

Third Arab Land Conference  
Troisième Conférence Arabe sur le Foncier  
المؤتمر العربي الثالث للأراضي  
18-20 FEBRUARY 2025 • RABAT, MOROCCO



# Integrating Land Value Capture Frameworks with Transit-Oriented Development: Advancing Sustainable Urban Financing

Land-based financing solutions

*Luay Ahmad, Beijing Jiaotong University*

المملكة المغربية  
ROYAUME DU MAROC



وزارة التراب الوطني والتعمير  
والإسكان وسياسة المدينة

MINISTÈRE DE L'AMÉNAGEMENT DU TERRITOIRE NATIONAL  
DE L'URBANISME, DE L'HABITAT ET DE LA POLITIQUE DE LA VILLE



الاراضي العربية ادارة  
Arab Land Initiative



北京交通大学  
BEIJING JIAOTONG UNIVERSITY



北京交通大学国土空间  
与交通协同发展研究院  
Academy of Beijing Jiaotong University



- PhD researcher at Beijing Jiaotong University, specializing in Transit-Oriented Development (TOD) and Land Value Capture (LVC) within the Transportation Planning and Management program at the School of Transportation.
- Active member of the TOD Academy, contributing to sustainable urban and transportation strategies.
- Holds dual master's degrees in Urban and Environmental Planning and Urban and Rural Planning.
- Over 10 years of professional experience, with active participation in conferences in China, Europe, and across the Arab world, including the UAE, Oman, and Egypt.
- [luay.arc@gmail.com](mailto:luay.arc@gmail.com), [21129094@bjtu.edu.cn](mailto:21129094@bjtu.edu.cn)



What are  
**TRANSPORTATION**  
costs?

**TOD**  
a finance solution from  
transportation field

**TOD + LVC**  
Successful stories

**Four-step LVC+TOD**  
A Framework for Action

**Engineering**  
Or  
**Planning**  
problem?

Is it **Stable**?  
Is it **Sustainable**?  
Is it **Equitable**?

**OUR**  
challenges  
**OUR**  
solutions

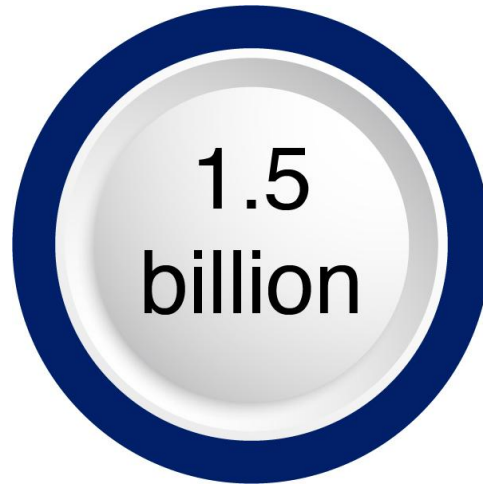


# What are **TRANSPORTATION** costs?





Population  
1982-2022



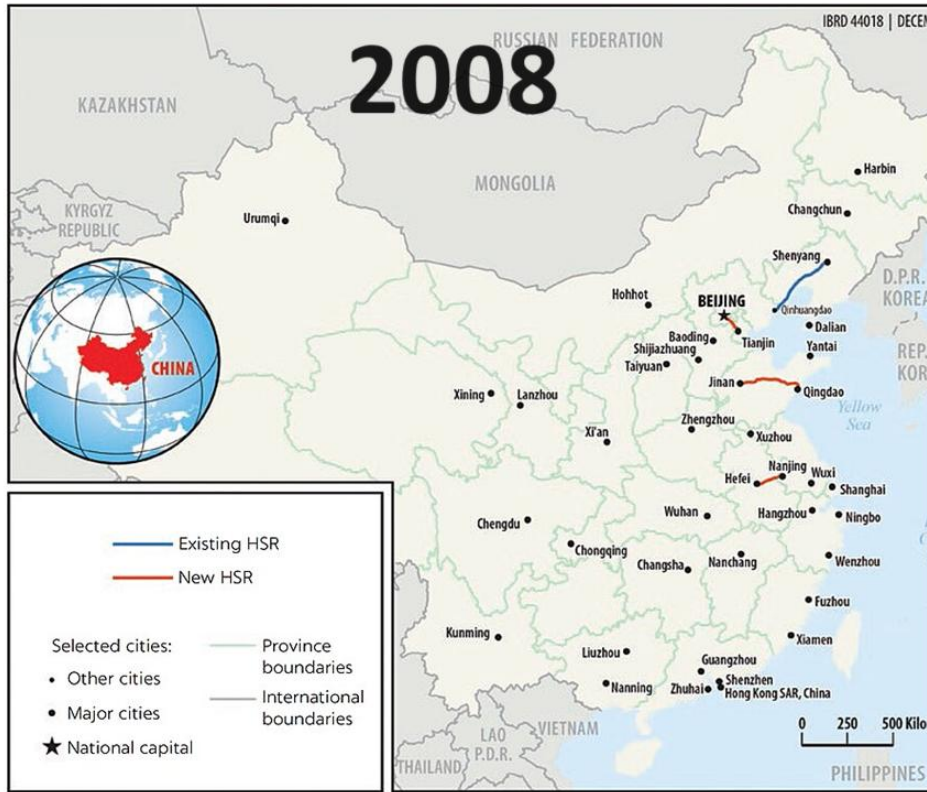
increase by  
2050

Urbanization has transformed global demographics, with the urban population doubling in the past 40 years and expected to increase by 1.5 billion by 2050

(OECD, Lincoln Institute of Land et al. 2022)

# الاراضي العربية Arab Land Initiative

# What are TRANSPORTATION costs?



China's 13th Five-Year Plan (2016–2020)

