

FINANCING TRANSIT-ORIENTED DEVELOPMENT WITH LAND VALUES

**Adapting Land Value Capture
in Developing Countries**

Hiroaki Suzuki, Jin Murakami, Yu-Hung Hong, and Beth Tamayose



OVERVIEW

Financing Transit-Oriented Development with Land Values

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Chapter 6	Yu-Hung Hong and Hiroaki Suzuki
Chapter 7	Jin Murakami and Hiroaki Suzuki
Chapter 8	Jin Murakami and Hiroaki Suzuki

Abbreviations

CEPAC	Certificate of Additional Construction Potential
DDA	Delhi Development Authority
DMRC	Delhi Metro Rail Corporation
FAR	floor area ratio
HMR	Hyderabad Metro Rail Ltd.
LVC	land value capture
MTR	mass transit railway
PPP	public-private partnership
R+P	Rail Plus Property program implemented by MTR Corporation, Limited (Hong Kong SAR, China)

Glossary

Air right sale. One of the development-based LVC instruments. Governments sell development rights extended beyond the limits specified in land use regulations (e.g., FAR) or created by regulatory changes to raise funds to finance public infrastructure and services.

Bus rapid transit (BRT). High-quality bus-based services that mimic many of the features of high-capacity metrorail systems but at a fraction of the cost. Buses most closely resemble metrorail services when they operate on specially designated lanes or have physically separated lanes for their exclusive use. Grade separation of busways at critical intersections and junctures also expedites flows. BRT systems often include bus stations instead of stops to provide weather protection and allow passengers to pay before boarding.

Central business district (CBD). Areas where cities' major businesses (financial institutions, stores, major convention and sport facilities, hotels, etc.) are concentrated. CBDs produce agglomeration economies.

Eminent domain. Regulatory power granted to governments or public agencies, which allows them to take private property for public projects or interests, subject to appropriate compensation.

Floor area ratio (FAR). Ratio of a building's total floor area to the size of the land on which it is built. The higher the FAR, the higher the density. Also referred to as floor space ratio (FSR) or floor space index (FSI).

Greenfield development. New development that takes place on lands that were not previously developed as urban land including agricultural, rural, and unused land.

Land readjustment scheme. Landowners pool their land together for reconfiguration and contribute a portion of their land for sale to raise funds to partially defray public infrastructure development costs. This can be used as a development-based LVC instrument to finance transit and TOD-related investments.

Land value capture (LVC). LVC is defined as a public financing method by which governments (a) trigger an increase in land values via regulatory decisions (e.g., change in land use or FAR) and/or infrastructure investments (e.g., transit); (b) institute a process to share this land value increment by capturing part or all of the change; and (c) use LVC proceeds to finance infrastructure investments (e.g., investments in transit and TOD), any other improvements required to offset impacts related to the changes (e.g., densification), and/or implement public policies to promote equity (e.g., provision of affordable housing to alleviate shortages and offset potential gentrification). There are two main categories of LVC: development-based LVC and tax- or fee-based LVC. Development-based LVC can be facilitated through direct transaction of properties whose values have been increased by public regulatory decisions or infrastructure investment. Tax- or fee-based LVC is facilitated through indirect methods, such as extracting surplus from property owners, through various tax or fee instruments (e.g., property taxes, betterment charges, special assessments, etc.).

Market freehold system. Land holding system under which landowners have absolute ownership of land. Its conditions are full right of transfer, right to bequeath, right to mortgage, full use rights (unless restricted by law), and unlimited duration.

Mixed use. Pattern of development characterized by a mixture of diversified land uses, typically including housing, retail activities, and private businesses, either within the same building space (e.g., vertical mixing) or in close proximity (e.g., horizontal mixing).

Nonmotorized transport (NMT). Any type of transport mode that is not motorized, such as walking or bicycling. NMT has gained popularity as not only a clean, carbon-free form of mobility with a very small footprint but also as a means to improve public health through increased physical activity.

Public-private partnership (PPP). Formal partnership between a public sector entity and a private corporation often used to construct and operate infrastructure facilities or develop certain urban areas.

Redevelopment/regeneration. Type of development that seeks to reinvest in already developed areas, typically targeting parcels that are underutilized (e.g., vacant or abandoned properties); often considered part of an economic development scheme.

Sprawl. Pattern of development characterized by uniform low density, lack of a distinctive core, poor accessibility, dependence on automobiles, and uncontrolled and noncontiguous land expansion.

State leasehold system. Land holding system under which lands are owned by the States and the lands are leased by the States to individuals or firms for a fixed duration, with lease fees and other conditions. The rights enjoyed by lessees can vary with specific lease conditions, but terms frequently allow for the right to assign the lease to another or allocate the residual value of the lease. Development and use rights are likely to be restricted by the States.

Transfer of development rights (TDR). Ability to effectively buy and sell “air rights” (i.e., rights to fully develop the maximum allotted vertical envelope—or “air space”—of properties) within the limit of their FAR allotment or the unused development rights that remain when a particular building does not use up its FAR allotment; typically applies only to certain parcels, and the rights often can only be transferred to specific “receiving” parcels.

Transit-adjacent development (TAD). Development that is similar to TOD in that it is located within the vicinity of a transit node but is not actually connected with transit in the absence of pedestrian-friendly development organized around a transit station.

Transit-oriented development (TOD). Compact, mixed-use, pedestrian-friendly development organized around a transit station. TOD embraces the idea that locating amenities, employment, retail shops, and housing around transit hubs promotes transit usage and nonmotorized travel.

Urban redevelopment scheme. Development-based LVC instrument mainly used in Japan. Landowners together with a developer establish one cooperative entity to consolidate piecemeal land parcels into a single site that they then develop (e.g., high-rise building and/or mixed-use building) with new access roads and public open spaces. The local government modifies zoning codes and increases maximum FARs in the targeted redevelopment district (typically around rail transit stations).

Message to City Leaders

Rapid growth has made your city heavily dependent on cars for transportation and is causing big headaches. Investors stay away as they lose time and money due to congestion. Parents complain that their children are developing respiratory diseases. And the poor must spend hours getting to work, to school, and to the hospital.

Your fleet of buses is slow, aging, and overcrowded, stuck in ever-worsening gridlock. A new metro system has been proposed, but the price tag is more than US\$1 billion. The economy has grown, and revenues have increased, but so have your expenditures on the construction of schools, public housing, and wastewater plants. Decentralization and fiscal autonomy have given you greater expenditure responsibilities but without corresponding fiscal devolution from the national government.

When you attempt to raise the bus tariff, you face protests by people dissatisfied with poor bus service. And in reality, raising tariffs or taxes would be politically risky in light of next year's election.

This is a story typical of many rapidly growing cities, underscoring the enormous challenge of urban transit that city leaders must tackle. There is no panacea to fix these problems overnight—but there is a solution. A few cities in the world have successfully mobilized funds to develop their transit systems by capturing incremental land values attributed to transit investment. These land value capture schemes were used not only to raise the funds to construct transit but also to develop more sustainable urban spaces by exploring the synergy between land value capture and transit-oriented development.

The underlying principle of land value capture is to jointly create value from transit-oriented development and to share this with all stakeholders. Adapting a land value capture scheme requires considerable effort from governments, transit agencies, investors, and communities, but it also

provides a great opportunity. With robust economic growth and increasing populations, the conditions are favorable for undertaking land value capture in many rapidly growing cities in developing countries, particularly middle-income countries.

This book aims to support these cities in adapting land value capture schemes to construct and operate a transit system that promotes sustainable spatial development. It presents the key conditions and enabling factors—such as vision, strategy, policies, financing methods, and institutional and legal framework—and specific land value capture techniques based on the experiences of Tokyo; Hong Kong SAR, China; and other cities worldwide that have benefited from incorporating these schemes into their development plans.

Should you let cars dominate your cities and towns, preventing citizens from reaping the benefits of urbanization? Or should you take the initiative to reclaim them by unlocking the value of land? The choice is clear. We believe that unsustainable development trajectories caused by rapid motorization can be reversed—and we are committed to supporting your efforts to pursue inclusive and sustainable urban development through transit-oriented development.

- **Developed World Case Studies**
- **Developing World Case Studies**

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Overview

Cities in developing countries are experiencing unprecedented growth. But this is often accompanied by the negative impacts of car-dependent urbanization such as congestion, air pollution, greenhouse gas emissions, inefficient use of energy and time, and social inequality of accessibility. The World Bank's *Transforming Cities with Transit: Transit and Land-Use Integration for Sustainable Urban Development* (Suzuki, Cervero, and Luchi 2013) concluded that compact, mixed-use, pedestrian-friendly development organized around a transit station is one of the most effective strategic initiatives to address the negative effects of motorization.

Despite increasing recognition of transit-oriented development as an effective strategic approach for sustainable urban development, most cities, particularly those in developing countries, do not have the practical know-how and expertise to make transit-oriented development happen. Because these cities are almost always under a severe fiscal constraint, they face great challenges in financing capital-intensive mass transit systems to reverse car-dependent urbanization. Development-based land value capture (LVC) in Hong Kong SAR, China; Tokyo; New York; Washington, DC; and London allows these cities not only to generate funds for transit investment and operation and maintenance but also to promote sustainable urban development. If adapted well to local contexts, such schemes have great potential to become an effective finance and planning apparatus for cities in developing countries.

