhen's 14th Five-Year Plan for Comprehensive Transportation: The "Shenzhen Comprehensive Transportation 14th Five-Year Plan" (2022-2027) aims to transform Shenzhen into a model of innovative urban transportation. The plan focuses on **enhancing transportation networks**, promoting green and smart solutions, and improving service quality. Key strategies include developing world-class ports, expanding airport infrastructure, and creating a competitive public transportation system. The plan also emphasises green transportation, smart technology, and robust governance to support Shenzhen's vision as a leading international city
- Shenzhen Land and Space Master Plan (2020-2035): This document aims to guide Shenzhen's development into a modern, innovative, and sustainable city, meeting national strategic development requirements and citizens' expectations. Regarding urban railway transit development, the plan outlines the construction of a modern and efficient urban railway network. The goal is to build a railway system with **over 1000 km of urban rail**, ensuring quick connections between central areas **and peripheral functional zones within 45 minutes**. This system will include new rail lines and upgrades to existing ones, creating a network that combines high-speed and low-speed rail, covering major city axes and key nodes
- Shenzhen City Master Plan (2010 – 2020): The Shenzhen City Master Plan 2010-2020 aims to guide the development of Shenzhen outline strategies for urban space development, environmental protection, and improving residents' quality of life. A key focus of the plan is the support for TOD, which **integrates urban development with public transportation**. The plan emphasises the creation of a well-connected urban environment where residential, commercial, and service areas are closely linked to public transportation systems
- Shenzhen Urban Village (Old Village) Master Plan (2018-2025): The Shenzhen Urban Village (Old Village) Master Plan (2018-2025) aims to guide the sustainable development and modernisation of Shenzhen's urban villages. It focuses on eliminating safety hazards, preserving historical and cultural heritage, providing low-cost living spaces, and improving environmental quality and supporting facilities. The plan emphasises the **integration of urban development with public transportation systems**, highlighting the importance of optimising urban space layout and structure, which includes **developing comprehensive transportation networks** that connect residential areas with public transit hubs.

[158] Page 3/46

- Shenzhen Pedestrian and Bicycle Transportation System Planning and Design Guidelines: This guideline aims to support Shenzhen in building a sustainable, low-carbon, and pedestrian- and bicycle-friendly global innovative city. It provides detailed guidance on pedestrian and bicycle network layout, space design, environment design, bicycle parking infrastructure, and coordination with other transportation modes. The guidelines emphasise **integrating pedestrian and bicycle systems with public transportation points** like bus and rail stations to facilitate seamless transitions, **promote public transport use**, and reduce private car usage
- Shenzhen Urban Planning Standards and Guidelines: The purpose is to guide the efficient use of land, promote industrial upgrading and transformation, reduce traffic demand, and enhance urban quality. The document includes standards and regulations on land use, space design, and other technical requirements to ensure sustainable and harmonious city development. It **encourages mixed land use in central areas**, public service areas, and key transportation points such as railway stations and bus terminals. Additionally, it regulates **land-use ratios for different types of development to optimise land use** and support the development of areas around public transportation stations
- Regulations on Planning and Land Supervision in Shenzhen Special Economic Zone: The regulations provide a legal framework for managing urban planning and land use in Shenzhen. It includes six chapters covering general provisions, responsibilities, investigation and handling, compulsory measures, law enforcement supervision, and supplementary provisions. The regulations ensure orderly city development, protect land resources, and enforce urban planning laws. Responsibilities are clearly defined for municipal, district, and sub-district agencies, with advanced technologies used for detecting violations. Public participation and media oversight are encouraged to enhance transparency and accountability

Other legal frameworks can be found at Shenzhen Government Online (i.e. Shenzhen City 2019/ 2018/ 2016 Urban Construction and Land Use Implementation Plan, Shenzhen Longgang District Land Use Master Plan 2010-2020, Conditional Construction Area Utilization Plan, Shenzhen Land Use Master Plan 2006-2020.)

4. Principles for Determining Development Boundary for TOD Areas

In the Chapter 3 of Shenzhen Urban Planning Standards and Guidelines, it is stated that this chapter points out some standards, guidelines and requirements to balance layout of various functional lands combined with the multi-centre axis-belt cluster urban structure; encourages concentrated mixed layout based on public transportation to promote the integrated development of land use and transportation facilities

- **Land use planning and layout** should be adapted to the level of public transportation development and promote the integrated development of land and transportation. A variety of land use functions such as residence, employment and public service facilities should be comprehensively arranged within 500 metres of large and medium-capacity public transportation stations (3.1.5, Shenzhen Urban Planning Standards and Guidelines)
- **The layout of residential land** should be relatively concentrated, taking into account factors such as location, surrounding environment and land conditions. The layout of residential land should be compatible with public transportation. Residential land within 200 metres of rail stations should be set up with mixed functions, and small-sized houses should be the main type of houses. (3.2.1.1, Shenzhen Urban Planning Standards and Guidelines)

3. LVC tools

- China's public land ownership[159] allows for a land value-capture approach to finance metro projects. In Shenzhen, the municipal government can leverage increased land value from metro investments through land lease revenue. This involves collecting land lease fees from developers and passing them to the metro corporation. The shift to the Rail + Property (R+P) model is a new method to fund metro investments using land development rights, which are transferred through bidding, auctions, and listings.
- Initially, the Shenzhen municipal government estimates the market price of the land, then selects and transfer these parcels of land with development right to Shenzhen Metro.

[159] The Use of Value Capture for Transport, page 15/27

- After that the Shenzhen Land and Real Estate Trading Centre provides a plan for land transactions, and SZMC makes a land use payment to the Shenzhen Municipal Finance Bureau. The Finance Bureau then transfers this payment to the Shenzhen State-owned Assets Supervision and Administration Commission, which eventually returns the payment to SZMC as registered capital. Note that, the land development rights can then be used to leverage bank loans.
- To ensure Shenzhen Metro wins the bid, expertise in metro operations is required, such as requiring bidders to have goals of constructing and operating an urban transit rail system with its ancillary facilities. This prevents non-metro private developers from winning the bids. However, some experts have expressed concerns that this method might undermine market competition and raise regulatory concerns.
- Other main stakeholders in this value capture method include the Shenzhen Development and Reform Commission, the Shenzhen Planning and Natural Resources Bureau, and the Rail Transit Office. Through this process, SMG not only grants land use rights to SZMC for free but also allows SZMC to capture most of the incremental land value, significantly improving SZMC's financial status.