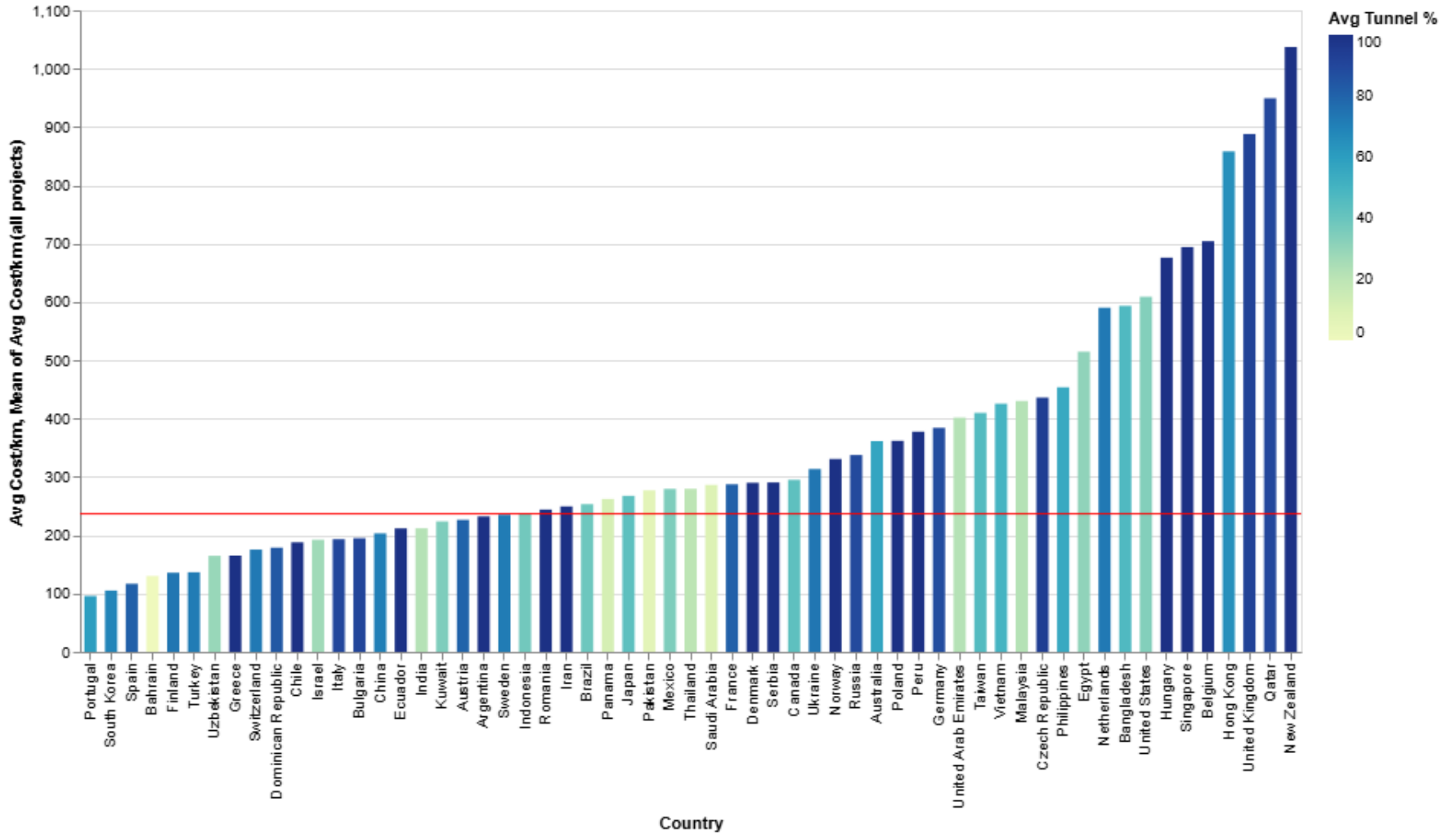
Over **2 trillion** yuan (**\$310 billion** USD)

Urban rail development

Yan, C., & Tong, Q. (2021). Analysis of the evolutionary game between the government and urban rail transit enterprises under the loss-subsidy mode: A case study of Beijing. Sustainability, 13(8041).

<https://doi.org/10.3390/su13148041>





Marron Institute. (2024, February 27). Average cost per kilometer of rail projects by country: Data visualization and analysis. Transit Costs Project. Retrieved January 7, 2025, from <https://transitcosts.com/new-data/>

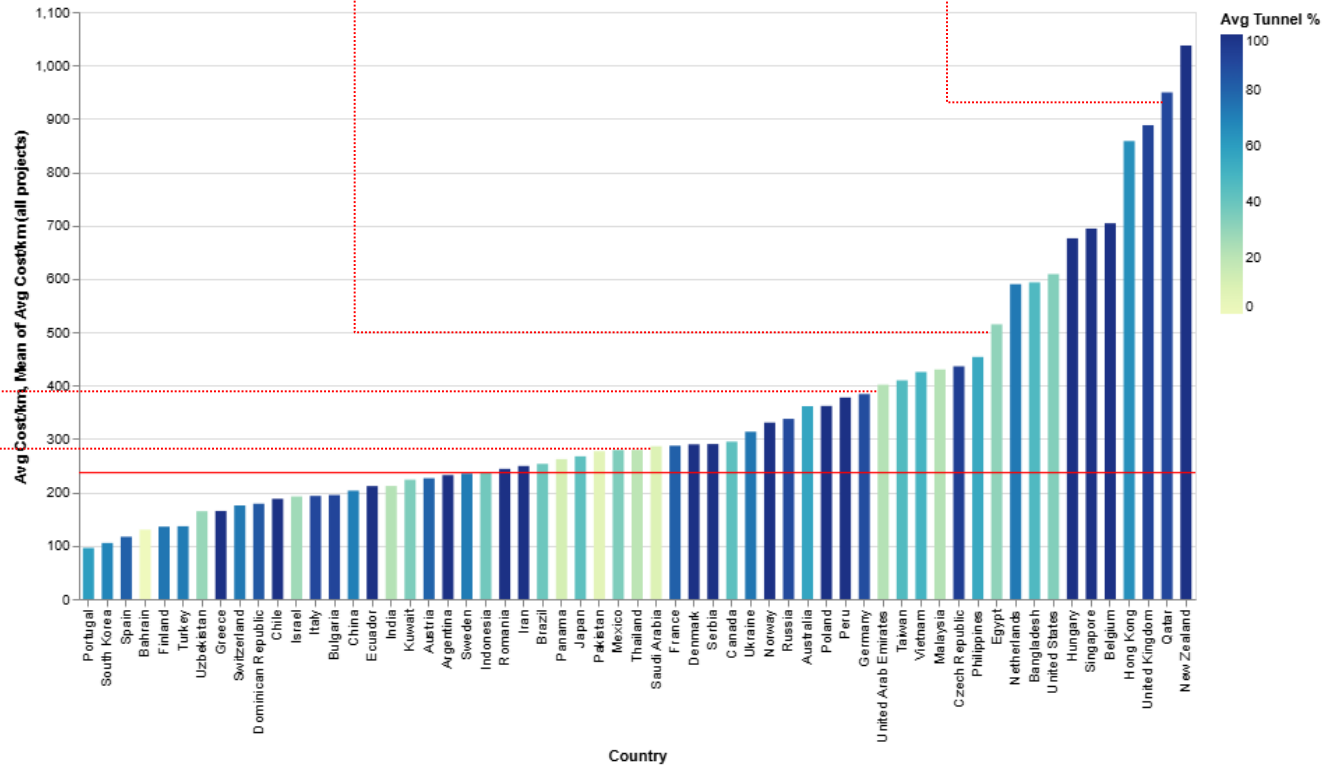


Country **United Arab Emirates**  
Avg Cost/km **401.8 \$ million**  
Avg Tunnel % **22**  
# Records in Database **3**

Country **Egypt**  
Avg Cost/km **514.7\$ million**  
Avg Tunnel % **31**  
# Records in Database **5**

Country **Qatar**  
Avg Cost/km **949.3\$ million**  
Avg Tunnel % **90**  
# Records in Database **1**

Country **Saudi Arabia**  
Avg Cost/km **286.3**  
Avg Tunnel % **9**  
# Records in Database **9**