Many rapidly growing cities in developing countries, particularly those in emerging middle-income countries, are endowed with macro conditions for development-based LVC schemes. Strong economic growth, rising real incomes, increasing motorization, and congestion all cause land values to appreciate near transit stations or corridors. And some forward-looking cities in middle-income countries such as Nanchang, Delhi, and Hyderabad are adapting development-based LVC for their metro systems. But the majority of cities in developing countries have not yet fully explored these

favorable conditions to adapt locally-specific development-based LVC schemes. Why? Because they lack a consistent vision, strategy, and policy. They also lack legal and institutional frameworks. And they lack technical expertise, capacity, and experience. This book can help them fill these gaps and adapt their own development-based LVC scheme as a strategic apparatus for urban finance and planning.

Car-Dependent Urban Development in the Developing World

The 21st is the century of cities. More than half the world's people, or 54 percent of the world's population (UN Department of Economic and Social Affairs 2014), reside in urban areas, and 7 of every 10 people will live in cities by 2050, with about 90 percent of the growth in developing countries (UN-Habitat 2013). Cities globally generate about 75 percent of gross domestic product. But urbanization also bears social, economic, and environmental costs. Cities consume about 67 percent of energy and produce about 70 percent of greenhouse gas emissions. And the problems of car-dependent urban development—congestion, air pollution, greenhouse gas emissions, lengthy commutes, and social inequality in accessibility—have been increasing in rapidly growing cities in developing countries. Enrique Peñalosa, former mayor of Bogotá, said (in 2005), “Transport differs from other problems developing societies face, because it gets worse rather than better with economic development.” As wealth increases, people shift from walking to bicycling, and then from bicycling to riding motorbikes and to driving cars. By 2050, China is projected to have 900 million cars, or more than the number in the world today (Fulton and Cazzola 2008).

Recognizing the problems of car-dependent urbanization, many cities in developing countries have started to invest in metrorail, light rail, bus rapid transit, and commuter and heavy rail transit. But these systems are extremely intensive in capital. Beyond the upfront construction costs, operation and maintenance also require substantial cross-subsidies from other revenue sources because fare revenues in most cities are insufficient (Murakami 2012). Such operational deficits are due in large part to the weak integration of transit infrastructure with urban development. And suitable development schemes are often unavailable for transit and planning agencies in developing countries (Suzuki, Cervero, and Iuchi 2013).

These constraints have stimulated interest in development-based LVC for transit financing and sustainable urban development. Indeed, Hong Kong SAR, China; Tokyo; Osaka; and Singapore have been using it to finance transit costs and promote sustainable urban development.

Development-Based Land Value Capture as a Strategic Apparatus for Transit Financing and Urban Planning

The notion of land value capture is to “mobilize for the benefit of the community at large some or all of the land value increments (unearned income)

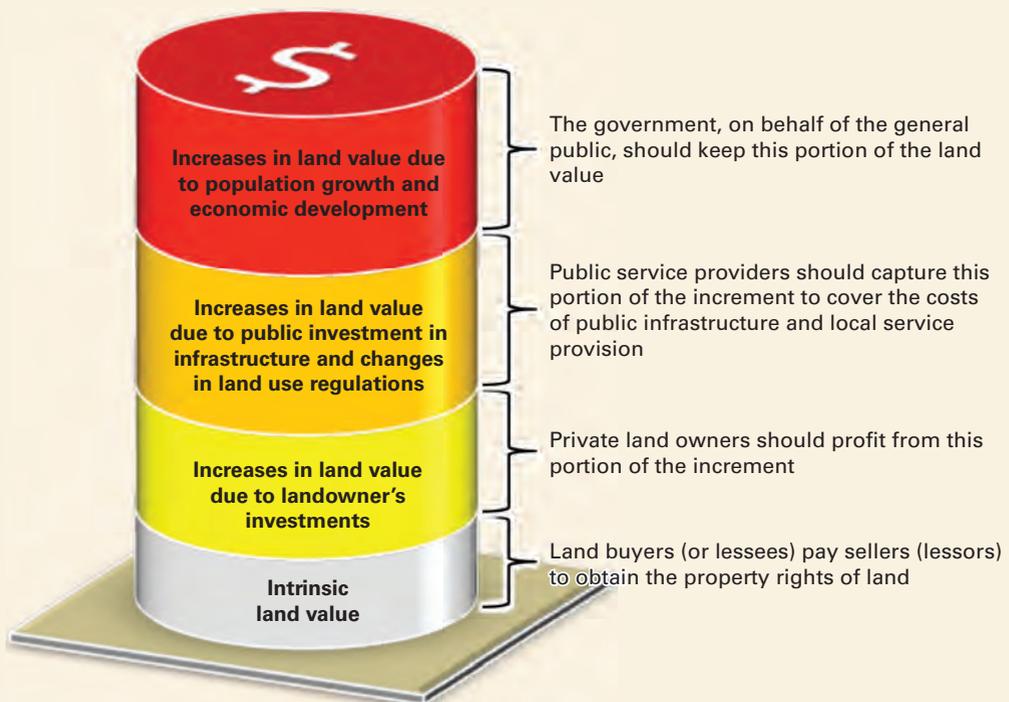
generated by actions other than the landowner's such as public investments in infrastructure or administrative changes in land use norms and regulations" (Smolka 2013) (figure O.1).

Unlike taxes and fees, development-based instruments capture land value increments by selling or leasing land, development rights, and air rights. Under such schemes, governments, transit agencies, developers, and landowners jointly increase land values by exploring development opportunities of transit station areas and sharing increments in land values.

Development-based LVC has the following advantages over taxes and fees in financing transit and transit-oriented development related investments (table O.1):

- It has greater potential to finance capital-intensive transit and transit-oriented development related investments without significant fiscal distortion or public opposition to additional taxes or fees.
- It can generate not only direct revenues from incremental land value increases attributed to transit investments but also more sustainable long-term revenues from higher transit ridership and retail shops, leisure facilities, parking, and residential buildings in the precinct of station areas.

Figure O.1 Land values and their attribution



Source: Adapted from Hong and Brubaker 2010.

Table O.1 Selected land value capture instruments

	Instrument	Description
Tax- or fee-based	Property and land tax	Tax levied on estimated value of land or land and buildings combined, with revenues usually going into budgets for general purposes.
	Betterment charges and special assessments	Surtaxes imposed by governments on estimated benefits created by public investments, requiring property owners who benefit directly from public investments to pay for their costs.
	Tax increment financing	A surtax on properties within an area that will be redeveloped by public investment financed by municipal bonds against the expected increase in property taxes. Mainly used in the United States.
Development-based	Land sale or lease	Governments sell developers land or its development rights, whose values have increased thanks to a public investment or regulatory change, in return for an up-front payment, leasehold charge, or annual land rent payments through the term of the lease.
	Joint development	A well-coordinated development of transit station facilities and adjacent private properties between transit agencies and developers, where the latter usually contribute physically or financially to the construction of the station facilities, as their property value will increase thanks to the transit investment. Used in Japan, the United States, and other countries.
	Air rights sale	Governments sell development rights extended beyond the limits specified in land use regulations (such as floor area ratios [FARs]) or created by regulatory changes to raise funds to finance public infrastructure and services.
	Land readjustment	Landowners pool their land and contribute a portion of their land for sale to raise funds and partially defray public infrastructure development costs.
	Urban redevelopment schemes	Landowners and a developer establish a cooperative entity to consolidate piecemeal land parcels into a single site that they then develop (such as a high-rise mixed-use building) with new access roads and public open spaces. The local government modifies zoning codes and increases maximum FARs in the targeted redevelopment areas (typically around rail transit stations) and finances the infrastructure. Mainly used in Japan.

- It involves transacting land rights, development rights, or air rights whose values have increased due to public investment or regulatory changes. It establishes a clear link between creating value and capturing value. In addition, the increment in land value is calculated using a method agreed by stakeholder consensus. By contrast, taxpayers often contest the coverage and amount of taxes or fees because the definition of benefits created by public intervention is often vague, the accuracy of the estimated incremental value is often challenged, and the calculation methods are not well defined.
- It has a much better chance of working well administratively in places with an inadequate property tax system (outdated cadasters, weak capacity for assessing value), as in most cities in developing countries.

Governments can explore development-based LVC not only as a financing instrument but also as an urban planning and public policy instrument to promote economic competitiveness, environmental sustainability, and social equity:

- By changing land use regulations, such as allocating higher floor area ratios (FARs) and converting land from single to mixed use, governments can increase densities in station areas for diverse uses while increasing revenues.
- By using proceeds for investments in station areas (such as parks, street lights, bike lanes, and pedestrian sidewalks), governments, transit agencies, developers, and communities can jointly develop efficient, attractive, and safe public places, further increasing property values.
- By providing bonus FARs or other regulatory incentives, governments can require developers to include social facilities and affordable housing in exchange for the additional rights.

This is not to deny the usefulness of tax- or fee-based schemes, which have their own advantages. For instance, the revenues from property taxes can be sustainable because their collection does not deplete finite land resources. Nor does adopting one category of LVC preclude adopting another. Taking into account the different objectives, the regulatory and administrative feasibility, and the political acceptability of public infrastructure finance, these different instruments can be applied separately or jointly in ways that suit the conditions of countries and cities.