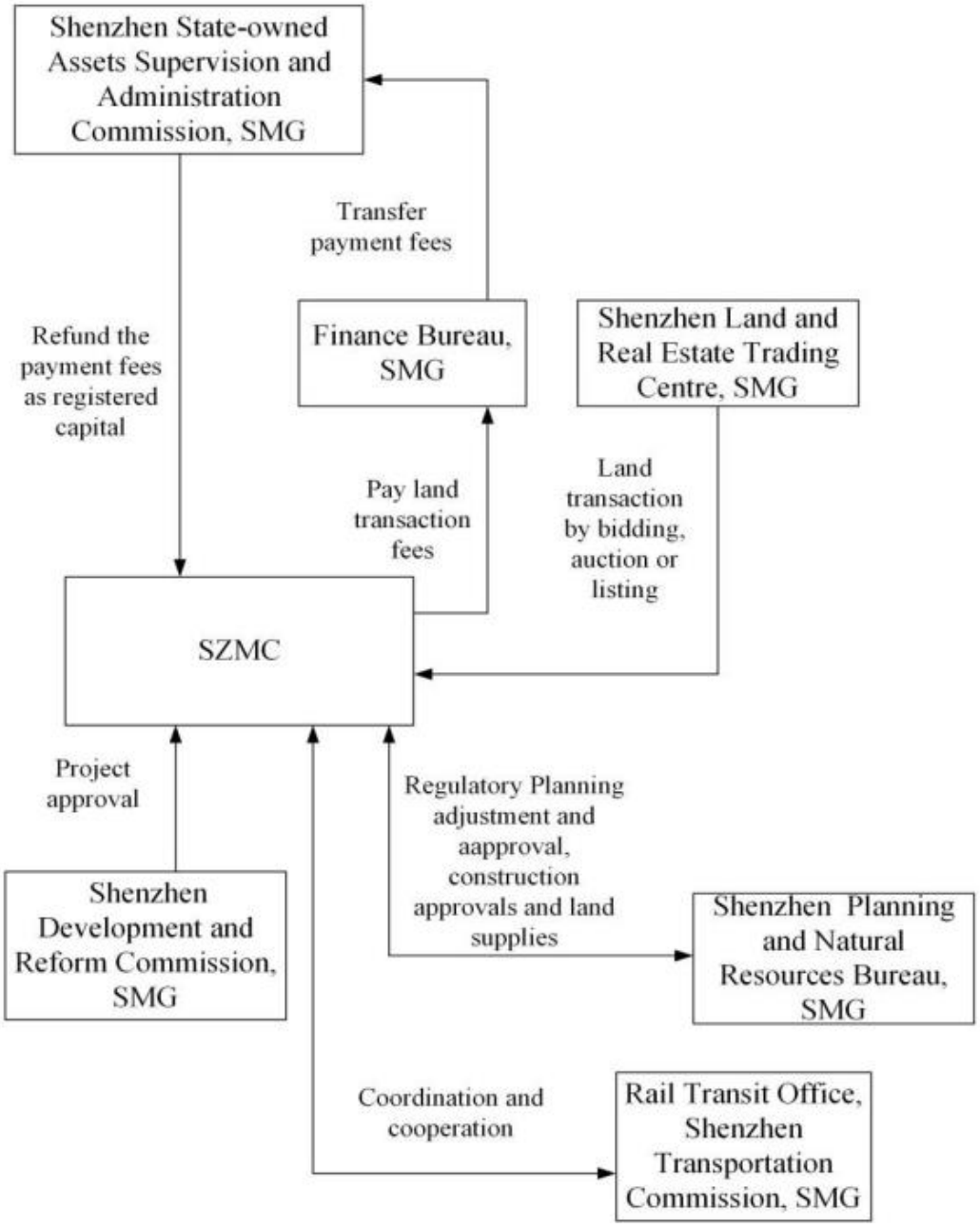


Figure 73: LVC financing mechanism in Shenzhen Metro

6. The Effectiveness in Implementing the TOD Model in Shenzhen

Shenzhen has made significant achievements in metro railways development, positioning itself as a leader in smart urban transportation. The Shenzhen Metro, with its network density ranking first in China, has become a powerful engine for urban development and an exemplary model of high-quality construction and operation. Key achievements include[160]:

- **Extensive Network:** Shenzhen Metro operates 17 lines spanning 559.1 kilometres, serving over 15.612 billion passengers and accounting for more than 70% of the city's public transportation.
- **Innovative Services:** Unique measures like varying car temperatures for passenger comfort have been widely praised and adopted by other cities.
- **Smart Operations:** Implementing smart technologies such as fully automated driving, building information modelling technology, and digital intelligence has enhanced construction, travel, and maintenance efficiencies.
- **High Passenger Satisfaction:** Shenzhen Metro's smart travel solutions, including quick mobile access and AI customer service, have reduced commuting times and improved the passenger experience.
- **Economic and Social Impact:** New lines have connected previously underserved districts, boosted regional development and made travel more convenient.
- **Operational Excellence:** High punctuality rates, safety records, and a focus on energy efficiency highlight Shenzhen Metro's commitment to quality and sustainability.

