Financing Transit-Oriented Development (TOD) with Land Values
Outline

- Transit Oriented Development (TOD) as the Most Effective Measure for Sustainable Urban Development
- How to Maximize Values of TOD
- Financing TOD with Land Values – Land Value Capture
- Land Value Capture Global Good Practices: Schemes and Instruments
  - Hong Kong R(Rail)+P (Property) Model
  - Tokyo Inclusive Multiple Integration Model
  - Emerging Land Value Capture in Cities in Developing Countries
- Critical Factors for Success of LVC in Developing Countries
- Conclusion
TOD As Effective Measure for Sustainable Urban Development
TOD Promoting Urban Sustainability

Source: GIZ/World Bank

www.worldbank.org/urban
TOD & Triple Bottom Line

**Economic**
- Time Saving
- Energy Saving
- Space Efficiency
- Infrastructure Cost Saving
- Synergy & Creativity
- Agglomeration Economy
- Functionality

**Accessibility & Mobility**
- Access to Jobs and Services
- Affordable Housing

**Social**

**Resilience to Disaster**
- Air Pollution Reduction
- CO2 Reduction
- Land & Green Preservation
- Biodiversity

**Environmental**

5

Aging Society
Economy of Agglomeration and Connectivity with Tradition in Global Capital (Tokyo Station Area)
Green TOD (Freiburg, Germany)

Photo: Wulf Daseking
Kashiwano Ha Smart City

- Solar power generation
- Storage battery
- Electric vehicles
- Gate Square hotel and residences
- Gate Square commercial and office building
- LaLaport KASHIWANOHA
- Private emergency transmission lines
- Kashiwa-no-ha Smart Center
  A central control center for a smart city
- Power company transmission network
- Park City Kashiwa-no-ha
  Campus Ichibangai District
- Park City Kashiwa-no-ha
  Campus Nibangai District

Source: Mitsui Fudosan
Toyama TOD for Aging Society

Source: City of Toyama
How to Maximize Value of TOD
Value is created by combination of transit and its influenced land use.

**Business As Usual**

**Vertical & Horizontal TOD**

- **Value Capture (VC1)**
- **Original Value (OV)**

**Tools**
- FAR Increase
- Transfer of Development Right
- Land Adjustment
- Urban Re-development, etc.

**Tools**
- Transit Feeder
- Bus Terminal
- Bicycle Lanes, etc.
GROW HIGH: Increasing Densities
Dveloping Countries: Average Built Up Densities

Comparative average population densities in built-up areas in 48 metropolitan areas

- Beijing
- Bangalore
- Hyderabad
- Tianjin
- Shanghai
- Guangzhou
- Hong Kong
- Ahmedabad
- Curitiba
Articulated Density Matters; Not Average Density

Uniform Average Population Density can have totally different height and spatial form. What matters most for transit and land integration is not average population density, but articulated density.

Source: OECD Compact City Policies / Laruelle, N
Bogota: Low (<2) FAR Control
Does Not Help Create Articulated Densities

Source: The World Bank Bogota Case Study
Curitiba’s Transit Oriented Development

Source: Curitiba
TOD as Envisioned by Peter Calthorpe

A diagram of Peter Calthorpe’s vision for TOD

2000 Feet from Transit Stop to Secondary Area

Secondary Area

Residential

Public Space

Transit Stop

Core Commercial

Office and Employment

600 meters
Expand Catchment Area by Various Transport Modes

Mode Connectivity At Station

Source: S. Sakaki
Expand Catchment Area by **Rail & Bus** Connection

Toyama LRT & Bus
Catchment Area

Rail enjoys Economies of Scale
Bus enjoys Economies of Scope

Source: Toyama City
TOD in Tokyo Metropolitan Area

- Mega-Cities in Japan = Chains of Walkable Cells connected by Railways

- A network of 800m radius walk-able areas from each railway station in Tokyo Metropolitan Area

※Pink is the author's ideas
Quality Increases Land Value of TOD Areas

Quality Urban Design Enhancing TOD

Efficient

Pleasant

Functional

Vibrant

Transit Value

Quality

Quantity: Vertical-Horizontal Expansion-

VC1

VC2

VC3

OV

Original V
Land Value Premiums of TOD in U.S.