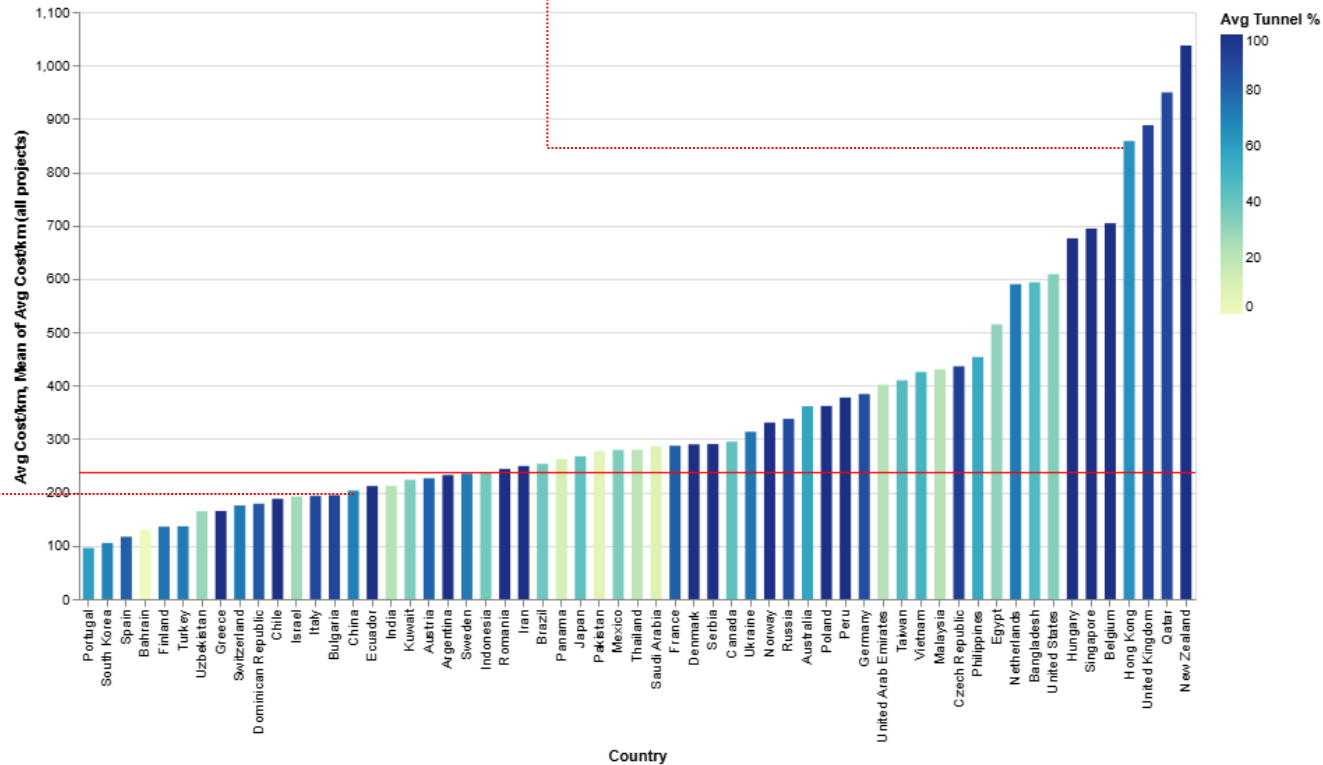
Marron Institute. (2024, February 27). Average cost per kilometer of rail projects by country: Data visualization and analysis. Transit Costs Project. Retrieved January 7, 2025, from <https://transitcosts.com/new-data/>





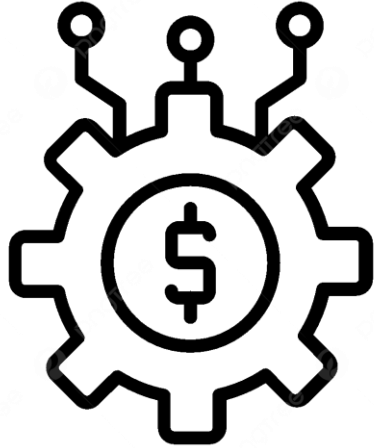
Country China, Hong Kong  
Avg Cost/km 858.1\$ million  
Avg Tunnel %65  
# Records in Database 14

Country China, Main land  
Avg Cost/km 203.1\$ million  
Avg Tunnel % 71  
# Records in Database 495



Marron Institute. (2024, February 27). Average cost per kilometer of rail projects by country: Data visualization and analysis. Transit Costs Project. Retrieved January 7, 2025, from <https://transitcosts.com/new-data/>

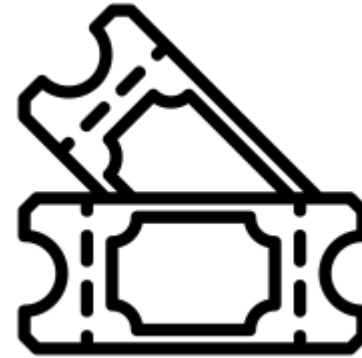




**Operational Costs**

**RMB 8.266 billion**

**≈ USD 1.24 billion**



**Revenue (Ticket):**

**RMB 6.772 billion**

**≈ USD 1.02 billion**

## Beijing Subway in 2016

Yan, C., & Tong, Q. (2021). Analysis of the evolutionary game between the government and urban rail transit enterprises under the loss-subsidy mode: A case study of Beijing. Sustainability, 13(8041). <https://doi.org/10.3390/su13148041>



ional Costs  
66 billion  
24 billion



Beijing Subway in 2016



Revenue (T  
RMB 6.772  
≈ USD 1.02

Analysis of the evolutionary game between the government and urban rail transit enterprises under the loss-subsidy mode: A case study of Beijing. Sustainability 2016, 8, 13148041

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**TOD + LVC**  
Successful stories