Global Good Practices for Development-Based LVC

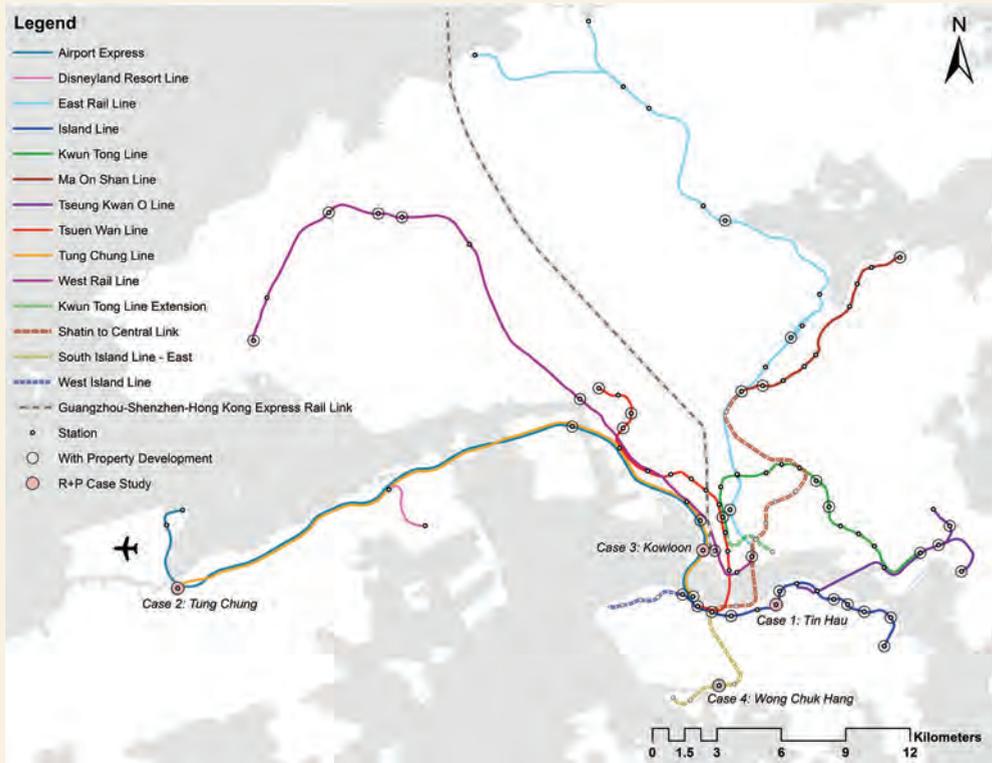
Two global cities in Asia—Hong Kong SAR, China, and Tokyo—provide cases of successful large-scale development-based LVC as a strategic apparatus for sustainable urban finance and development. They have been applying development-based LVC not only to recoup the costs of mass transit construction, operation, and maintenance but also to support transit-oriented development for sustainable urban development.

Hong Kong SAR, China's, R+P Program

Hong Kong SAR, China, is one of few global cities whose rail transit sustains the world's densest urban form productively. The 218-kilometer mass transit railway (MTR) network consists of 10 railway lines with 84 stations serving Hong Kong Island, Kowloon, and the New Territories, with more than 4 million passenger trips a day. Due to the high ridership, MTR generated a net operating profit of HK\$6.694 billion (US\$869 million) from its transit operation and achieved farebox recovery of 185.5 percent for 2012. This financial success is thanks to the Rail Plus Property (R+P) program implemented by the MTR Corporation (map O.1).

Under the R+P program, the Hong Kong SAR, China, government gives exclusive property development rights of government-owned land at a “before-rail” market price. MTR then captures the land value increment created by R+P, such as accessibility and agglomeration benefits thanks to transit and transit-oriented development related investments, by partnering with private developers in developing the land and selling the completed

Map O.1 Hong Kong SAR, China: MTR's operating network and future lines with property developments



Source: Based on Hong Kong SAR, China, Mass Transit Railway (MTR) route maps and other maps.

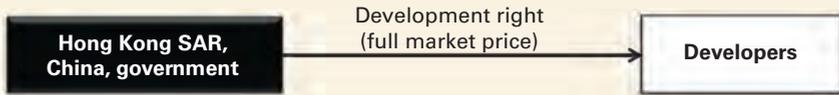
Note: R+P = Rail Plus Property.

development at an “after-rail” market price. It recoups the capital, operating, and maintenance costs of railway projects through sharing profits (figure O.2). R+P also allows MTR to integrate different phases of rail and property development projects, ensuring smooth project implementation and reducing transaction costs.

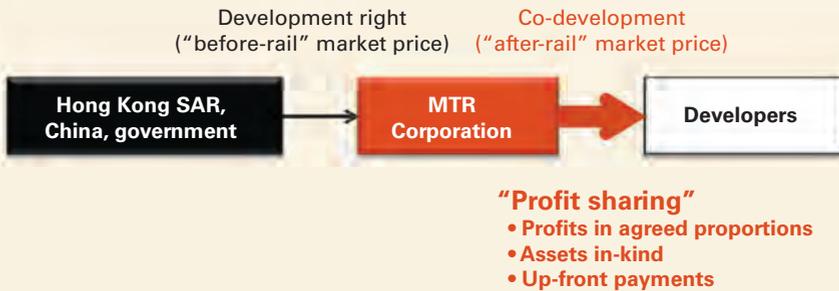
From 2000 to 2012, property development produced 38 percent of MTR’s corporate income, related businesses (such as commercial and property lease and management business) 28 percent, and transit operations 34 percent. From 1980 to 2005, the government received US\$18 billion equivalent in net financial returns, with earned income from land premiums, market capitalization, shareholder cash dividends, and initial public offer proceeds of US\$22.2 billion equivalent, minus the equity capital injected of US\$4.2 billion equivalent. Although MTR is entitled to capture land value increments, its financial benefits are distributed to the government through dividends and appreciation of the value of its shareholding. MTR also contributes to sustainable urban development and economic development by providing efficient transit services and high quality property development.

Figure O.2 Hong Kong SAR, China's, land value capture mechanism: Relationships among the Hong Kong SAR, China, government; MTR Corporation; and developers

a. Usual government land leasing program



b. Rail Plus Property (R+P) program



Source: Based on Cervero and Murakami 2009.
Note: MTR = mass transit railway.

The following key principles ensure the program's effectiveness:

- Master plans and policy documents consistently state the importance of an MTR network as a "backbone" of urban and regional development, particularly during a rapid growth period.
- A public leasehold system controls urban land supply, attracts private resources, and ensures public interests around new railway corridors.
- The Comprehensive Development Area zoning sets special FARs around key stations to attract private investment to strategic locations, while providing flexibility for private developers to negotiate and design.
- Property development rights are exclusively granted at a pre-rail market price for a business-oriented rail corporation to cover the capital and running costs of a rail project and to master multiple functions and phases of rail and property development at lower transaction costs.
- The granting of development rights starts with small parcels above stations or depots primarily to generate project revenue and later evolves into large-scale, high-quality new towns, iconic business centers, and local community hubs.
- Private developers cover land premiums and bear project risks for higher financial returns, whereas the government and rail corporation (to some degree) are protected from market and development risks.
- The rules for sharing costs and profits among public agencies, the railway corporation, and private developers are clear and sound, easing project uncertainties and public opposition.

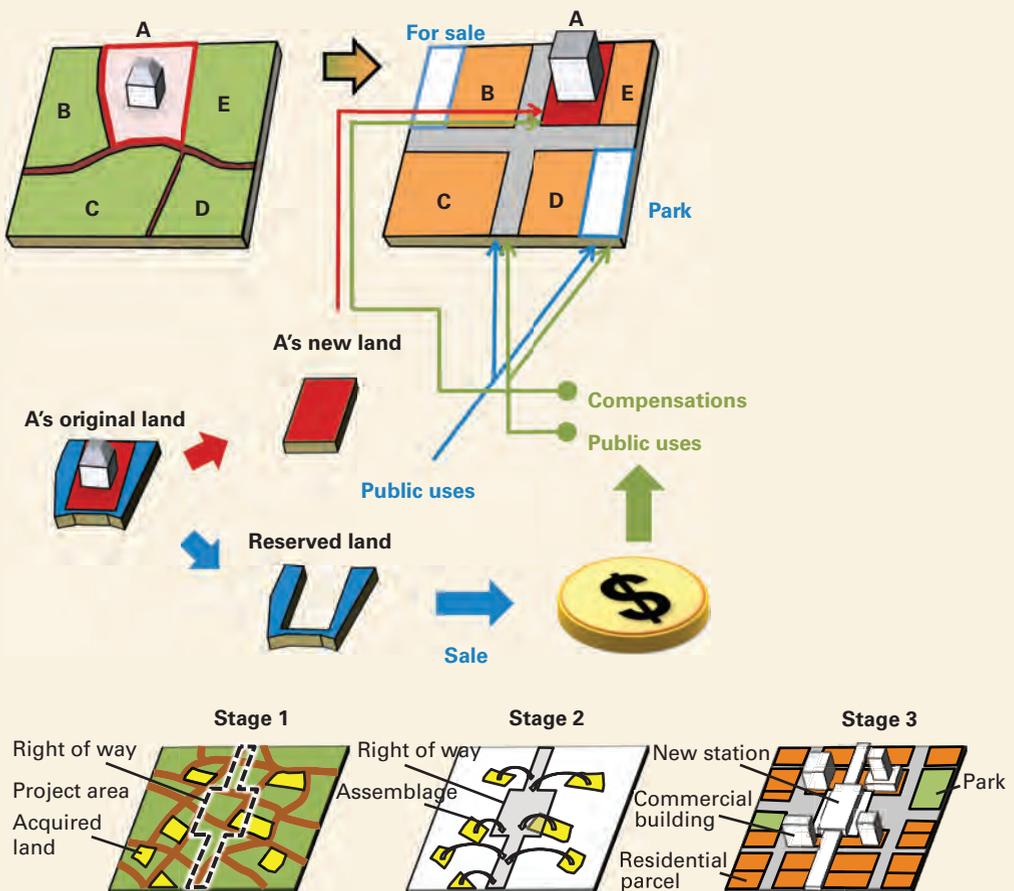
experiences in applying development-based LVC to finance railway investments with the revenues from real estate development. Unlike Hong Kong SAR, China's, state leasehold system, Tokyo's schemes operate under a market freehold system.