TOD: High Quality Pedestrian-Friendly Design

TOD: Low Quality Non Pedestrian-Friendly Design

Source: R. Cervero
The “3V Frame WORK”

- Node Value based on its location in the network
- Place Value based on its urban qualities
- Market Value, based on its economic potential
Financing TOD with Land Values

Tax
Fairebox Revenues
Land Value Capture (LVC)

Scarcity & Affordability
Political Economy
Economic Rational &
Financial Viability
Transit is Capital Intensive

Tokyo Metro Construction Costs

<table>
<thead>
<tr>
<th>Year</th>
<th>Line</th>
<th>Cost (Billion Yen)</th>
<th>Length (Km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1962</td>
<td>Marunouchi</td>
<td>5</td>
<td>29</td>
</tr>
<tr>
<td>1964</td>
<td>Chiyoda</td>
<td>12</td>
<td>17</td>
</tr>
<tr>
<td>1966</td>
<td>Hibiya</td>
<td>15</td>
<td>33</td>
</tr>
<tr>
<td>1968</td>
<td>Toei</td>
<td>15</td>
<td>30</td>
</tr>
<tr>
<td>1970</td>
<td>Yurakucho</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>1972</td>
<td>Marunouchi</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>1973</td>
<td>Yurakucho</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>1974</td>
<td>Marunouchi</td>
<td>15</td>
<td>20</td>
</tr>
<tr>
<td>1975</td>
<td>Marunouchi</td>
<td>15</td>
<td>20</td>
</tr>
</tbody>
</table>

Metro in Developing Countries

<table>
<thead>
<tr>
<th>Cities</th>
<th>Cost (Billion)</th>
<th>Length (Km)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nanchang Line 2</td>
<td>$2.6</td>
<td>24Km</td>
</tr>
<tr>
<td>Hyderabad</td>
<td>$2.6</td>
<td>72 Km</td>
</tr>
<tr>
<td>Delhi</td>
<td>$11.7</td>
<td>120Km</td>
</tr>
<tr>
<td>Sao Paulo</td>
<td>$30.0</td>
<td>100Km</td>
</tr>
</tbody>
</table>

Source: World Bank LVC Case Studies

Fig. 7. Construction cost of underground railways in Tokyo (nominal values).
Source: Hitoshi Ieda
Fare-box Recovery Ratio

Fare Revenues/Operation Expenses (%) – 60 Global Cities

Source: Murakami, Jin. 2012. Transit Value Capture
Focus of the WB’s New Book

- Focusing on Development based Land Value Capture (DBLVC) practices in HKSAR and Tokyo as global best cases
- Seeing DBLVC as a strategic model of both urban finance and planning
- Discussing how to adapt DBLVC in cities of the developing world

Source: Suzuki, Murakami, Hong and Tamayose, 2014
Concept of Land Value Capture

The government, on behalf of the general public, can capture a part of this portion of the increased land value, as property tax.

Public service providers should capture this portion of the increment to cover the costs of public infrastructure and local service provision.

Private land owners should profit from this portion of the increment.

Land buyers (or lessees) pay sellers (lessors) to obtain the property rights of land.

Source: Adapted from Hong and Brubaker 2010.
## Categories of LVC Instruments

“Tax or Fee based” LVC & “Development-based” LVC (DBLVC)

<table>
<thead>
<tr>
<th>Instrument</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tax &amp; Fee-Based</strong></td>
</tr>
<tr>
<td>Property and Land Tax</td>
</tr>
<tr>
<td>Betterment Levies and Special Assessments</td>
</tr>
<tr>
<td>Tax Increment Financing (TIF)</td>
</tr>
<tr>
<td><strong>Development-Based</strong></td>
</tr>
<tr>
<td>Land Sale or Land Lease</td>
</tr>
<tr>
<td>Air Right Sale</td>
</tr>
<tr>
<td>Land Readjustment</td>
</tr>
<tr>
<td>Urban Redevelopment Financing</td>
</tr>
</tbody>
</table>

Source: Suzuki, Murakami, Hong and Tamayose, 2014
Betterment Fees/Charges

Colombia

- Contribución de Valorización (1921):
  - Cost recovery through betterment charge