**Four-step LVC+TOD**  
A Framework for Action

**Engineering**  
Or  
**Planning**  
problem?

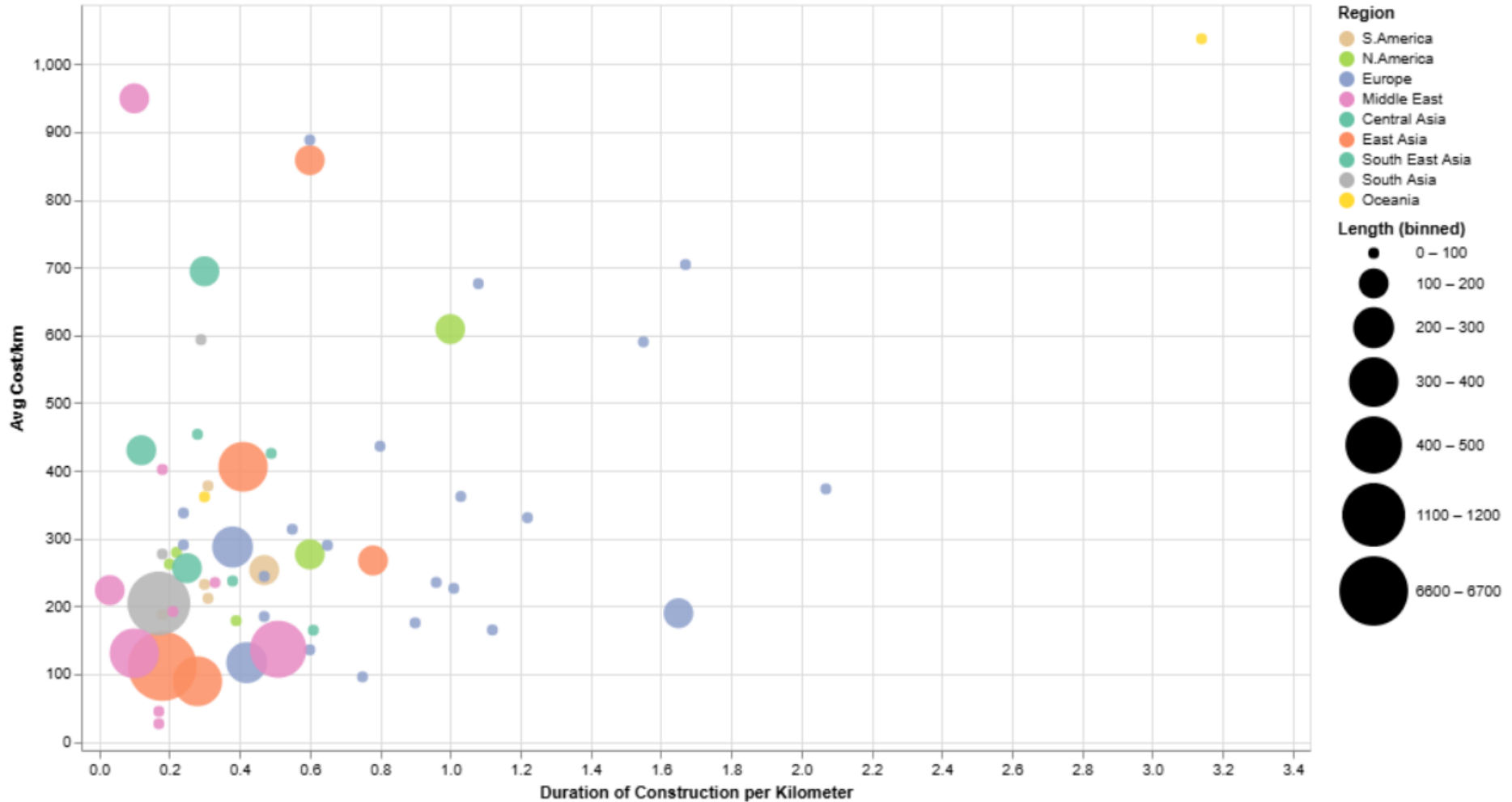
Is it **Stable?**  
Is it **Sustainable?**  
Is it **Equitable?**

**OUR**  
challenges  
**OUR**  
solutions



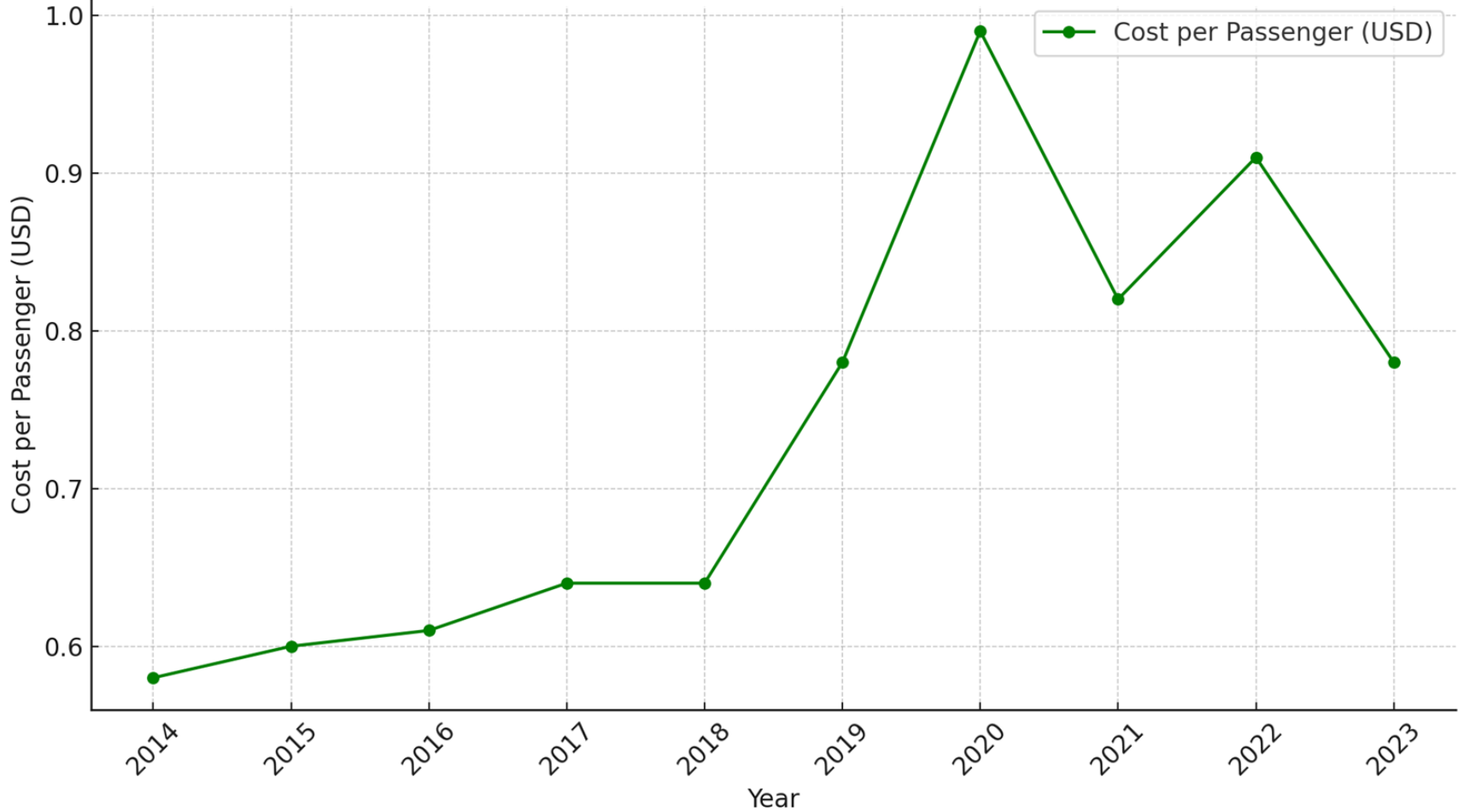
# Engineering Or Planning problem?