Land readjustment is mainly used on urban fringes, and urban redevelopment schemes in built-up areas especially, where property rights are fragmented (boxes O.1 and O.2). Both instruments, however, require either

Box O.1 Integrated land readjustment for Tsukuba Express

Under the Housing-Railway Integration Law, municipal governments and housing agencies can designate special land readjustment areas along future railway lines. In this scheme, several landowners within the designated areas give up and reserve percentages of their land for public uses, including the transit facilities or land sales to generate funds for public investments (figure BO.1.1). The economic rationale is that although the original landowners receive smaller land parcels, these parcels would have higher land values thanks to a new station and other local infrastructure and service provision. Railway companies can smoothly acquire the rights of way for their transit investment and promote transit-supportive housing developments through the land readjustment practices.

Figure BO.1.1 Integrated land readjustment



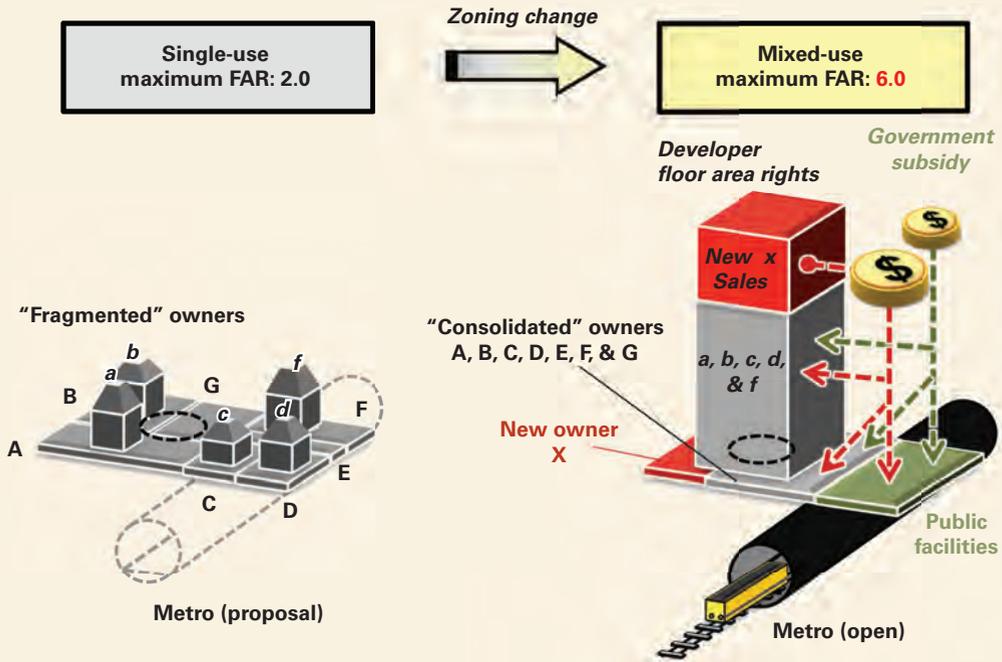
Source: Adapted from the Chiba Prefectural Government 2009.

strong community ties or sufficient economic incentives. The consent of all landowners is typically sought, though the laws allow project agencies to implement schemes once they secure the consent of more than two-thirds of landowners.

Box O.2 Inclusive urban redevelopment scheme, Japan

Under the Urban Redevelopment Law, landholders, tenants, and developers can create development opportunities in built-up areas, typically where a transit station exists or has newly opened. To capture the potential accessibility benefits conferred by the transit station, the local government first converts zoning codes from single use to mixed use with higher floor area ratios (figure BO.2.1).

Figure BO.2.1 Inclusive urban redevelopment scheme, Japan (hypothetical)



Source: Adapted from Ministry of Land, Infrastructure, Transport, and Tourism 2013.
 Note: FAR = floor area ratio.

Before the urban redevelopment project, the site consisted of several small parcels owned by individual landowners and occupied with different tenants. Most houses are one- or two-story structures because each parcel is too small to replace the old building with a taller building, and the landowners do not have the capital or expertise to do so. This urban redevelopment project consists of construction of a taller, higher-quality building on land prepared by assembling small parcels; construction of an underground metro station; and provision of public infrastructure (such as wider roads, a station plaza, and amenities). The national government finances a third of site survey, land assembly, and open space foundation costs, using the national general budget, and half the public infrastructure costs using the roadway special fund. Through this process, the original landholders and building

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Box O.2 Inclusive urban redevelopment scheme, Japan *(continued)*

owners are entitled to keep the property rights of floor spaces in the new building that are valued as equal to their original property (though sometimes one developer will purchase all the property rights from the original owners to accelerate the redevelopment). The “surplus” floor area permitted by the municipal government is sold to new property owners to substantially cover the costs of land assembly, new building(s), and public facilities within the district.

Table BO.2.1 presents respective stakeholder’s contribution to the land value and their benefit received through the urban redevelopment undertaking.

Table BO.2.1 Stakeholder contributions and benefits

Stakeholders	Contribution	Benefit
Landholders (A, B, C, D, E, F, & G)	Land parcel for the new building	Joint ownership of land for the new building (sections A, B, C, D, E, F, & G) with higher access and better local infrastructure and service provision
Building owners (a, b, c, d, & f)	Old buildings and housing units	Ownership of the new building (sections a, b, c, d, & f) with higher access and better local infrastructure and service provision
Developer	Capital and property development expertise	Profit from section X & from surplus FAR
Transit agency	Construction of transit station	Transit-supportive environment/increased ridership
National government	Subsidies for land assemblage and road construction	Save road and other public infrastructure construction costs
Local government	Change in zoning code (from single use to mixed use with higher FAR)	Yields higher property tax revenue; promotes local economic development; builds townships resilient to natural disasters

Note: FAR = floor area ratio.

The world’s largest metropolis has adapted LVC to match the variety of stakeholders, locations, time periods, and scales over the world’s most expansive railway network. Tokyo’s rich transit-oriented experiences offer the following lessons:

- The national government’s master plan leads to polycentric regional development and railway extension strategies, even though multiple public, private, and semi-private entities use different development approaches and LVC techniques in the same metropolitan area. All stakeholders need to share a clear vision and take collective actions.
- Both the land readjustment and urban redevelopment schemes require a consensus building that is often very thorough and time-consuming. And smooth implementation relies on traditional social ties and adequate economic incentives. The power of eminent domain can help practitioners speed land assembly, but careless application could generate long-lasting social tensions and feelings of mistrust.
- Entrepreneurial railway agencies should also acquire expertise not only for conventional system engineering but also for real estate

investment, town planning, and marketing to set appropriate development parameters, analyze market profiles, offer multiple services, and maximize value increments in their station properties and wider catchment areas. Essentially, railway agencies need to be entitled to keep the long-term ownership and stewardship of properties to generate recurring revenues from both development and service activities around stations.

- The rights of way for a new railway line can be assembled cost-efficiently by railway agencies and local governments through land readjustment projects, especially in areas where local residents are waiting for new railway access. This approach can promote property development along the new line to achieve targeted ridership and fare revenues.
- Major landholders or developers in a designated district can foster land readjustment projects. With their real estate knowledge and resources, they are more likely to invest in local infrastructure, take strong initiatives in planning, and maximize the value of their land around a new station.
- To create high-quality built environments around a station, substantial density bonuses should be provided. Private transit agencies and developers are encouraged to supply social infrastructure and services, maximize synergies, and mitigate redistributive impacts through inclusive urban redevelopment. They can provide human-scale built environments within the superblocks already constructed in many developing countries.

Tokyo's multiple techniques provide lessons for the rapidly growing cities of developing countries.

Critical Factors for Success in Developing Countries

Case studies of cities that have creatively pursued development-based LVC to finance transit and transit-oriented development in both developed and developing countries highlight the unique contexts and challenges of creating and sharing land values for transit financing and transit-oriented development. The insights from these experiences point to policy recommendations and implementation measures that deserve careful consideration at different levels of strategic decisions. They also highlight policy decisions, planning exercises, and project development in applying development-based LVC in developing countries.

Key Findings

Inclusive Value Creation

The rationale behind development-based LVC is creating and sharing incremental value among the governments, transit agencies, developers, businesses, and residents in and around stations. This obviously differs from tax- or fee-based capturing of "windfalls" from private property owners,

as practiced in North America and other parts of the world. The Japanese expression of development-based LVC (“開発利益還元”) literally means “returning profit generated by development,” rather than having the government or transit company unilaterally capture the land value increments from landowners or developers. Development-based LVC is designed and implemented around the incentives of various stakeholders. This shared interest facilitates various complex property development processes such as acquiring land and authorizing land use change and zoning codes. Unlike most tax- or fee-based LVC instruments, evaluating increment value in development-based LVC is not a unilateral decision by municipalities. The land price is agreed on by all parties up-front based on market trends, and the distribution of profit is decided through negotiations, based on the contribution of each stakeholder.

Public Land Ownership Is Important but not Absolutely Necessary

Development-based LVC is a value creation exercise rather than a simple sale of public land or lease of land use rights. Even under a market freehold system, municipalities and transit agencies that do not own land can acquire land through incentive-based techniques such as “land readjustment” or “urban redevelopment,” as applied in Tokyo. These can generate land values exceeding the land purchase costs by exploring undeveloped economic opportunities through densification, transit, and other transit-supportive investments. New York City and São Paulo are also exploring vertical development opportunities by leveraging air rights of the lands owned by private landowners in densely built-up districts (box O.3).