7. Lessons Learned on TOD Model Development for Vietnam

- **Develop in the "Rail + Property" model:** create a sustainable financial source for the public transportation system and promotes integrated urban development. It also increases property values, reduces environmental impact, and creates many new job and business opportunities[161]
- **Starting with high-level strategies:** This means initiating with strategies from the highest levels of government to ensure strong leadership and direction. Developing clear technical standards is also essential to guide the planning and implementation processes. Additionally, creating comprehensive legal frameworks will provide the necessary regulatory support. Establishing a system that ensures long-term sustainability is vital for the ongoing success of TOD projects

F. Philippines

1. Process of planning and implementing TOD projects

The development of TOD and railway infrastructure in the Philippines, particularly for projects like the North-South Commuter Railway (NSCR) and the Metro Manila Subway, follows a structured process managed primarily by the Philippine government and supported by international agencies

- **Planning:** The Department of Transportation (DOTr) spearheads these projects, aiming to enhance urban mobility, reduce road congestion, and support economic growth. Partnerships with agencies such as the Japan International Cooperation Agency (JICA) and the Asian Development Bank (ADB) help align project goals with regional development priorities. Land is acquired in phases, guided by national land-use policies and local development plans to ensure minimal community disruption. For example, specific guidelines are established to address any necessary relocations along the rail corridor
- **Design and Environmental Considerations:** Initial stages have involved extensive feasibility studies that consider engineering requirements, environmental impact, and integration with local infrastructure. For instance, the NSCR project was carefully planned to include elevated and at-grade sections to optimise land use and reduce disruption. Both projects conducted Environmental Impact Assessments (EIAs), ensuring adhering to sustainable practices, reducing emissions, and integrating climate resilience. This process involves consultations with local communities to address environmental and social impacts.
- **Financing:** Financing for these projects is sourced from both international loans and public–private partnerships (PPPs). The NSCR and Metro Manila Subway have secured significant funding from JICA and ADB, covering construction, technology, and operational costs. The Philippine government also

[160] Shenzhen Metro: Leading the Smart Upgrade of "City Arteries" with Quality Construction
[161] Technical Summary Series, page 33/40

allocates funds through national budgets, supplementing loans from foreign investors and grants where necessary. Contracts for each project section are awarded through competitive bidding, involving both local and international construction firms. For instance, the NSCR has multiple phases, with specific contractors assigned to individual sections. The DOTr coordinates with the Department of Public Works and Highways and other agencies to streamline construction, resolve bottlenecks, and ensure adherence to safety and design standards.

- **Operation and Maintenance:** Upon project completion, operational responsibilities may be shared or transferred to private entities under PPP agreements. Both local and international agencies closely monitor the projects to ensure they meet operational goals and quality standards, adjusting policies and operations as required to optimise service and financial performance.

2. Roles and Responsibilities of Stakeholders in the Process of Planning and Implementing TOD Projects

Roles and responsibilities of stakeholders in the process of planning and implementing TOD projects in Manila include:

- **Department of Transportation**: The DOTr leads the planning, implementation, and oversight of major transit infrastructure, such as rail projects and related TOD initiatives. The department works on policies to integrate TOD elements, often collaborating with other agencies for effective execution and urban planning .
- **Department of Finance (DOF):** The DOF plays a vital role in managing the financial aspects of TOD and LVC, including taxation policies and incentives that impact real estate and land valuation around transit hubs. DOF's involvement ensures that financing mechanisms, including LVC taxes and fees, are structured to support sustainable development.
- **Bases Conversion and Development Authority (BCDA):** The BCDA focuses on land development in former military and underutilised government lands. It is instrumental in creating economic zones and infrastructure hubs, like those seen in Clark, which align with TOD principles. By leveraging public lands, BCDA helps generate revenue for transit investments through land leases and development partnerships. Crossrail International supported BCDA in 2023 under the GCIEP funding in order to put forward proposals for TOD at New Clark City which will be a potential new station as an extension to the NSCR In northern Luzon.
- **National Economic and Development Authority (NEDA):** As the agency responsible for strategic economic planning, NEDA oversees the integration of TOD in the Philippines' broader development plans. NEDA evaluates project feasibility, assesses impacts, and aligns TOD projects with national development priorities.
- **Local Government Units (LGUs):** LGUs are crucial for implementing and adapting TOD plans to local contexts. They manage zoning, issue permits, and engage with the community to ensure that TOD projects are tailored to local needs and that LVC mechanisms, such as special assessment districts, are feasible at the local level.
- **Private Sector and Developers:** Private developers are often the direct beneficiaries and stakeholders in TOD projects, especially those involved in real estate near transit hubs. They engage in PPPs with the government for infrastructure funding and participate in LVC schemes by developing properties around transit projects.
- **Asian Development Bank (ADB):** ADB provides funding, technical assistance, and advisory support for TOD and LVC initiatives in the Philippines. Its role is often to bring in international best practices and financial models that enable sustainable TOD planning and implementation, as seen in projects like the NSCR.

Interactive relationships between the key players involve:

- **Policy and Regulatory Coordination:** Agencies like NEDA, DOTr, and DOF create policies for TOD and set LVC mechanisms. They collaborate to ensure alignment with national and local planning goals. See the ICC process below
- **Local Government Engagement:** Local governments manage zoning and facilitate community engagement, aligning TOD projects with local needs and growth strategies.

- **Public–Private Partnerships (PPP):** The private sector develops land around transit hubs, often co-funding infrastructure with the government, while receiving incentives. These partnerships support financing and optimise land use.
- **International Collaboration:** Entities like Crossrail International, JICA and ADB provide funding, expertise, and best practices for sustainable TOD and LVC implementation, contributing technical assistance and capacity-building to local agencies.

The Investment Coordination Committee (ICC) process, led by the NEDA in the Philippines, is essential for evaluating major infrastructure projects. It ensures that public investments align with national development goals and are financially and economically viable via several key steps:

- Project Proposal Submission: Government agencies submit project proposals, detailing financial and technical aspects.
- Technical Board Review (ICC-TB): This Board assesses the project's viability, recommending approval, conditional approval, or return to the initiating agency.
- Cabinet Committee Deliberation (ICC-CC): If endorsed, the project moves to ICC-CC for high-level review and possible NEDA Board approval.
- NEDA Board Approval: Final approval is required for large projects, especially those funded by foreign loans or PPPs.

This rigorous process ensures projects are aligned with national goals and provide value for investment

DOTr is the central player as the primary government body responsible for overseeing the development and regulation of the country’s transportation systems. Its principal responsibilities include:

- Policy Formulation: Creating policies for efficient and sustainable transportation systems.
- Infrastructure Development: Planning and implementing major transportation projects, including highways, railways, airports, and seaports.
- Regulation and Safety: Ensuring transportation safety standards, regulating transport services, and issuing licences.
- Public Transportation and TOD: Supporting projects that integrate TOD and improve urban mobility.

DOTr works with various government agencies, local governments, and private entities to enhance connectivity and mobility across the country.