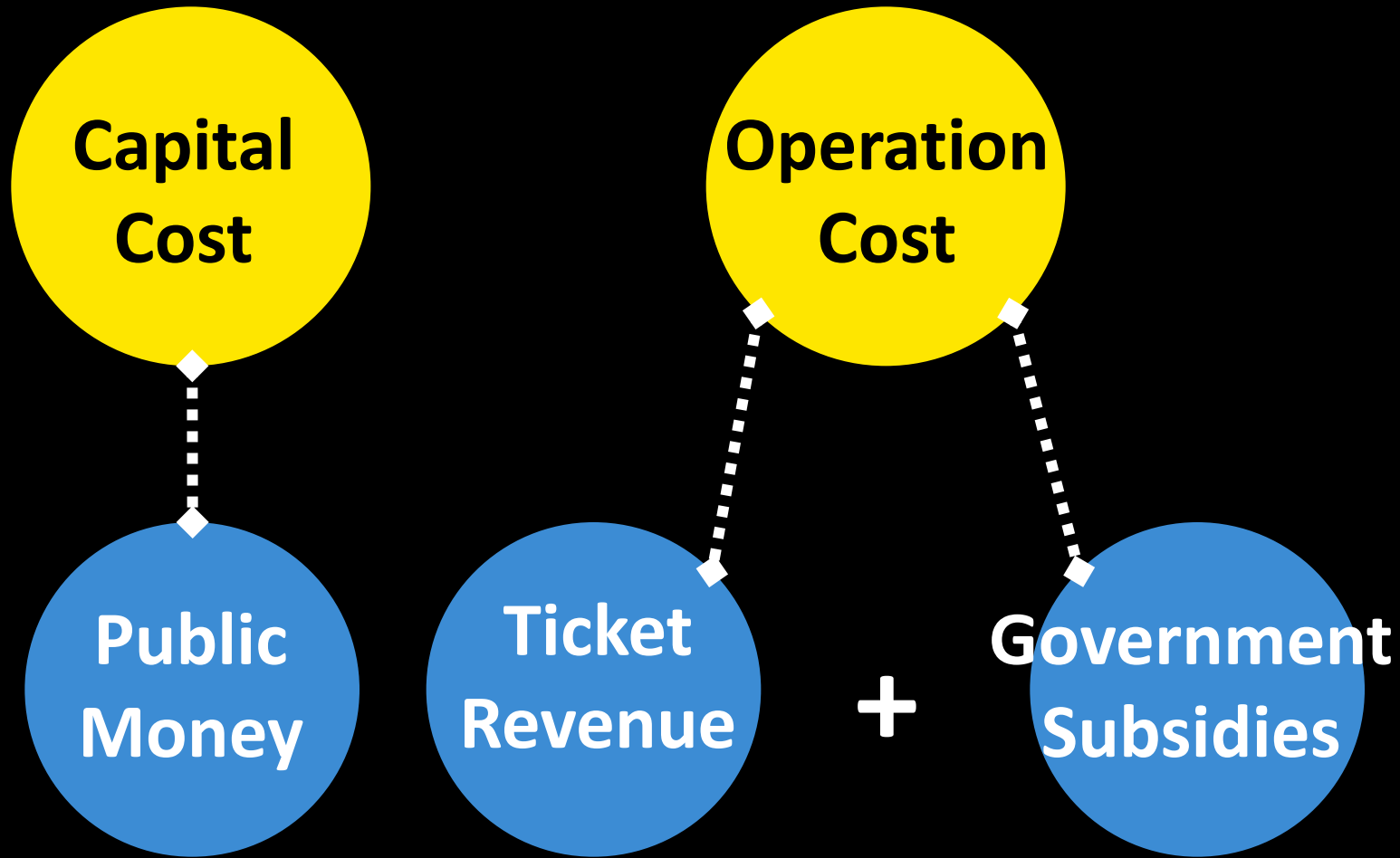


Marron Institute. (2024, February 27). Cost/km per Country and Duration of Construction per km : Data visualization and analysis. Transit Costs Project. Retrieved January 7, 2025, from <https://transitcosts.com/new-data/>

Operating Cost per Passenger Carried by MTR in Hong Kong (2014–2023, in USD)

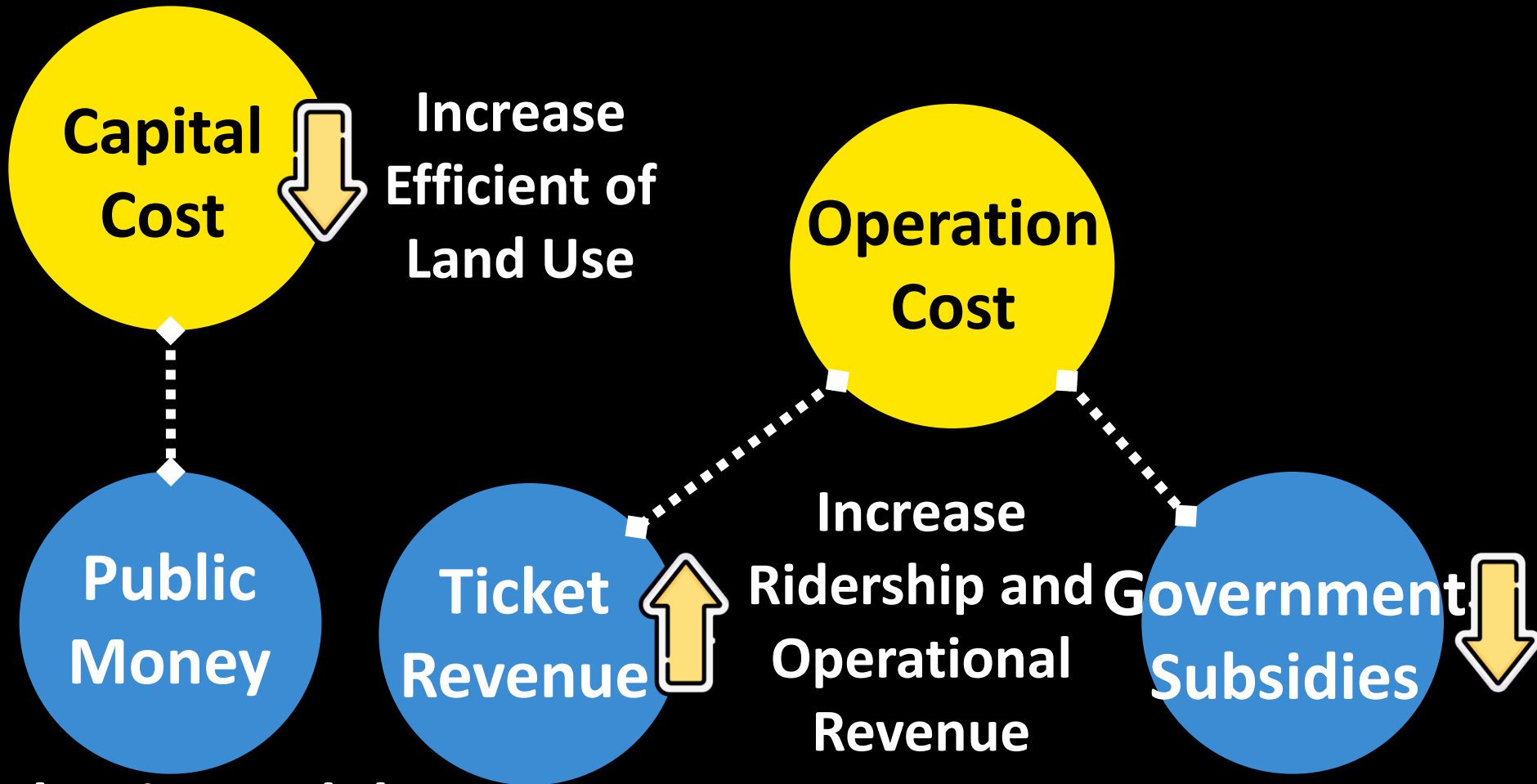


MTR Corporation. (2023). Ten-Year Statistics: 2014–2023, Operating Costs for Hong Kong Transport Operations. Retrieved January 7, 2025