- Participación en Plusvalías (1997):
  - Broader value capture
Challenges of Tax-Based Land Value Capture

- Nobody likes tax-Political Economic Problem;
- Valuation Method;
- Uncertainty
- Question of Equity: TIF District and Other Districts;
- Tax-Based Land Value Capture instruments are based on Property Tax; and Collection system such as cadastral, which is not often well developed and managed
Underlying Principle of DBLVC

開発利益還元

Development Profit  Return

VS

Land Value Capture
LVC for Finance & Planning in TOD

“Synergetic Benefits to be Shared”

- Landholders
- Transit Agency
- Railway Investment
- Developers
- Other Agencies

Land Value Increment
- Accessibility
- Density & Mixture
- Amenity
- Integration

“Urban Planning to Promote TOD”

Source: Jin Murakami 2013
Transit/TOD Investment - O&M Costs vs Revenues from Land Sale and Use and Others

**COSTS**

- Transit (Guided ways, Rolling Stock, Stations)
- Other TOD (Station Plaza, Pedestrian Facilities, etc.)
- Transit O&M
- Other TOD O&M

**REVENUES**

- Land Sale (land, land use, air or underground use right)
- Tariff
- Advertisement
- Property Mgt. & Commercial Revenues
- Tax & (Property Tax & Sales Tax) Fees (Betterment, Development)

**CF**

\[ \text{Land Price Increase} \land \text{Ridership Increase} \land \text{Business Increase} \land \text{Cost Recovery} \]

\[ \text{Revenue} \land \text{Expense} \]

“Development” based LVC

“Tax or Fee” based LVC

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Land Value Capture
Global Good Practices: Schemes and Instruments
Hong Kong

- Total Land Area: 1,104 sq. km
- Urban Area: 261 sq. km (23.6%)
- Population: 7 million
- Urban Density: 26,700 people/sq. km
- Private Vehicles: 60/1,000 residents

MTR is a “backbone” of Hong Kong’s urban development. Hong Kong’s “urban density” supports MTR’s ridership.
HKSAR: R+P Program (1)

a. Usual government land leasing program

Hong Kong SAR, China, government

Development right (full market price)

Developers

b. Rail Plus Property (R+P) program

Hong Kong SAR, China, government

Development right ("before-rail" market price)

Co-development ("after-rail" market price)

MTR Corporation

Developers

“Profit sharing”
- Profits in agreed proportions
- Assets in-kind
- Up-front payments

Sources: Based on Cervero and Murakami 2009. Note: MTR = mass transit railway.
HKSAR: R+P Mechanism (2)

Source: Based on Hong Kong SAR, China, Mass Transit Railway (MTR) route maps and other maps.
Note: R+P = Rail Plus Property.
MTR Corporation

MTR Corporation, Revenue Sources, 2000-2010

Source: Hiroaki Suzuki et al., Financing Transit-Oriented Development with Land Value
Early Generation

Tin Hau Station (1989)
- Site Area... **0.58** ha
- Residential... **61,000** sqm (72.9%)
- Commercial... **3,700** sqm (4.4%)
- Others... **19,000** sqm (22.7%)
- Parking... **650** lots
- F.A.R... **14.43**
Integrated Development Package

Kowloon Station (1998-2010): 13.5 ha

Source: AL Stephan (2013)
Mass Transit Integration
How to Finance Massive Transit Investments?
Explore Possible Land Value Capture Financing

Hong Kong MTR’s Maritime Square Residential-Retail Development
Source: Hong Kong MTR
Recent Generation

**Tung Chung Station (1998)**

<table>
<thead>
<tr>
<th>Category</th>
<th>Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site Area</td>
<td><strong>21.7 ha</strong></td>
</tr>
<tr>
<td>Residential</td>
<td><strong>935,910 sqm</strong> (90.8%)</td>
</tr>
<tr>
<td>Office</td>
<td><strong>14,999 sqm</strong> (1.5%)</td>
</tr>
<tr>
<td>Commercial</td>
<td><strong>55,862 sqm</strong> (5.4%)</td>
</tr>
<tr>
<td>Hotel</td>
<td><strong>22,000 sqm</strong> (2.1%)</td>
</tr>
<tr>
<td>Others</td>
<td><strong>2,063 sqm</strong> (0.2%)</td>
</tr>
<tr>
<td>Parking</td>
<td><strong>3,869 lots</strong></td>
</tr>
<tr>
<td>F.A.R.</td>
<td><strong>4.76</strong></td>
</tr>
</tbody>
</table>