Box O.3 Air rights sales in São Paulo

Brazil is a pioneer in air rights sales, but these sales have rarely been adapted to finance transit or transit-oriented development related investments in São Paulo.

In Brazil, a private landowner cannot freely develop air rights above a certain floor area ratio (usually between 1.0 and 2.0 in São Paulo) without paying for the costs of the impact of the air rights use. The logic behind selling air rights is that owners should contribute to infrastructure construction costs in proportion to the volume of their air rights use, as higher densities require additional infrastructure investments. Certificates of Additional Construction Potential (CEPACs) are sold by auction as a tradable financial security, and they are applicable only to designated urban districts, with the revenues to finance predetermined urban infrastructure. Through the issue of CEPACs, municipalities can raise infrastructure investment funds by selling the bearer additional building rights—such as a larger floor area ratio and possible land use changes—that would induce private investments to adjust to the transformations desired in urban development policy.

São Paulo’s highly indebted financial position forced city authorities to generate funds for infrastructure without increasing debt. Unlike many cities in developing countries, São Paulo cannot raise revenue by selling land because it possesses little developable land. So, air rights sales are one of a few possible measures for São Paulo to raise funds for infrastructure investments. By auctioning CEPACs, the city can allocate limited air rights according to market needs at a price to be fixed by market demand.

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Box O.3 Air rights sales in São Paulo *(continued)*

Except for a few minor investments, CEPAC revenues have not been used for metro construction. Nor have allocations of CEPACs been linked to railway station areas. So, CEPACs have not always captured the increments of land value attributable to metro construction. Further, the state government and the city government are not controlled by the same political party, making coordination between transit agencies and the urban planning department difficult. Even in the same transport sector, railway transit companies owned by the São Paulo State and bus companies owned by the municipality seem to compete rather than collaborate. Due to lack of coordination between transit agencies and city planning bureaus as well as agencies' railway-centered engineering approaches, transit agencies often miss out on great opportunities to explore the use of air rights above stations to generate revenues. Given the tight budget situation and legal restrictions, metro company engineers tend to design metro stations according to minimum structural specifications requiring the least investment costs. But these developments cannot support the type of multipurpose use terminal building that could generate sizable lease revenues and increase transit ridership.

Although São Paulo currently faces these planning and institutional challenges, there is great potential to adapt development-based LVC for transit investment and to shape urban form and develop articulated densities suitable for future transit-oriented development. This approach has already been adapted in the "Linha Verde" (Green Line) Urban Operation in Curitiba, where a major national highway was converted into an urban avenue with the extension of a bus rapid transit green line and higher density land uses. CEPAC revenues partially financed the investment costs of this transit-oriented development project (Smolka 2013). In São Paulo, the Metro has already started to study the possibility of using air rights sales to finance new metro construction in the Vila Sonia Urban Consortia (Fróes and Rebelo 2006).

In addition, São Paulo's city planners are now considering to reduce the overcrowded commuting movement between suburbs and city centers by developing subdevelopment centers to balance business and residential densities across the city area (Região da Jacu-Pêssego as a new commercial center and Região da Cupecê for both commercial and residential use), based on the transit-oriented development concept where developable lands are still available. As the demand for good quality housing at the mid-market segment is very high because of rapid household income increase in Brazil, land prices close to transit stations could increase due to good accessibility and connectivity. If the municipal government and transit agencies collaborate and coordinate with investors and developers, as their counterparts in Hong Kong SAR, China, and Tokyo have been doing, they would be able to raise revenues to recoup a portion of the transit and other transit-oriented development related investment costs.

For cities with a state leasehold system, strategic public land use is imperative for successful development-based LVC implementation. Public land is a finite resource in cities—especially growing ones—and would be hastily exhausted if municipalities sold it for short-term cash flow. Municipalities as landholders must therefore strategically manage limited public land, taking into account long-term development benefits. The Hong Kong SAR, China, MTR captures the land value increment created by R+P not by selling the development rights, but by partnering with private developers, selling the completed property units, and finally capturing the value through the sharing of profits. In this sense, regardless of the differences between the respective landholding systems, both the Hong Kong SAR, China, MTR and the Japanese railway companies have been undertaking development-based LVC, based on creating and sharing value.

Sound Planning Principles

Revenue maximization is important because developable land is scarce in rapidly growing cities, but development-based LVC should be based on sound planning principles that increase the benefit of society as a whole. If these schemes are co-opted by cities to simply raise money, and not to try to plan cities sustainably, they may “distort the purposes of planning by putting the focus on benefits extracted from developers rather than on the actual needs of new residents and businesses” (Rahenkamp 2013). In this context, policymakers and practitioners should design development-based LVC so that the transaction generates land value increments that benefit society to the greatest extent possible (box O.4). In a different context, the unintended negative impact of São Paulo’s planning regulation on free FAR limit (between 1.0 and 2.0), combined with its air rights sales on its spatial development pattern (urban sprawl and shortage of affordable housing stocks in the city center), should be carefully analyzed. So should the impact of Hong Kong SAR, China’s, land lease policy on the affordability of local housing.

Enabling Factors

Macro Fundamentals

Demographic and economic fundamentals are paramount when applying development-based LVC. Generally, it works well when rapid urban population and strong economic growth create high demand for land and property prices increase. But even under slow economic growth, municipalities and transit agencies can adapt it to maximize accessibility and agglomeration premiums around selected station areas where the economic potential has not yet been fully realized due to inadequate land uses and outdated zoning codes.

The emergence of middle-income households—and high housing demand—can justify large-scale investment in rail extensions to suburbs

Box O.4 Development rights leases in Nanchang, China

Chinese cities have long converted rural agricultural land to urban land equipped with infrastructure and then leased the development rights for a premium. And as in many other Chinese cities, revenues from development rights leases are the major public finance source of infrastructure investments in Nanchang. But Nanchang, one of several forward-looking Chinese cities, is using development-based LVC schemes to promote transit-oriented development by creating articulated densities around major metro station areas. The idea is to maximize development rights lease revenues to recoup new metro investment costs by promoting efficient land use around stations through zoning changes for mixed use with higher floor area ratios—and to promote sustainable urban development through transit-oriented development.

Nanchang’s practice is more sustainable than the typical rural-urban land conversion, which runs the risk of unnecessarily expanding cities outward, leading to urban sprawl. As this scheme has not yet been fully implemented, it is still too early to know whether it will generate the desired financial and urban development outcomes. But if successful, Nanchang’s scheme could provide a good model for other Chinese cities.

and generate up-front value increments along new corridors. The metro corporations in Nanchang and Hyderabad are taking advantage of their growth, as Japanese private railways exercised development-based LVC for the initial infrastructure investments in the 1960s and Hong Kong SAR, China's, MTR Corporation in the 1980s.

Both Tokyo and Hong Kong SAR, China, could generate steady recurring revenues, even during periods of slow economic growth, since their instruments were well positioned for long-term development benefits rather than short-term financial gain. Tokyo's development-based LVCs are still being undertaken, thanks to market demand to consolidate land parcels for redevelopment and regenerate property values in selected strategic built-up areas with high economic potential.

Economic restructuring from low-cost manufacturing to knowledge- and service-based industries, as in Nanchang and Hyderabad, also provides greater opportunities to capture accessibility and agglomeration benefits around stations, where firms and workers can explore value-added business opportunities through agglomeration. Indeed, the competitive advantage of international and regional businesses in Tokyo, New York, and London has shifted toward central locations thanks to recent urban regeneration programs, taking advantage of strong infrastructure reinvestments, land use deregulation, and tax incentives.

Visionary Master Plans

A master plan needs to provide a long-term vision of development shared among all members of a city. Policymakers must emphasize transit infrastructure as the spine of spatial development strategies in their visionary plans, helping guide planning, funding, construction, and operations in a way that supports transit. This long-term development vision should be consistently reflected in other planning instruments such as diverse sector plans and local master plans.

Master plans from the past decades of global good practice cities clearly identified rail transit systems as the backbone of urban development. Hong Kong SAR, China's, territorial development strategies in the 1980s and 1990s anticipated growth areas along with a series of MTR extensions. Tokyo's latest national capital region master plan also stresses the formation of business cores and nine satellite centers that are well served by multiple rail lines. Nanchang's comprehensive development plan considers the metro railway system redirecting industrial and housing development from the old center to newly planned areas on a metropolitan scale. The location of key corridors and nodes for future development should be specified based on this vision, taking into account the feasibility of transit investment, market demand, and availability of developable land.

To formulate and revise master plans in a pragmatic way, national governments, metropolitan bodies, and city authorities need to invite multi-level stakeholders and cross-sectoral professionals to come together to share key information and address mutual interests. The National Capital

Region Plan of Tokyo has long coordinated potential development areas and authorized specific transit projects among multiple local governments and railway corporations. By contrast, the master plan of Delhi as the national capital region has been unable to resolve many conflicting bureaucratic interests and unfavorable land use regulations, which significantly blocks development-based LVC practices for the new metro system.

Master plans should not be too prescriptive. Development parameters depend on diverse site conditions and changing market demands, though transit-oriented development in general has a certain set of design principles. The overly standard and impractical criteria stipulated in the master plans of Delhi (maximum FAR of 1.0 at metro stations) have reduced or completely negated the opportunities for developers to coordinate better layout plans and maximize accessibility to their real estate.