## Classic Model





**Classic Model**

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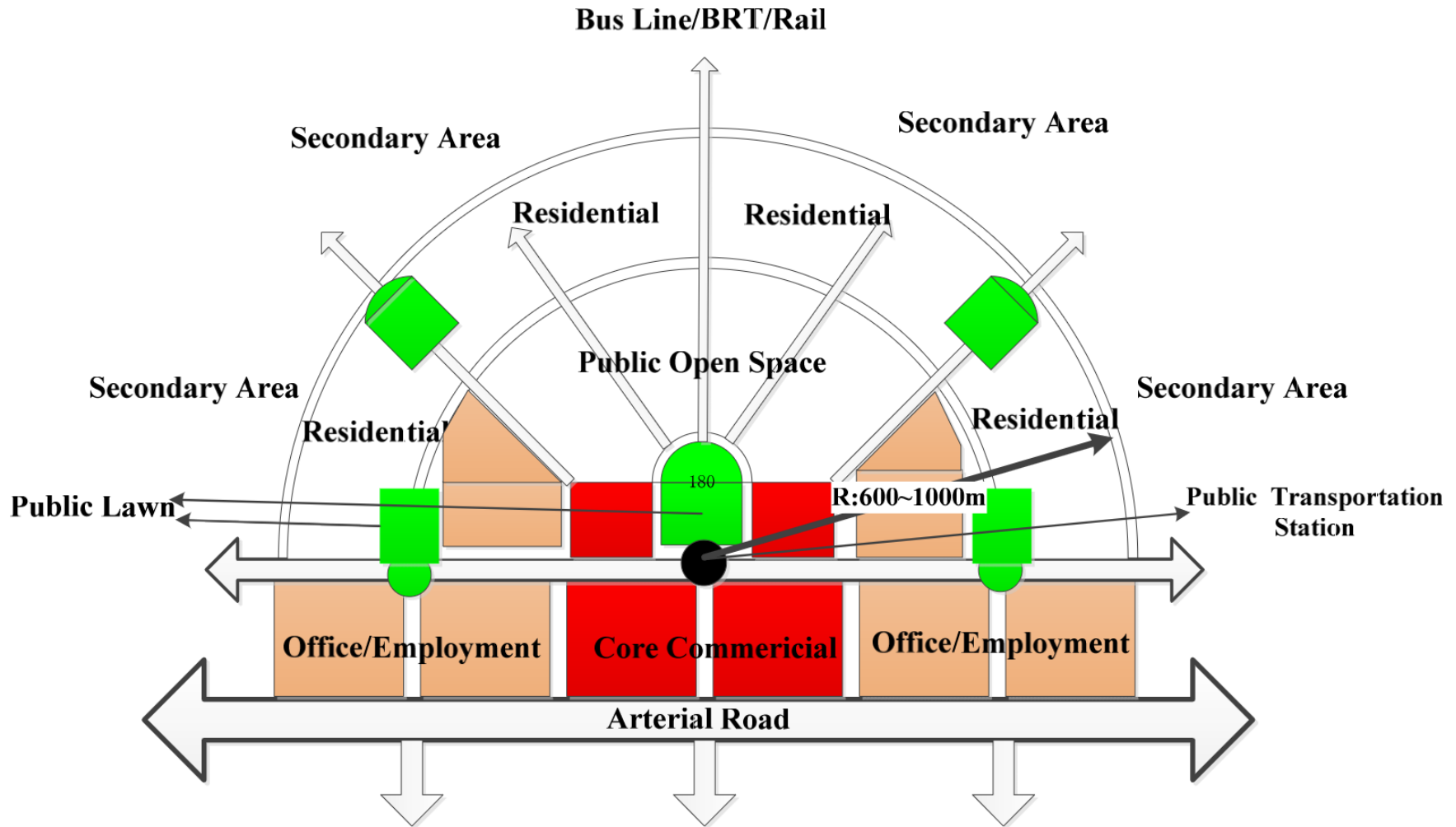
**OUR**  
challenges  
**OUR**  
solutions



# TOD

## a finance solution from transportation field





Zou, M., Mao, C., Zhang, K., & Li, M. (2014). Review on the theory and planning principle of transit-oriented development. Proceedings of the 2014 International Conference on Transportation and Development (pp. 3532–3547). <https://doi.org/10.1061/9780784413623.338>

1990



Controlling urban  
sprawl with 3Ds.

2000



Focused on inclusivity and data-  
driven planning  
(e.g., Node-Functionality-Place  
framework)

2010



Adaptable to global  
challenges such as rapid  
urbanization and transit gaps.