J.Murakami
Tokyo: Multiplicity

- Population: 36.93 million
- Land Area: 13,368 sq. km
- Operaters: 48 (Mostly Private Agencies)
- About 3,500 km
- About 2,000 stations

Source: Based on data from National Land Information, Ministry of Infrastructure, Land, and Transport (MILT), Japan.
Example 1: Tokyu Corporation (1)

Tokyu Corporation, Revenue Sources 2004-2013

Source: Data from Tokyu Corporation’s Annual Reports 2004–13.

Source: Hiroaki Suzuki et al, Financing Transit-Oriented Development with Land Value
Example 1: Tokyu Corporation (2)

Privately Develop & Operate

Total 105 km Rail Network

Garden City

Shibuya

J.Murakami
Example 1: Tokyu Corporation (3)

Garden City Line & New Town Development 2,983 ha (1960-1980s)
Example 1: Tokyu Corporation (4)

Futagotamagawa Station Redevelopment 11.2 ha (2000-2015)

Source: Tokyu Corporation 2013
Example 1: Tokyu Corporation (5)

Corporate Ownership & Stewardship Model

High percentage of the key station areas are owned by Tokyu Corporation

Very High Ridership

Group’s Intergenerational Resource Allocation
Example 2: H-R Integration (1)

Tsukuba Express (1998-2006)

Rail Construction Costs
US$ 9.4 billion

Integrated Housing-Rail Development Act of 1989
Land Readjustment Projects

19 Districts
Total 2,908 ha

Source: Chiba Prefecture 2012
Example 2: H-R Integration (2)
Example 2: H-R Integration (2)

Integrated H-R Land Readjustment: Mechanism

<Local Governments, Housing Agencies, Land Owners>

Source: Chiba Prefecture 2012
Land Value Capture Instrument (2)
Urban Redevelopment Financing Instrument

Single Use
Maximum FAR: 2.0

Zoning Change

Mixed Use
Maximum FAR: 6.0

“Fragmented” Owners
A, B, C, D, E, F & G

“Consolidated” Owners
A, B, C, D, E, F & G

New Owner X

Developer
Floor Area Rights

Government Subsidy

Public Facilities

Metro (Proposal)

Metro (Open)
### Joint Value Creation & Profit Sharing
#### Urban Redevelopment Financing Instrument

<table>
<thead>
<tr>
<th>Stakeholders</th>
<th>Contribution</th>
<th>Benefit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Landholders</strong> A, B, C, D, E, F &amp; G</td>
<td>Land Parcel for the New Building</td>
<td>Joint Ownership of Land for the New Building (Section A, B, C, D, E, F &amp; G) with higher access and better local infrastructure and service provision</td>
</tr>
<tr>
<td><strong>Building Owners a, b, c, d &amp; f</strong></td>
<td>Old Buildings and Housing Units</td>
<td>Ownership of the New Building (Section a, b, c, d &amp; f) with higher access and better local infrastructure and service provision</td>
</tr>
<tr>
<td><strong>Developer</strong></td>
<td>Capital and Property Development Expertise</td>
<td>Profit from Section X &amp; from Surplus FAR</td>
</tr>
<tr>
<td><strong>Transit Company</strong></td>
<td>Construction of Transit Station</td>
<td>Transit Supportive Environment/Increased Ridership</td>
</tr>
<tr>
<td><strong>National Government</strong></td>
<td>Subsides for Land Assemblage and Road Construction</td>
<td>Save Road Construction Costs</td>
</tr>
<tr>
<td><strong>Local Government</strong></td>
<td>Change in Zoning Code (from Single Use to Mixed Use with Higher FAR)</td>
<td>Higher Property Tax Revenue Promotes Local Economic Development Builds Townships Resilient to Natural Disasters</td>
</tr>
</tbody>
</table>
Example 3: Depot Redevelopment (1)
Example 3: Depot Redevelopment (2)