In addition to the metropolitan master plans, there are various sector or local master plans across government departments and agencies. Such sub-plans must be consistent vertically among national, metropolitan, and local governments—and horizontally among departments of urban planning, land administration, transport, economic development, and housing—all under one consistent vision. For example, new transit investments cannot create enough ridership and associated land value if subplans encourage public spending on massive roadway systems and automobile-dependent housing development. In Hong Kong SAR, China, and Tokyo, transit-supportive policies and investment have been endorsed throughout a subset of sector plans or local master plans.

Flexible Zoning

Development-based LVC facilitates negotiations among planning authorities, transit companies, developers, landowners, and local stakeholders for mutual interests and benefits. So zoning codes and site design parameters around stations should be flexible enough to meet changing market demands and diverse local needs.

Zoning systems can provide flexible and negotiable codes with minimum standards to target station areas, allowing transit companies and developers to adjust site-design parameters. In Hong Kong SAR, China, Comprehensive Development Areas have been designated around key stations as set out in the MTR Corporation's Master Layout Plan to coordinate more complex, integrated mixed-use development packages and to flexibly exercise the financially viable R+P program. Tokyo's urban regeneration districts were designated to attract private real estate investments with generously relaxed development codes around the former rail yard sites (maximum FAR over 10.0, height deregulation, and expedited approvals).

In many developing countries, outdated land use plans or inconsistent regulations enforced by planning and statutory authorities deter transit agencies and real estate companies from exploring development opportunities in and around stations. For example, the Delhi Development Authority has strictly fixed maximum building coverage at 25 percent, with a FAR of

1.0 for any development activities at metro station areas. But under the new draft master plan (MPD-2021), it is proposing to allocate a higher FAR in the metro influence zones outside metro station sites. One official justification for the strict development regulations in Delhi is that increasing the maximum FAR around stations generates additional trips and exacerbates traffic congestion. But newly attracted travelers are more likely to choose transit and nonmotorized travel modes in origins and destinations near stations. Indeed, the most typical issue preventing flexible land use is the conflict of development interests inside and outside station areas.

Relaxing development regulations around stations alone does not ensure transit-supportive land use. To achieve this, municipalities and transit agencies need to coordinate the physical integration of rail station facilities with private property development and surrounding neighborhoods. Such integration can enhance a transit's accessibility and produce greater revenues from both transit farebox collections and development-based LVC schemes. In Delhi, nevertheless, a residential condominium project undertaken by a private developer along the metro depot is filled predominately with luxury 3–5 bedroom units having about four parking spaces per household. This can be regarded as transit-adjacent development rather than transit-oriented development (box O.5).

Box O.5 Government-led development-based land value capture for India's first metro system in Delhi

The Delhi Metro Rail Corporation (DMRC) is India's first metro system, extending over 190 kilometers with 144 stations. It has enjoyed very strong political and financial support from the national government, which leased land owned by various ministries and public agencies to DMRC for metro construction over a 99-year period at an intergovernmental transfer rate lower than the market rate. The government provided the land for property development to finance 11 percent of the construction costs of the first two phases. The government also provided the remaining financing, including budgetary support, together with the Delhi government, and secured yen loans from the Japan International Cooperation Agency by providing a sovereign guarantee. DMRC reports only to the Ministry of Urban Development, which coordinates with other relevant ministries and agencies, while DMRC holds all the decision-making power for metro construction and operation.

But Delhi's complex governance and regulatory framework is a direct result of multiple layers of government stakeholders—the national government, Delhi government with three municipalities, and the Delhi Development Authority (DDA; a state enterprise in charge of land management and policies, under the Ministry of Urban Development)—which has adversely affected the implementation of development-based LVC. While the national cabinet mandated DMRC to carry out property development projects to finance its construction cost, DMRC had difficulty obtaining development approval from different authorities such as DDA and the municipal government for the floor area ratio modification, the land use change for property development, and the construction permits. Effectively, the decision of the national government is being blocked by lower governments and planning and land management agencies that have statutory approval powers over the change of land use or construction permit. While DDA approved the land use for the right of way, it often rejected DMRC's applications for the land use change for property development.

Multiple Funding Sources

Development-based LVC should not be regarded as a single funding source to fill any funding gaps. In theory, the primary funding source for transit systems must be the fare revenue that can be increased by adopting transit-oriented development principles around stations. But few transit agencies in the world can cover even their operation and maintenance costs with fare revenues alone. The capital intensity of transit investment further increases the financing challenges for municipalities and transit agencies. Given the broader economic, environmental, and social roles of transit systems, including a range of externalities and social benefits, governments should help transit agencies close their financial gaps by mobilizing diverse funding sources.

Development-based LVC accounts for a substantial portion of transit finance in Hong Kong SAR, China, and Tokyo. But it should not be considered as a single financing source to cover expensive transit costs. As transport economists have long argued, the primary funding source for transit systems should be fare revenue, which should ideally increase with effective transit-oriented development. Railway finance models in Hong Kong SAR, China; Tokyo; Nanchang; Delhi; and Hyderabad assume that fare revenues will fully cover operation and maintenance costs and partially cover construction costs, primarily thanks to adequate passenger demand driven from their high-density passenger catchment areas. But even in such an exceptionally high-density area as Hong Kong SAR, China, the MTR Corporation sometimes relies on government cash grants when the R+P scheme cannot fill a funding gap, especially because of the scarcity of developable land parcels along new lines.

Land prices by their nature are volatile in response to changing economic and political climates, which are beyond the control of local governments or transit agencies. So a variety of alternative funding sources should be available to mitigate the risks of volatile land prices, through diversification of funding sources, and to prepare contingent financing sources in case of lower revenues from development-based LVC. Diversified funding arrangements can ensure the provision of transit infrastructure and services for the long term.

Any special funds run the risk of being captured by special interests—sometimes for economically unjustifiable investment, as with economically nonviable highway construction funded by a road fund. But if designed well, special funds could support governments' planning objectives and address externalities. For example, governments could apply a gasoline tax or automobile charge as strategic funding arrangements to supplement transit and transit-oriented development related investments and discourage automobile use. Tokyo's Roadway Special Fund—comprising earmarked gasoline charges and vehicle registration fees—financed one-third of transit-related bridge and underpass construction to reduce traffic congestion and upgrade station facilities to improve local feeder access, pedestrian circulation, and street amenities, along with the land readjustment and urban redevelopment schemes.

Among several funding sources, property taxes are particularly important for municipal governments, transit agencies, developers, landholders, and commercial entities around stations. Such taxes not only support the provision of infrastructure and services but also determine the distribution of development benefits in and around station facilities. Indeed, the special exemption of property tax for railway development and railway-associated businesses have been debated in Tokyo and Delhi, since railway corporations take advantage of the exemption without considering the redistributive effects of railway and property development in and around stations.

Intergovernmental Collaboration

Development-based LVC requires multiple government entities to work together to deliver innovative transit-related projects and programs, and that is one of the biggest challenges in many cities of developing countries. One recommended approach would be for a single local government body—which includes transit agencies—to coordinate planning, design, land acquisition, construction, operation, and asset management to sustain collaborative relationships and actions.

The culture of transit agencies is traditionally engineering-oriented, with a focus on narrowly defined performance criteria, even though development-based LVC needs expertise and intergovernmental collaboration beyond transit facilities. It is crucial for transport officials to recognize the financial potential and social importance of dealing with land and property around their transit stations. In both Delhi and São Paulo, the national or state transport bureaus have been less involved in adapting development-based LVC due in part to their technical focus, the multiple layers of governments (sometimes controlled by different political parties, as in São Paulo), and the complicated land and development right transfers from one agency to another.

Development-based LVC usually involves a wide range of government agencies to create greater development opportunities, generating conflicts of intergovernmental interests in lands and properties around stations. In many capital cities, such as Delhi and São Paulo, multiple layers of governments have long adopted their own legislative policies and design parameters. Delhi planning authorities and statutory bodies have used their regulatory instruments to block property development projects mandated by their national government around metro stations and to prevent the full exploration of development opportunities the new metro investment could bring.

Trusted political leaders may be able to remove such intergovernmental barriers and regulatory constraints by bringing all stakeholders together. But such a top-down approach might not always work well in democratic cities. In addition to political support, it is important that one government body acts as a coordinator to deal with land-related legislative tasks across agencies. In Hyderabad, a transit agency is a liaison to ensure that a private partner can smoothly obtain land for metro construction and property development by coordinating with several municipalities, traffic and

police departments, and utility agencies for multiple statutory clearances (box O.6).

Entrepreneurship

Transit agencies need to become entrepreneurial as they manage development-based LVC's evolving process from a simple tool of short-term corporate or project finance to a strategic model of long-term urban finance and development—mainstreaming property development and asset management around stations as a part of their businesses. To ensure the sustainability of these property-related businesses, transit companies have to develop a consensus with other stakeholders on the ownership of and responsibilities for land and property management in and around stations.

Development-based LVC was originally an entrepreneurial undertaking in the mid-19th century in the United Kingdom and the United States. Around the turn of the 20th century, a few entrepreneurs in Japanese cities began adapting the classic private railway and land development business model. Since then, more railway corporations have evolved development-based LVC from a simple tool of short-term project finance to a strategic

Box O.6 World's largest public-private metro project in Hyderabad

Hyderabad, the largest historical city of southern India, home of 7 million citizens and prosperous information technology industries, is implementing the world's largest public-private partnership (PPP) for a metro project, extending 77 kilometers and with 66 stations. The PPP project is being implemented in the form of design-build-finance-operate-and-transfer under a 35-year concessionary agreement between Hyderabad Metro Rail Ltd. (HMR) and Larsen and Toubro Limited (L&T; one of the largest contractors and developers in India). HMR is a Special Project Vehicle set up by the state government of Andhra Pradesh to coordinate and manage the project. Through HMR, the state government and the municipality provided L&T with the right-of-way for metro construction and land for property development (109 hectares) close to the metro stations.