**Design**

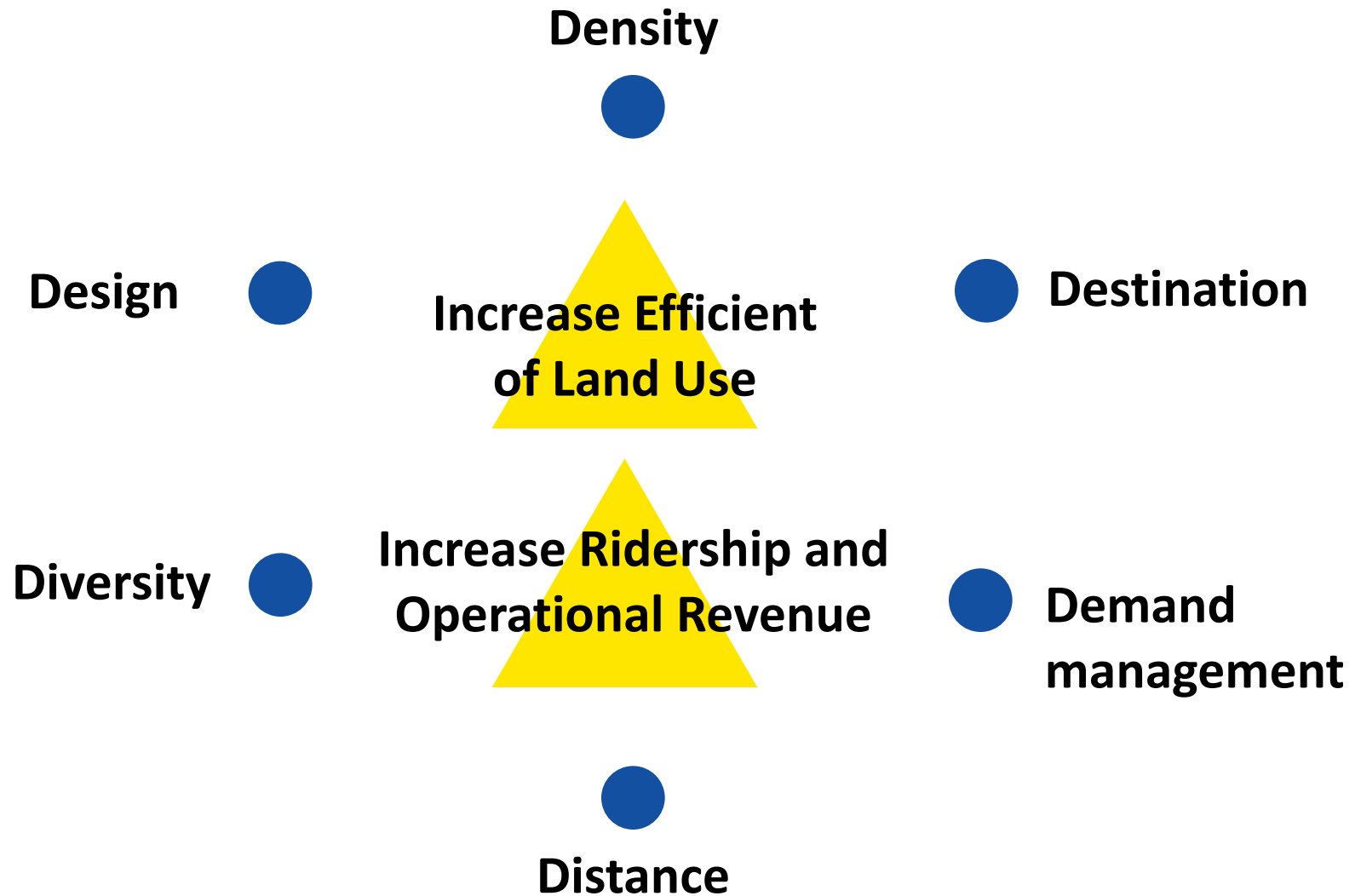
**Density**

**Destination**

**Diversity**

**Distance**

**Demand  
management**



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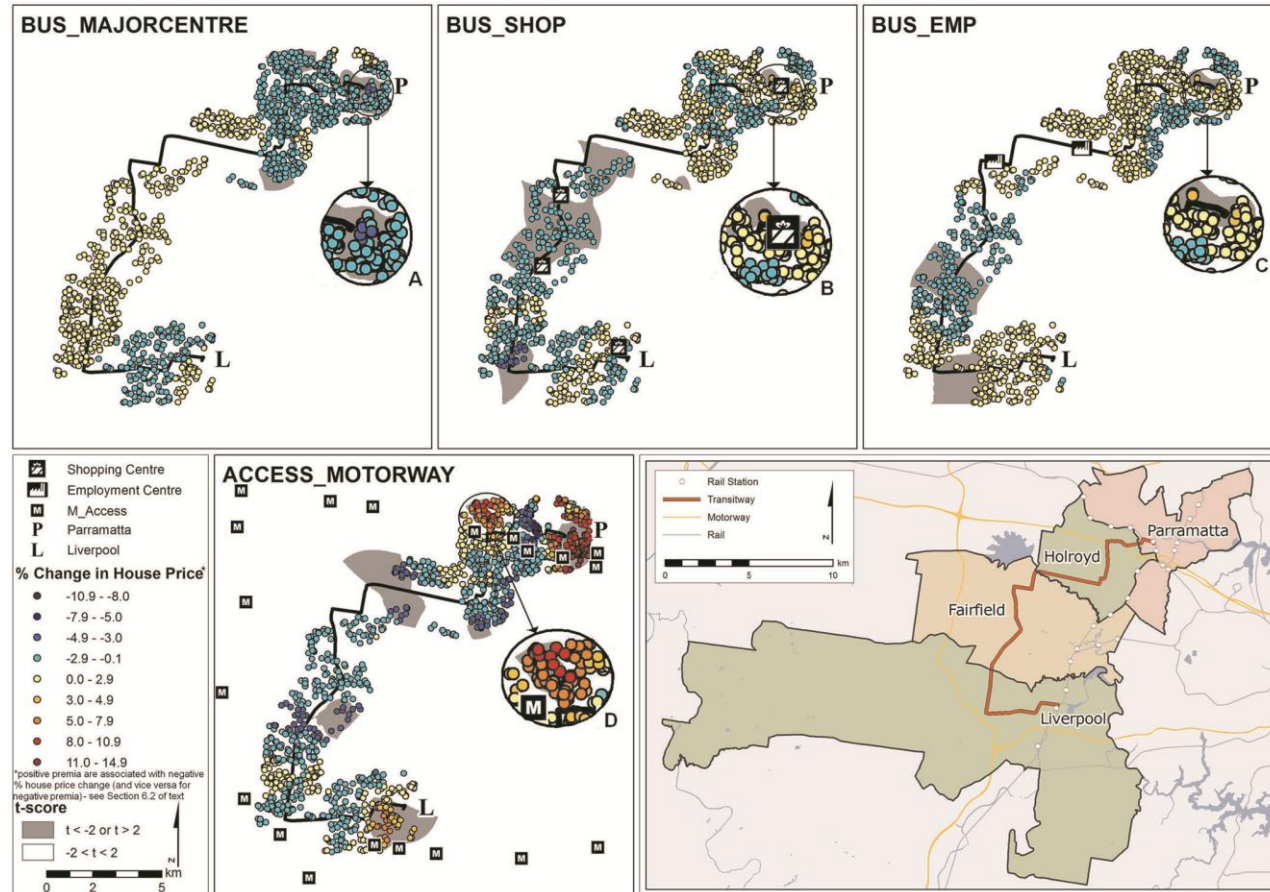
“  
Transport differs from other problems  
developing societies face because it gets  
worse rather than better with economic  
development  
”

2002, Enrique Peñalosa, the former mayor of Bogotá

Is it **Stable**?  
Is it **Sustainable**?  
Is it **Equitable**?

Increase Efficient  
of Land Use

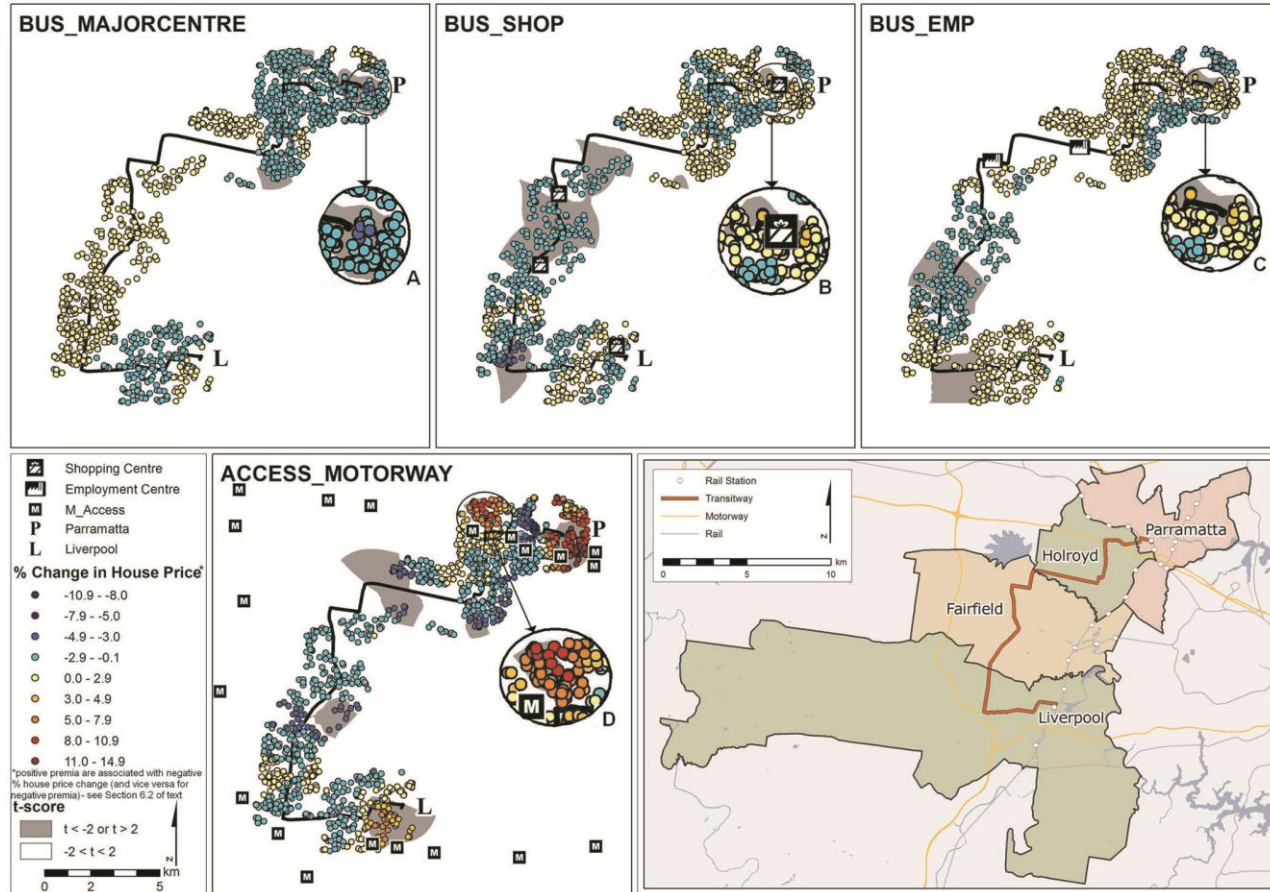
Increase Ridership and  
Operational Revenue