JNR Yard: National Land Sales

Shinagawa Station 16.2 ha (1992-2008)

Source: JNR Settlement Corporation 2008
Example 3: Depot Redevelopment (3)

Civic Space Provision & FAR Bonus
(e.g., Case of Shinagawa Station Area)

<table>
<thead>
<tr>
<th>Joint Housing Provision</th>
<th>Green Space, Underground Access</th>
<th>Road &amp; Pedestrian Network</th>
<th>Civic Open Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>35,433 sq.m.</td>
<td>18,167 sq.m.</td>
<td></td>
<td>12,480 sq.m.</td>
</tr>
</tbody>
</table>

**FAR Assessment**

<table>
<thead>
<tr>
<th></th>
<th>Before (Industrial Site)</th>
<th>After (Office Site)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base FAR</td>
<td>4.0</td>
<td>7.0</td>
</tr>
<tr>
<td>+1.9</td>
<td></td>
<td>+1.9</td>
</tr>
<tr>
<td>+0.6</td>
<td></td>
<td>+0.6</td>
</tr>
<tr>
<td><strong>9.5</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

J.Murakami 58
Example 4: Tokyu Shibuya Station District Redevelopment

Consecutive Urban Redevelopments Through Restructuring Station-related Infrastructure

HIKARIE Data

[Completion of construction] 2012
[Owner] Tokyu Corporation and others
[Total floor area] 144,000㎡ approx.
[Number of lines] 8 lines, 6 stations
[Number of passengers] 3,000,000 persons per day approx.

Source: Nikken Sekkei Corp.
Hub stations along Railroads Network

Inokashira Line
Garde City Line
Hanzomon Line
Ginza Line
Yamanote Line
Toei Oedo Line
Saikyo Line

Source: Nikken Sekkei Corp.
Example 5 Tokyo Railway Renovation by Air Right Sale

Adopting “FAR Transfer System” to earn restoration costs

2012 : Restoration to the Original

Post War : Temporary Mended Roof

Tokyo Station

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Preservation & Restoration

Original 1914

Win-Win Structure for Both Public & Private FAR Seller & Buyer

Floor Area Ratio Transfer System
Nanchang: Public Development Right Sale for New Metro Construction (1)

Suzuki, Murakami, Hong and Tamayose, 2014
Nanchang: Public Development Right Sale for New Metro Construction (2)
Hyderabad: Innovative PPP

**Private Concessionaire:**
- Min. Gap Fund Request
- Project Period of 35 years
- Property Development Rights (25 Sites + 3 Depots)

**Design-Build-Finance-Operate-Transfer (DBFOT)**

Project Revenues (est.):
- Fare Box = 50%
- **Real Estate = 45%**
- Other = 5%

**Gov. & Special Purpose Vehicle:**
- Land Acquisition
- Statutory Clearances
- 10% Max. Gap Fund
- 300 m TOD zone
Critical Factors for Success of LVC in Developing Countries

- Inclusive Land Value Capture: Aim at “Win Win” for All the Stakeholders, including urban poor in the project area;
- Sound planning principle based on Visionary Long-Term Master Plan;
- Intergovernmental collaboration is must, especially at capital city.
- Macro fundamental and regional economic growth is fundamental;
- Public landownership is important, but not absolutely necessary;
- Flexible zoning should be provided by the city planning authority;
- Entrepreneurship is prompted by the transit agency (creating a real-estate development unit by bringing in private business expertise and/or develop partnership with businesses);
- Develop, clear, fair and transparent rules to prevent corruption;
- Loan or other source of financing is still needed as bridge financing till LVC can materialize; and
- LVC is not a silver bullet, explore multiple funding sources, hedging against real-estate market risks
Conclusion

TOD 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 and to increase value.

Collaborative efforts of national government, municipalities, transit agencies, developers, landowners, and communities can maximize LVC premium. In this joint value-creating and sharing exercise, municipalities and transit agencies can contribute significantly to value creation either through zoning changes (FARs and land use) and through transit investment.

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.
THANKS

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