L&T will finance most of the metro construction costs (\$2.7 billion) and expects to recover them over a 35-year concession, extendable for 25 years. Revenue sources include fare revenues (50 percent of the total), property development (45 percent of total revenues from 109 hectares of leased land), and a viability gap fund (VGF), which receives subsidies from the national government to fill the financial gap of the PPP project and others. The criterion for selecting the concessioner was the amount of VGF requested by the bidders. L&T, which requested the smallest VGF (\$320 million), won the award. The Hyderabad Metro Project is a unique example of a PPP using development-based LVC as its financing scheme.

Hyderabad's institutional and regulatory framework is less complicated than Delhi's and more straightforward. On the government's side, stakeholders such as the heads of various departments of the government of Andhra Pradesh—including the Chief Secretary, the Commissioner representing Greater Hyderabad Municipal Corporation, and the Managing Director of HMR—sit on the board of HMR. HMR is assuming the role of a one-stop-shop representing the governments vis-à-vis L&T, the PPP concessionaire. This well-coordinated institutional framework ensures that a consistent vision, strategy, and policy facilitates various steps of the project, such as provision of state land, acquisition of land, and permission for land use changes. And the Chief Minister of Andhra Pradesh provides strong leadership and political support.

model of long-term urban finance and development across the Tokyo Metropolitan Area.

Transit agencies are typically established as public sector entities in cities of both developed and developing countries since urban transit on its own is seldom profitable enough. This is due in part to high land acquisition costs and competition with other transport modes, particularly automobiles. Even so, encouraging private entrepreneurship through different degrees of privatization in the provision of transit infrastructure and services could support such a public sector undertaking. In Hong Kong SAR, China, the MTR Corporation is highly entrepreneurial in exercising its R+P program, though the government as a beneficial owner keeps 76.7 percent of the MTR shares issued under the control of the Financial Secretary to ensure broader public interests. The privatization of the Japanese National Railways in 1987 brought a more business-oriented corporate culture and entrepreneurial business model, exemplified by large-scale private redevelopment of rail yard sites near strategic terminal stations.

In the portfolios of entrepreneurial transit agencies or private railway companies, real estate and other related business practices have accounted for more than one-third of their recurring profits over the last decade—38 percent between 2000 and 2012 for Hong Kong SAR, China's, MTR Corporation and 34 percent between 2003 and 2013 for Tokyo's Tokyu Corporation. The diversification of corporate portfolios also reveals that railway companies can be passenger service providers, real estate developers, and town planners through the implementation of development-based LVC in broader urban contexts. Indeed, high-profile railway agencies in progressive cities such as Hong Kong SAR, China; Tokyo; Washington, DC; Nanchang; and Hyderabad have accumulated knowledge by recruiting not only transport engineers, but also real estate experts and urban planners and designers.

The MTR Corporation is an example of an entrepreneurial transit agency with sufficient expertise to propose site-level layout plans in and around stations and control development parameters/design standards that maximize the accessibility benefits conferred by stations on a case-by-case basis. To assure the public interest in the private provision of infrastructure and services, the innovative public-private partnerships (PPPs) in cities of developing countries should clearly specify the obligations of private partners in each of the project phases. In Hong Kong SAR, China, and Tokyo, public requirements are also set up along with market incentives for entrepreneurial private entities to meet local community needs through the exercise of development-based LVC.

Clear, Fair, and Transparent Rules

The underlying principle of development-based LVC as practiced by Hong Kong SAR, China, and Tokyo is the joint creation and sharing of land value increment. Creating development opportunities among voluntary public-private contributors in a collaborative effort can generate additional values

and greater synergies. Thus, it is essential to establish clear and fair rules for sharing costs, benefits, and risks among stakeholders to ensure the long-term commitment of public agencies and private entities to deliver transit projects, promote transit-supportive activities, and maximize benefits in and around stations.

The rationale behind development-based LVC is incremental value creation and sharing among governments, transit agencies, developers, businesses, and residents in and around stations. This obviously differs from tax- or fee-based LVC capturing “windfalls” from private property owners, as practiced in North America and other parts of the world. Tokyo illustrates the need for some voluntary contributions to create greater development opportunities for both the public and private sectors. So, in adapting development-based LVC for local contexts of the developing world, the rules for sharing costs, benefits, and risks must support the collaborative actions of multiple stakeholders.

The rules should be clear. In Hong Kong SAR, China, for example, the MTR Corporation’s R+P model offers three options for benefit sharing to private developers: profits in agreed proportions from the sale or lease of properties, assets in kind, and up-front payments from developers. The case-by-case arrangements are made according to development locations and market conditions, but rules of thumb make it easier for developers to work with the MTR Corporation on more complex and higher risk mixed-use development projects for greater returns on investment around stations. The government has also reaped substantial rewards through the transfers of development rights to the MTR Corporation, which can be shared with multiple departments and agencies for other social welfare programs.

The rules must be fair and transparent. As in Delhi, the land granted exclusively to a transit agency for development-based LVC is likely to produce intergovernmental conflicts of interest in capital cities with complex multilayered governance structures, unless other agencies can also obtain some development benefits in proportion to their resource contribution. To establish a win-win relationship among stakeholders, the innovative PPP scheme in Hyderabad attempts to ensure that the rules for sharing costs, benefits, and risks are adhered to by clearly specifying the obligations of government agencies and a private partner in the concession agreement.

Key Instruments

Policymakers and practitioners need to understand the basic features of various instruments and adopt appropriate combinations of development-based LVC techniques for the landholdings, stakeholders, periods, scales, and localities in their cities. Among the various instruments, land readjustment and urban redevelopment financing schemes—through the inclusive process of land resource allocation and urban planning—are particularly important for cities with a market freehold system.

Cities under a state leasehold system can generally use development rights sales with public requirements, as well as development incentives, to achieve their planning objectives. Cities in developing countries—such as China—have limited experience in property development in conjunction with transit investment. As a consequence, disproportionately large-scale layout plans have sometimes been adopted in station catchment areas. To set up realistic site parameters and attain intended spatial outcomes around stations, the MTR Corporation in Hong Kong SAR, China, maintains staff expertise in property development and town planning and has updated the property market profiles since the 1980s. These capacity building efforts can be seen as steps for adopting development-based LVC techniques in the developing world.

Cities under a market freehold system may be able to auction off public land with development conditions for public interests as well as development incentives for developers. In so doing, government agencies can raise up-front capital for infrastructure development, but they do not generate recurring revenues for operation and maintenance activities. Rail yard redevelopment in Tokyo and London shows that either local development agencies or private railway corporations should remain as stakeholders to directly control the public domain and sustain property management incomes in and around station facilities.

Land readjustment can efficiently assemble the rights of way for guided transit extension projects and simultaneously promote transit-supportive property development around new stations (mainly in suburban areas) if all landholders agree. Similarly, inclusive urban redevelopment schemes should become available with sufficient market incentives to consolidate private land parcels in target built-up urban areas, and create development opportunities in and around existing underused stations. Adopting inclusive instruments in developing countries requires entrepreneurial transit agencies to engage in lengthy negotiation processes, acquire knowledge about the options, and establish close relationships with multiple local stakeholders. The multiple development experiences in Tokyo highlight the need for active involvement and commitment of major landholders—who are often large real estate developers as well—to create greater development opportunities and maximize the land value added by transit investment.

FAR distribution requires special attention as it is associated with development rights sales, land readjustment projects, and inclusive redevelopment schemes. FARs can be used as a market incentive to achieve multiple policy objectives. These include the provision of infrastructure and services, public open space and amenities, affordable housing units, and mixed land uses in private development packages or urban regeneration districts near target stations.

The sale of tradable air rights can raise up-front cash for cities in developing countries where local governments face increased public debt and acute land constraints. But New York and São Paulo reveal that it is very

difficult to estimate the value of air rights and to control land use parameters that could directly result in transit-supportive urban forms through market-based air rights transfers.

Challenges and Risks

Development-based LVC is a powerful financing and planning apparatus, unlocking unexplored land value to finance transit and promote transit-oriented development, but the risks of overreliance, corruption, and gentrification should be carefully addressed.

Overreliance

Overreliance on development-based LVC exposes municipalities and transit companies to excessive risk in real estate markets. While a robust real estate market and rising land prices are good for development-based LVC, both governments and transit agencies should adopt sound funding strategies and financial management, especially when property markets indicate excessive speculation. Given the unpredictability of the real estate market, municipalities and transit companies should estimate the revenue to be generated from development-based LVC schemes based on cautious and realistic assumptions, taking market trends into account. But in the face of rapid urbanization, transit investment cannot wait for the market. So, governments should prepare contingent plans in case revenues are lower than projected—preparing alternative funding sources or adjusting the sequence of investments based on technical and economic consideration.

Corruption

In general, the perception of land transfers from the public to private sector is negative among citizens in many developing countries because of a lack of transparency. For this reason, governments or transit companies often find it difficult to secure public support for development-based LVC, especially from those living in the targeted property development areas. To secure public support, governments should raise public awareness of the chosen scheme and its objectives, principles, rules, and regulations. It is also important for governments to involve civil society organizations in front-end planning and postproject development activities.