3. Laws and Regulations Guiding TOD Planning and Implementation

In the Philippines, while there isn't a single law specifically TOD, there are a series of policies and partnerships that facilitate TOD implementation, particularly in the context of large infrastructure projects like the MMSP and NSCR. Key regulations and guidelines relevant t

TOD implementations include the Urban Development and Housing Act and the Local Government Code, which promote sustainable urban planning and empower local governments to support urban redevelopment initiatives.

A TOD approach is consistent with existing Philippine government laws, plans, and policies on urban, transport, and socio-economic development. The Philippine Development Plan (PDP) for 2023-2028 identifies TOD as a critical strategy for promoting sustainable urban development, improving transportation efficiency, and enhancing the quality of life in urban areas. The PDP highlights essential components of TOD, including the integration of land use and transportation planning, the encouragement of compact, mixed-use development, a focus on infrastructure investment, and the implementation of policy and regulatory reforms.

TOD as a strategy is also aligned with the National Transport Policy (NTP) (2020) which aims to establish an integrated, intermodal, environmentally sustainable, and people-oriented national transport system. The Implementing Rules and Regulations (IRR) of the NTP promotes the integration of land use and transportation planning and puts a premium on people-oriented mobility over vehicle mobility in the assessment of projects. The NTP IRR also provides that local government units (LGUs), in coordination with national agencies, may implement strategies focusing on accessibility, connectivity, TOD, improvement of public transport facilities, mixed-use development, and other related measures to minimise private vehicle trips, while maximising the

use of mass transportation, hence promoting a shift from a high carbon mode to sustainable transport infrastructure.

Additionally, TOD is consistent with the National Urban Development and Housing Framework (NUDHF 2017-2022) and the National Housing and Urban Development Sector Plan (NHUDSP) 2040, which recommend integrating mobility and transport planning in land use planning, supporting compact and mixed-use development, and pursuing urban redevelopment, as well as to the Philippines Nationally Determined Contribution (NDC), which aims for a 75% reduction in GHG emissions by 2030, and identifies transport as being a major sector for GHG emissions.

4. Principles for Determining Development Boundary for TOD Areas

There is currently no defined standard but DOTr and local government units generally focus on a radius of 400 to 800 metres around key stations, within which TOD principles guide urban planning.

5. Mechanism of Cooperation and Contribution of Private Enterprises in the Process of TOD Implementation

There is no standard approach and on that basis under the current GCIEP Deep Offer funding from the UK Foreign, Commonwealth and Development Office, Crossrail International Ltd and TfL have been engaged to deliver:

- TOD implementation framework and guidelines for DOTr – identifying ways to standardise TOD implementation in DOTr and co-create practical tools that DOTr can adopt to implement TOD, using TfL as a model
- TOD Masterplan Demonstration Project – Practical delivery of a TOD demonstration project by Crossrail International at Senate DepEd station in Metro Manila

6. Mechanism of Cooperation and Contribution of Private Enterprises in the Process of TOD Implementation

There is a relatively mature private developer market in the Philippines with companies such as Ayala Land Corporation, Filinvest and Megaworld. It is expected that companies such as these will be procured by DOTr/ADB in order to take forward TOD projects. At present there is no track record of successful developments, however, partly due to the complexities of such schemes and this is why Crossrail International is working with DOTr on the potential demonstration project at Senate DepEd station.

7. The Effectiveness in Implementing the TOD Model

Outstanding achievements include enhanced transit ridership due to improved accessibility, increased housing supply, including affordable housing, creation of complete, mixed-use communities that boost local economies. However, TOD implementation also faces with many challenges in balancing rapid transit development with community concerns about density and affordability.

8. What are the lessons learned for the Vietnam case?

- The need for rigorous processes to help shape infrastructure investment
- The benefits from having a mature pool of private developers with experience in delivery of complex projects
- The need for a TOD Implementation framework
- The need for a practical demonstration project to help identify the steps needed for effective TOD delivery and land value capture

G. Toronto, Canada

1. Process of planning and implementing TOD projects

- **Planning:** The Ontario government prioritised high-density development near transit corridors, working with agencies like Metrolinx (for transit operations) and Infrastructure Ontario (IO) (for property development expertise and public–-private partnerships (PPPs)). This phase involved extensive

community consultation to integrate public and stakeholder feedback, focusing on affordability, accessibility, and local economic benefits.

- **Designing:** TOC designs emphasised mixed-use buildings combining residential, commercial, and office spaces to support a “live, work, play” model. Design standards focused on walkability and bike-friendly infrastructure, with requirements for affordable housing to ensure inclusive, transit-accessible communities. Standards for universal access, wayfinding, and station architecture were developed to maintain consistency across projects.

Table 16: Design Standards list in Toronto

Design Standards		
DS-00	Front End	Compilation and how to use the Design Standards
DS-02	Universal Design Standard	General Design Guidelines
DS-03	Metrolinx Wayfinding	Wayfinding Design Standard
DS-07	Bike Infrastructure	Bike Infrastructure Design Requirements
DS-09	Subway Station Architecture	Subway Station Architecture Design Standard
DS-11	3rd Party Entrance	Connection Requirements
	TTC Design Manual	Guidance
	Adjacent Development	Metrolinx Adjacent Development Guideline for Priority Transit Projects
	Building near Metrolinx	Guidelines and Permits

- **Financing:** Financing relied on a mix of government investment, LVC, and PPPs. Key mechanisms included land leases, air rights, and incremental taxes through the Business Rate Supplement (BRS) and Community Infrastructure Levy (CIL).
- **Operating/Managing:** Metrolinx oversees daily operations and management of transit systems. Infrastructure Ontario manages the commercial aspects, ensuring alignment with TOC objectives and ongoing integration with transit operations.