Governments should also introduce a transparent monitoring and recording system for development-based LVC transactions. Stakeholders and citizens should have access to information on how the private development partner has been selected, what are the projected actual revenues, and how the revenues will be used. Probably the most important way to prevent potential corruption is to require that transactions be at the market prices based on independent assessment. For example, in Hong Kong SAR, China, the land price assessed by the government is not arbitrary—it is a market price based on independent, highly sophisticated land valuation principles

and practices. Transparent information systems will also help governments, transit agencies, and developers prepare future development-based LVC schemes, by making the relevant market data available for them.

Gentrification

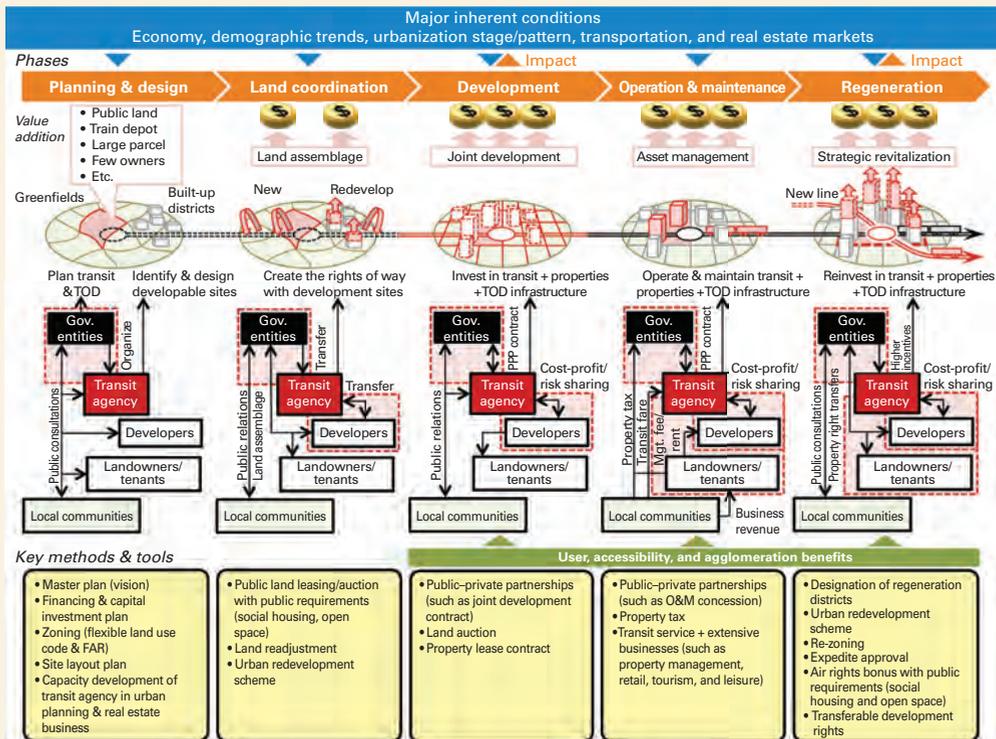
Land prices in and around transit stations typically rise, often displacing low-income households. But transit-oriented development should not just create economically efficient and environmentally friendly urban spaces. It should also address urban poverty and deprivation. Where possible, city authorities should pursue affordable housing and provide developers the incentives to ensure that affordable housing is built close to transit stops. A FAR density bonus for constructing social housing is such an incentive and can be built into development-based LVC agreements.

Roadmap for Development-Based LVC Implementation through a Gradual Approach

Development-based LVC is a complex operation where various public and private stakeholders jointly maximize and share increments in land value around transit station areas, exploring the accessibility and agglomeration benefits of transit investment. It requires favorable macro conditions, a strategic vision, a supportive regulatory and institutional framework, and considerable expertise. Its adoption and implementation depend on the conditions and needs of each city. The roadmap for development-based LVC implementation shows the critical decisions and steps for governments and their transit agencies in designing and implementing development-based LVC—and the factors related to their decisions and actions (figure O.3).

Adapting and implementing development-based LVC requires consistent policies, a strong institutional framework, a clear and transparent regulatory framework, strong planning and financial management, effective design, and efficient property management. Many policymakers and practitioners likely feel that what Hong Kong SAR, China's, MTR Corporation and Japanese railway companies have done is unmanageable in developing countries. But both organizations developed expertise over many years, through trial and error. Other policymakers and practitioners might hesitate to adopt development-based LVC schemes because of the lack of available lands or the difficulty in acquiring them. Even in these situations, however, transit agencies can explore the possibilities for their own land, such as underground or above-station areas or depots, just as Nanchang Metro and Hyderabad Metro are doing. On land under their control, municipalities or transit agencies could start with a simple development-based LVC property development such as a single tower office building above a transit station. They could next develop a mixed-use complex, possibly with private developers. And they could eventually apply land readjustment or urban redevelopment schemes to develop areas adjacent to transit stations owned by

Figure O.3 Roadmap for development-based land value capture implementation



Note: FAR = floor area ratio; O&M = operation and management; TOD = transit-oriented development.

private owners. To do this, the national or any upper-level government may need to adjust the regulations for railway properties to allow their commercial development. The key is to take incremental steps that make sense for each municipality and to leverage internal and local assets.

What International Development Financial Institutions Can Do

At the 2012 Rio+20 Conference, international development financial institutions including the World Bank announced a joint commitment to provide more than \$175 billion in loans and grants to develop sustainable transport systems in developing countries over the coming decade. While encouraging this commitment, it can cover only a fraction of total urban transit investment needs. For example, the total financial needs (for investment, operation, and maintenance) for the next two decades in Latin America are estimated at \$308 billion (Ardila-Gomez, Ortegón, and Rubiano forthcoming). Given this financial gap, international development financial

institutions can help national and local governments develop policies and institutional capacities to tap financial resources other than public sources, through unconventional financial and project development schemes. They could also help countries develop their institutional and regulatory frameworks and implementation capacities. And they could finance prototype projects to demonstrate the effectiveness of development-based LVC. Given the expertise needed for development-based LVC implementation, they should collaborate with experienced transit companies like Hong Kong SAR, China's, MTR Corporation and various Japanese railway companies. The institutional support also requires "bridge financing," which allows transit agencies and their partner developers to start construction before development-based LVC revenues begin to flow.

Conclusion

High-quality transit is indispensable for sustainable urban development. Well-integrated transit and land use fosters cities' economic competitiveness, environmental sustainability, and social equity. More specifically, transit-oriented development—which creates articulated densities around transit hubs by locating amenities, employment, retail, and housing in close proximity—is one of the most effective ways to achieve sustainable urban development. Properties in well-designed areas gain a price premium thanks to their accessibility and agglomeration benefits. Collaborative efforts of municipalities, transit agencies, developers, landowners, and communities can maximize this premium. In this joint value-creating exercise, municipalities and transit agencies can contribute significantly to value creation either through zoning changes (FARs and land use) or through transit investment. And by adapting various development-based LVC schemes in their respective local context, they can recoup some of their transit investment, operation, and maintenance costs.

The rapid population increase and robust economic growth in rapidly growing cities in developing countries, particularly in middle-income countries, are certainly favorable for development-based LVC. Regardless of diverse political, institutional, and regulatory frameworks, regardless of different economic development stages and financial positions, and regardless of state leasehold or market freehold systems, all cities are endowed with invaluable land resources that have made them what they are. Policy makers, government officials, transit practitioners, developers, landowners, and citizens can together decide their cities' future—whether they continue to let cars dominate their places or whether they reclaim those places for the benefit of society. To reverse unsustainable development trajectories caused by rapid motorization, cities can unlock unexplored land values to finance transit investments and promote transit-oriented development for the well-being of people today and for their sustainable future.

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OVERVIEW

What the literature has long been missing is a thorough, thoughtful book that translates how to move land value capture from the ivory towers of theory to real-world implementation. This book comes as close to any in achieving this. It shows that land value capture holds tremendous untapped potential as a viable and sustainable funding source for public transit improvements and leveraging transit-supportive growth, particularly in developing cities.

— **Robert Cervero**, *Friesen Chair of Urban Studies and Professor of City and Regional Planning at the University of California, Berkeley*

This book will help cities in emerging economies, and those of us working with them, to tap into the increases in land value resulting from the economic development stirred by public investments in infrastructure, providing opportunities to finance further public investment in infrastructure in a virtuous cycle. This provides finance but also helps structure more sustainable cities through complementary land use regulations, furthering the virtuous cycle of financial, environmental, and social sustainability.

— **Holger Dalkmann**, *Acting Global Director, Transport and Cities; Director, EMBARQ; World Resources Institute*

What a timely and important book! It makes an impressive contribution to urban planning literature, bridging theory and practice in transit-oriented development and offering much needed practical advice on how to structure and execute land value capture mechanisms to finance infrastructure investment. It is invaluable for all city planners and public investors, providing pragmatic guidance based on thorough analysis of successful efforts in Hong Kong [SAR, China] and Tokyo and emerging efforts in places like São Paulo, Nanchang, and Hyderabad. Bravo!

— **George W. McCarthy**, *President and CEO, Lincoln Institute of Land Policy*

This book identifies enabling factors from the experiences of Tokyo and other cities in promoting private sector railway construction and operation with revenues from development rights sales or leases around transit stations, so-called “land value capture” (LVC). Also addressed are the risks and challenges in applying the LVC apparatus to other cities. This book provides rich experiences of many cities and deserves to be an essential reference for development agencies, including the Japan International Cooperation Agency (JICA), to address transportation in megacities in developing countries where public transit is needed as the backbone of urban development.

— **Junichi Yamada**, *PhD; Senior Special Advisor of Japan International Cooperation Agency (JICA)*