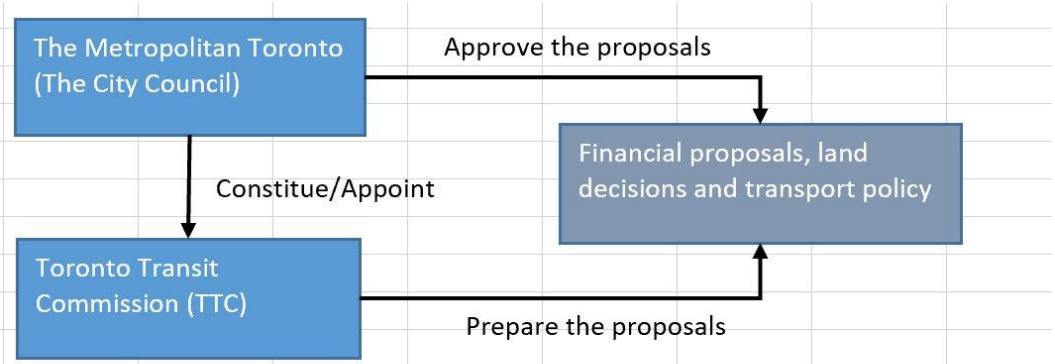
2. Roles and Responsibilities of Stakeholders in the Process of Planning and Implementing TOD Projects

Key stakeholders in the process of planning and implementing TOD projects include:

- **Metrolinx:** Acts as the transit agency, ensuring the integration of transit and TOD planning.
- **Infrastructure Ontario (IO):** Manages commercial transactions, oversees procurement, and leads PPP negotiations.
- **Provincial Government:** Establishes regulatory frameworks, enacts supportive legislation, and coordinates funding.

In which, Metrolinx and IO share primary roles in TOD, with Metrolinx focusing on transit and IO on development and funding. They collaborate closely, with IO property teams embedded within Metrolinx’s delivery teams to streamline decision-making for TOD projects, aligning transit and development expertise.

Metrolinx is the central player empowered through the **Metrolinx Act** (2006), is central to TOD implementation. It collaborates closely with IO, creating a project structure that co-locates transit and development expertise within one entity to streamline TOD outcomes.



- The TTC is functioning as an independent agency of the City Council
- The idea of using land and property development to finance the railway came from a cost recovery programme when fare revenues alone could no longer support the expansion of the railway.
- The TTC began exploring possibilities of long-term leasing of its properties and cost-sharing with developers for station connections.
- The TTC acquires land for its subway lines and transport right-of-way. The TTC is responsible for planning the alignments, determining the land requirements, costing the alternatives, managing the land acquisition and its disposal, if appropriate.
- The TTC operates like an autonomous business-like organization when dealing with the property developers.

Figure 74: TOD Development and Management Process

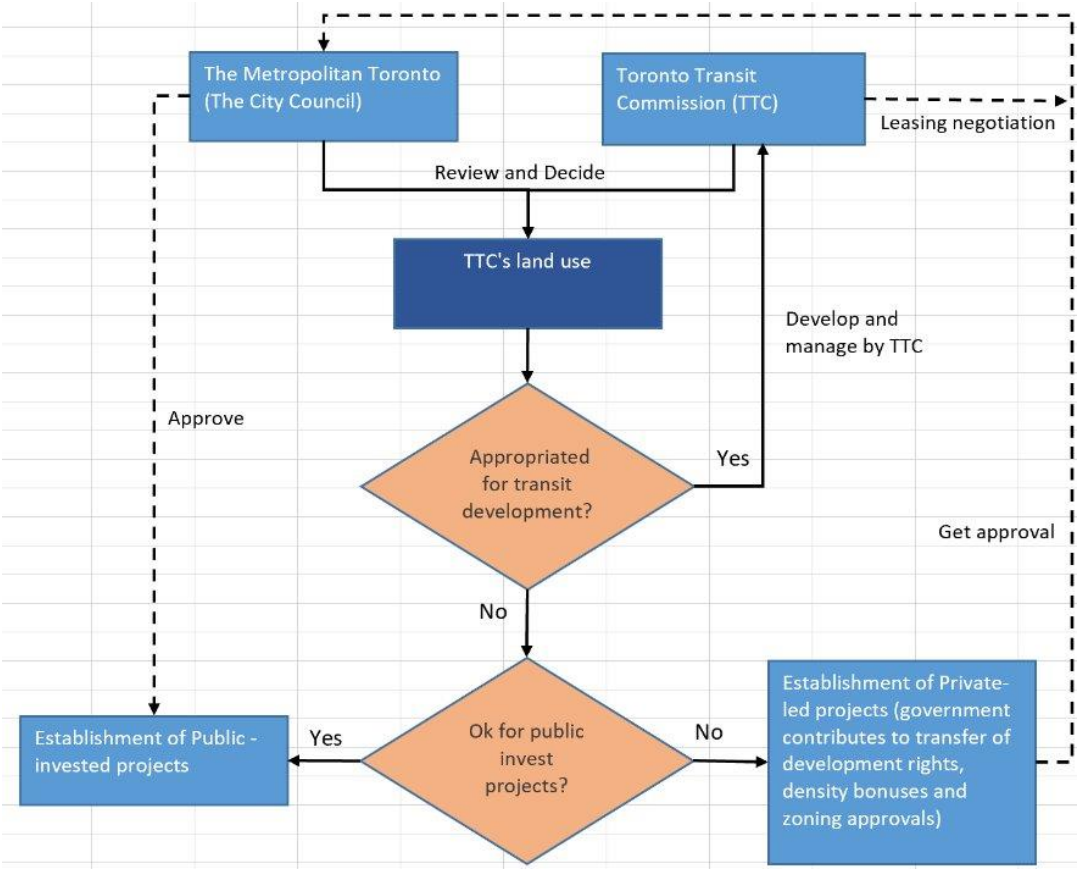


Figure 75: process for approving and managing TOD projects

3. Laws and Regulations Guiding TOD Planning and Implementation

The following legislative acts were critical in supporting TOD implementation:

- **Getting Ontario Moving Act** (2019): Enabled Metrolinx and IO to assume control over transit projects from municipal entities, ensuring cohesive provincial oversight[162].
- **Building Transit Faster Act** (2020): Streamlined permit and expropriation processes for priority transit projects[163].
- **Transit-Oriented Communities Act** (2020): Empowered the government to establish TOC zones and prioritise high-density, mixed-use development near transit stations[164].
- **Ontario Rebuilding and Recovery Act** (2020): Enabled rapid implementation of provincial transit projects beyond the Greater Toronto Area (GTA) and amended the TOC Act to allow exemptions from hearings on necessity for land expropriation[165].

Table 17: Timeline of Key Preparatory Legislation to pave the way for TOC

April 10, 2019 The $28.5 billion New Subway Transit Expansion Plan for the GTA is unveiled.
June 4, 2019 The *Getting Ontario Moving Act* passes, transferring responsibility for new subway projects to the province.
July 25, 2019 Metrolinx and Infrastructure Ontario release the Initial Business Case for the Ontario Line.
October 29, 2019 Toronto City Council endorses Ontario's transit expansion plan, as a joint commitment between the city and the province to building transit in partnership.
November 4, 2019, Premier Ford and Toronto Mayor John Tory announce the historic 'Ontario-Toronto Transit Partnership' to work together to build the most ambitious subway expansion in Canadian history.
February 6, 2020 Minister delivers keynote speech to Economic Club of Canada where she presents Ontario's plan to build new transit faster, together.
February 14, 2020 - Ontario and the City of Toronto announce the signing of the Ontario-Toronto Transit Partnership Preliminary Agreement, including a "Memorandum of Understanding on Transit-Oriented Development," to fund and build rapid transit projects in Toronto including the four priority subway projects outline in the "New Subway Transit Plan for the GTA."
February 18, 2020 - The Building Transit Faster Act is introduced, to streamline construction of the four new subway projects.
February 20, 2020 Province signs Memoranda of Understanding with select utility companies to Improve Coordination for Priority Transit Projects
February 28, 2020 Metrolinx and Infrastructure Ontario release the Preliminary Design Business Case for the Scarborough Subway Extension and the Initial Business Case for the Eglinton Crosstown West Extension.

[162] Getting Ontario Moving Act
[163] Building Transit Faster Act
[164] Transit Oriented Communities Act
[165] Ontario Rebuilding and Recovery Act

March 10, 2020 Advance tunnelling RFQs issued for the Scarborough Subway Extension and the Eglinton Crosstown West Extension.
May 28, 2020 - Ontario and York Region officially complete the Ontario-York Region Transit Preliminary Partnership Agreement, including a "Memorandum of Understanding on Transit-Oriented Development" confirming their partnership to deliver on Premier Ford's plan and build the Yonge North Subway Extension faster.
June 2, 2020 - Issued first two PPP RFQs to identify and qualify those who will design, build and maintain Ontario Line.
July 8, 2020 The *Building Transit Faster Act* receives royal assent becoming law, providing the province with the tools to expedite the planning, design and construction process of the four priority transit projects.
July 21, 2020 - Ontario passes legislation, the Transit-Oriented Communities Act, which will rethink the relationship between transit, housing, and commercial spaces and enable more timely construction of vibrant communities around transit stations along the routes of the province's four priority subway projects.
August 20, 2020 Advance tunnelling RFPs issued for the Scarborough Subway Extension and the Eglinton Crosstown West Extension.
October 22, 2020 The province introduced the *Ontario Rebuilding and Recovery Act, 2020*, proposing to amend the *Building Transit Faster Act* and the *Transit-Oriented Communities Act*. This would provide the province with regulation-making authority to streamline project delivery and accelerate the completion of other provincial transit projects beyond the GTA, including Government of Ontario Rail expansion and Light Rail Transit projects. Amendments would allow future priority transit projects for TOC to be exempt from the Hearings of Necessity provisions in the *Expropriations Act* and enter into new types of commercial arrangements.
December 8, 2020 The *Ontario Rebuilding and Recovery Act, 2020*, received royal assent becoming law, providing the province with the tools to expedite the planning, design and construction process of other provincial transit projects beyond the GTA.
December 17, 2020 The first two PPP Request for Proposals (RFPs) issued to shortlisted teams to design, build and maintain Ontario Line. Metrolinx releases the Preliminary Design Business Case (PDF) for the Ontario Line.

4. Principles for Determining Development Boundary for TOD Areas

A TOD zone in Toronto typically encompasses a radius of 400-800 metres (a 5–10-minute walk) around transit hubs. **Metrolinx** and **municipal planning authorities** define these zones collaboratively, focusing on high-density and mixed-use zoning near transit stations, tapering density as distance from the hub increases.

5. LVC tools

LVC mechanisms in Toronto include:

- **Air Rights Leasing:** Leasing development rights above and adjacent to transit stations. Land value uplift is captured when development rights, whose values have increased due to public investment, is sold to developers in return for an upfront payment, leasehold charge or annual rental for the term of the lease. Similarly to Crossrail in London these were often joint development projects between Metrolinx and adjacent developers to build new station facilities in return for the development rights above, together with a share of profits.

- **Development Charges and Density Bonuses:** Municipalities collect one-time fees from developers to fund transit infrastructure. Density bonuses allow developers to build at greater density than typically permitted in exchange for contributing to infrastructure or community improvements.
- **Property Tax Levies:** Toronto, for example, implemented a property tax levy to fund part of the Scarborough subway extension, generating substantial revenue from local property owners over a 30-year period.
- **Tax Increment Financing (TIF):** This involves borrowing against projected future property tax revenue in a designated area, enabling upfront funding for infrastructure by leveraging anticipated increases in property values due to transit enhancements.

The Ontario State government primarily manages LVC collection through Metrolinx and municipal authorities, ensuring funds support TOD initiatives and infrastructure.

6. Mechanism of Cooperation and Contribution of Private Enterprises in the Process of TOD Implementation

Private sector enterprises play critical roles in project delivery and TOD. **PPPs** are key to securing development, with IO overseeing the selection of developers via a Request for Proposal (RFP) process. Selected developers integrate community feedback into their proposals, often meeting criteria for affordability, sustainability, and accessibility. The PPP approach has proven successful, with developers incentivised to align projects with community and government objectives through performance bonds and penalties.

7. The Effectiveness in Implementing the TOD Model

The implementation of the TOD model in Toronto has achieved a number of significant achievements such as: enhanced transit ridership due to improved accessibility, increased housing supply, including affordable housing and creation of complete, mixed-use communities that boost local economies. However, TOD implementation also faces with challenges in balancing rapid transit development with community concerns about density and affordability.

8. Lessons Learned on TOD Model Development for Vietnam

- **Streamlined Legislation: Introduce** comprehensive TOD-specific laws, similar to Ontario's legislative model.
- **Integrated Agency Approach:** Establish a central, empowered agency to coordinate between transit and development projects.
- **Effective PPPs:** Ensure clear selection criteria for developers that align with TOD goals.
- **Land Value Capture:** Implement air rights, incremental taxes, and other LVC mechanisms to sustainably fund TOD.

These insights from Toronto’s model may guide Vietnam in structuring efficient TOD projects that meet urban growth and community needs.

H. Crossrail - London

1. Process of planning and implementing TOD projects

- **Planning:** Crossrail’s planning began with safeguarding the proposed route through "safeguarding directions," preventing conflicting developments. After feasibility studies and public consultations, high-level design concepts and business cases were developed to support funding applications.
- **Designing:** Designs incorporated TOD principles, with over-station developments (OSD) around key stations. Crossrail’s Technical Interface Parameters (TIP) specified requirements for construction integration, including multi-use spaces and urban realm improvements.
- **Financing:** Financing combined public funds, private contributions, the BRS, and Community Infrastructure Levy (CIL). Private investments from key stakeholders supplemented government grants, ensuring a comprehensive funding model.
- **Operating/Managing:** Crossrail Limited managed the project until the Elizabeth Line’s handover to TfL. The line’s operation was then managed by MTR Elizabeth Line under a concession agreement, with TfL overseeing day-to-day functions.

2. Roles and Responsibilities of Stakeholders in the Process of Planning and Implementing TOD Projects

Key stakeholders in the process of planning and implementing TOD projects in London include:

- **Department for Transport (DfT):** Central government body providing project funding and legislative support.
- **Transport for London (TfL):** Manages the delivery and eventual operations of the Elizabeth Line.
- **Crossrail Limited:** Special purpose vehicle established to oversee Crossrail's delivery.
- **Private Partners (e.g., Canary Wharf Group, Heathrow Airport Ltd):** Provided financial support and carried out over-station developments around Crossrail stations.
- **Programme Partner (Transcend JV Nicholls, Aecom and CH2M Hill):** Ensured compliance with budgets, schedules, and safety requirements.
- **Project Delivery Partner (Bechtel):** Project managed delivery of construction contracts.

Crossrail's joint sponsor team between TfL and DfT ensured coordinated oversight of project delivery, with Crossrail Limited acting as the delivery agent. The joint sponsor team maintained regular contact, facilitating a streamlined decision-making process. Private developers engaged through contractual agreements contributed to funding and project development, under careful regulation by Crossrail to protect railway operations.

Crossrail Limited, a wholly owned subsidiary of TfL, acted as the central player, empowered as a special-purpose entity for project delivery. Its role focused on integrating transit development with urban planning through over-station development initiatives, with support from the DfT and private sector partners.

3. Laws and Regulations Guiding TOD Planning and Implementation

The **Crossrail Act (2008)** provided the key legislative framework, providing deemed planning permission for stations and infrastructure and permitting compulsory land acquisition for construction. The Act enabled streamlined approvals, compulsory purchase rights, and provided the legal basis for balancing the public interest case with a proportionate removal of private rights where necessary, which was crucial to overcoming opposition and allowing the project to proceed into the delivery phase.

4. Principles for Determining Development Boundary for TOD Areas

UK planning does not directly define TOD zones but often uses **Public Transit Accessibility Levels (PTAL)** to assess and prioritise areas for high-density development. Crossrail measured property impact within a 400-metre radius for commercial values and a 1000-metre radius for residential values, allowing for targeted development around stations. Local planning authorities retain control over specific TOD approvals based on local planning regulations.

5. LVC tools

Key LVC mechanisms included:

- **BRS:** Levy on larger businesses to support Crossrail's financing.
- **Community Infrastructure Levy (CIL):** Imposed on commercial and residential developments around Crossrail to generate additional revenue.
- **Private Contributions:** Direct investments from stakeholders like Canary Wharf Group, with property developers contributing through negotiated agreements.

The Greater London Authority and TfL managed these mechanisms, directing funds to support the project's financial needs.

6. Mechanism of Cooperation and Contribution of Private Enterprises in the Process of TOD Implementation

Private sector entities such as Canary Wharf Group and Berkeley Homes partnered with Crossrail, investing in station developments and over-station developments. Crossrail's contractual agreements protected infrastructure integrity while fostering private involvement, leading to successful TOD initiatives and urban regeneration around key stations.

7. The Effectiveness in Implementing the TOD Model

TOD implementation brought many achievements such as enhanced transit capacity and reduced travel times across London, increased property values around stations, fostering local economic growth and creation of vibrant, mixed-use urban spaces around transit hubs. However, this process also deals with challenges in managing the balance between rapid development and community concerns, particularly regarding affordability and sustainable urban growth.

8. Lessons Learned on TOD Model Development for Vietnam

- **Clear Legislative Framework:** Adopt TOD-specific laws for regulatory support and streamlined approvals.
- **Dedicated Delivery Vehicle:** Establish a central agency or special-purpose entity to coordinate TOD and transit development.
- **Leveraging Private Involvement:** Ensure private sector alignment with public goals through structured partnerships.
- **Density-Based Zoning:** Use accessibility measures to allow high-density developments around transit hubs, adapting local planning for TOD needs.

These insights from Crossrail's approach to TOD provide valuable guidance for Vietnam as it plans for integrated transit and urban development.

Appendix 3: Data Collection and Calculation Details of the IPN Index for Hanoi and Ho Chi Minh City

1. Overview of the IPN Index

- The IPN (Income-Population-Needs) Index assesses the feasibility and optimal timing for implementing urban development projects, particularly public transportation projects like urban rail. This index is typically calculated based on three main factors:
- Income: Average income level of the population in the area, reflecting the financial capacity and purchasing power of residents. Higher income generally indicates a greater ability to afford new and improved services, including public transportation.
- Population: Size and density of the population, influencing the demand for infrastructure and public services. Areas with larger and denser populations typically have a higher need for efficient transportation solutions.
- Needs: Demand for infrastructure and service development based on factors like traffic congestion, environmental pollution, and quality of life requirements.
- Formula:

Equation 4: IPN Index Calculation Formula

$$IPN\ Index = \sqrt{\frac{Income}{Average\ Income} x \frac{Population}{Average\ Population}}$$

2. Calculation Details

To calculate the IPN index for implementing urban rail projects, follow these steps:

- Step 1: Determine Average Income
  - Collect data on the average income (GRDP/capita) of around 50 cities worldwide in the year they opened their first MRT line.
  - Convert the income value of each city to purchasing power parity (PPP) at the base year, for example, 2020.
  - Calculate the average of the adjusted incomes to obtain the "average income" in 2020 purchasing power.
- Step 2: Determine Average Population
  - Collect data on the population of the same 50 cities at the time each city opened its first MRT line.
  - Calculate the average of these population figures to obtain the "average population."

- Step 3: Calculate the IPN Index
  - Apply the calculated average values to determine the IPN Index for Hanoi (in 2021 when the Cat Linh - Ha Dong line opened) and Ho Chi Minh City (in 2024 when the MRT1 line is expected to open).
  - Note that Hanoi's GRDP/capita should be taken from 2021 and converted to 2020 purchasing power. Similarly, Ho Chi Minh City's GRDP/capita should be taken from 2024 and converted to 2020 purchasing power.

3. Calculation Data

Table 18: IPN Calculation Data

0	Cities (*)	Countries	Year of first MRT opening	GRDP per capita (USD), year of opening of first MRT line	Population (million people), year of opening of first MRT line	PPP Conversion Factor (2020)	PPP conversion factor (base year)	GRDP per capita at PPP (Base year)
1	Hanoi	Vietnam	2021	5,476	8.4	7,064.95	7,120.01	5,433.95
2	HCMC	Vietnam	2024	7,321	9.6	7,064.95	6,802.47	7,603.18
3	Paris	France	1900	2,876	2.7	0.69	1.03	1,943.47
4	London	United Kingdom	1863	2,881	2.8	0.65	0.63	2,985.37
5	Toronto	Canada	1954	7,699	1.4	1.20	1.24	7,451.78
6	Cairo	Egypt	1987	2,465	8.3	3.70	0.46	19,799.31
7	Seoul	South Korea	1974	3,015	6.8	829.36	559.92	4,465.85
8	Shanghai	China	1995	2,653	9.5	4.01	2.74	3,892.70
9	Singapore	Singapore	1987	11,827	2.8	0.83	0.97	10,161.80
10	Taipei	China	1997	14,598	2.6	4.01	2.86	20,500.75
11	Bangkok	Thailand	2004	7,100	6.6	11.41	11.13	7,276.18
12	Delhi	India	2002	2,289	15.5	20.32	9.97	4,663.40
13	Dubai	United Arab Emirates	2009	26,866	3.8	2.09	1.67	33,688.61
14	Doha	Qatar	2019	63,008	2.2	2.29	2.26	63,755.10
15	Ahmedabad	India	2019	2,914	7.7	20.32	20.24	2,925.90
16	Almaty	Kazakhstan	2011	18,809	1.9	124.88	82.09	28,611.73
17	Bangalore	India	2011	4,353	8.9	20.32	15.55	5,688.15
18	Bursa	Turkey	2002	9,221	2.3	2.11	0.59	32,923.85
19	Changchun	China	2017	9,426	5.0	4.01	4.04	9,366.95
20	Changsha	China	2014	16,279	4.1	4.01	3.69	17,693.17
21	Changzhou	China	2019	20,768	3.9	4.01	4.06	20,537.93

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22	Chengdu	China	2010	5,278	7.2	4.01	3.33	6,366.61
23	Chennai	India	2015	2,867	9.6	0.32	19.12	3,047.36
24	Chongqing	China	2005	2,405	6.8	4.01	2.84	3,398.70
25	Daejeon	South Korea	2006	17,260	1.5	829.36	772.22	18,537.22
26	Dongguan	China	2016	11,095	9.4	4.01	3.87	11,496.66
27	Foshan	China	2010	11,770	7.0	4.01	3.33	14,196.68
28	Fuzhou	China	2016	12,591	3.4	4.01	3.87	13,047.07
29	Guangzhou	China	1997	5,765	11.1	4.01	2.86	8,095.53
30	Isfahan	Iran	2015	4,551	2.3	32,954.59	10,701.56	14,013.82
31	Jakarta	Indonesia	2019	8,670	31.6	4,791.01	4,847.45	8,568.76
32	Kayseri	Turkey	2009	8,101	1.2	2.11	0.90	18,903.37
33	Kaohsiung	China	2008	18,088	2.8	4.01	3.18	22,850.01
34	Mecca	Saudi Arabia	2010	15,165	1.5	1.92	1.40	20,763.69
35	Mumbai	India	2014	3,987	19.5	20.32	18.30	4,426.44
36	Palembang	Indonesia	2018	5,943	1.7	4,791.01	4,833.60	5,890.14
37	Tel Aviv	Israel	2023	73,095	4.4	3.57	3.75	69,583.77
38	Ürümqi	China	2018	12,719	3.8	4.01	4.09	12,472.62
39	Utsunomiya	Japan	2023	36,664	1.4	00.74	95.10	38,841.02
40	Wuhan	China	2004	3,016	9.1	4.01	2.82	4,293.50
41	Valparaíso	Chile	2005	7,110	0.9	333.69	409.84	5,789.07
42	Santo Domingo	Dominican Republic	2009	4,869	3.4	21.23	17.20	6,007.61
43	Salvador	Brazil	2014	11,016	3.6	2.26	1.82	13,672.25
44	Quito	Ecuador	2023	0,939	2.9	0.47	0.41	12,600.12
45	Phoenix	USA	2008	46,854	4.1	1.00	1.00	46,853.80
46	Panama	Panama	2014	20,529	1.7	0.49	0.54	18,630.91
47	Mendoza	Argentina	2012	11,940	1.0	26.89	3.22	99,700.37
48	Honolulu	USA	2023	74,144	1.0	1.00	1.00	74,143.50
49	Fortaleza	Brazil	2012	8,412	3.8	2.26	1.61	11,840.45

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50	Cochabamba	Bolivia	2022	3,093	0.7	2.58	2.43	3,290.17