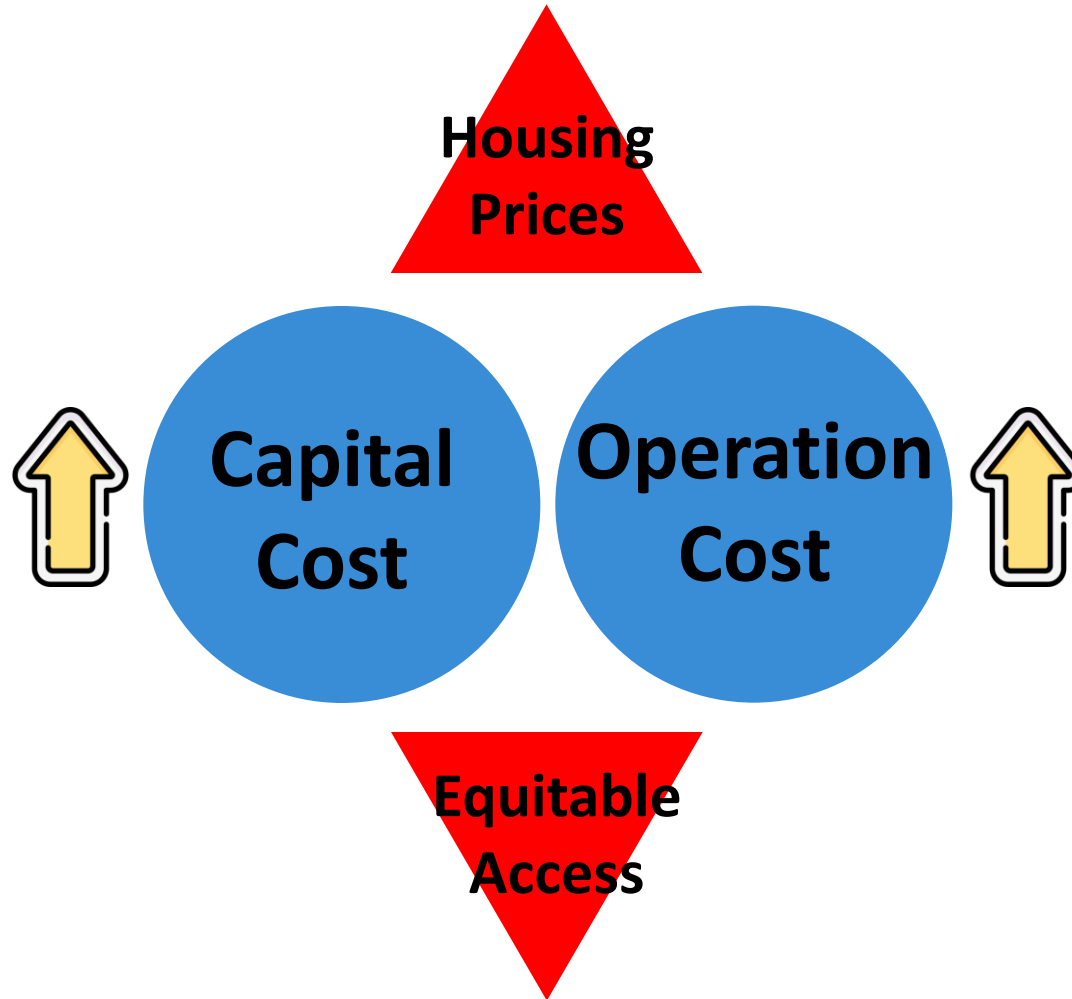


Is it **Stable**?  
Is it **Sustainable**?  
Is it **Equitable**?

Housing  
Prices

Equitable  
Access





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# TOD + LVC

## Successful stories



وزارة إعداد التراب الوطني و التعمير و الإسكان و سياسة المدينة  
Ministère de l'Aménagement du Territoire National,  
de l'Urbanisme, de l'Habitat et de la Politique de la Ville

 **UN-HABITAT**  
FOR A BETTER URBAN FUTURE



北京交通大学  
BEIJING JIAOTONG UNIVERSITY

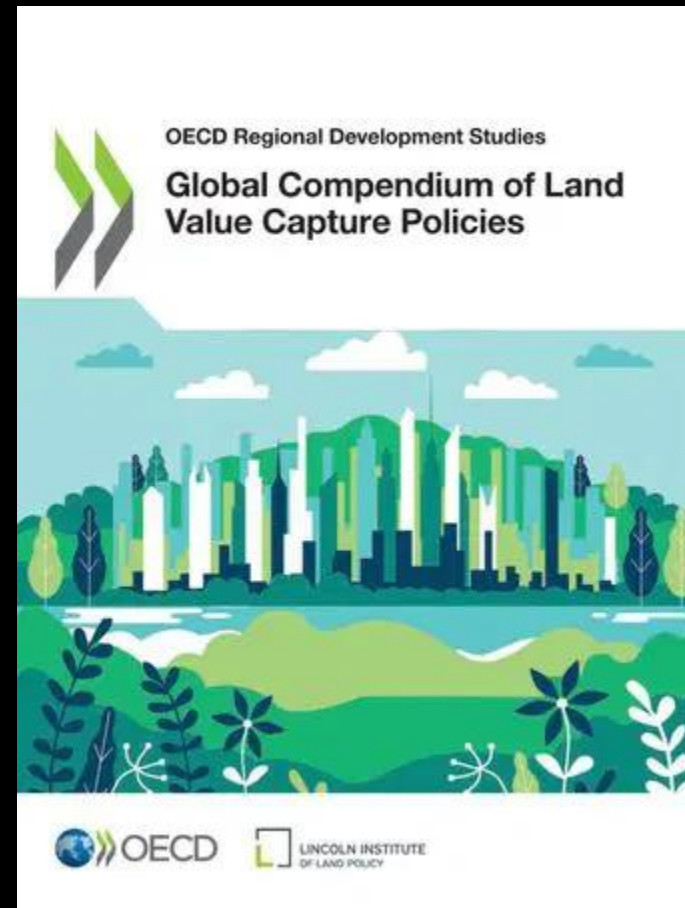
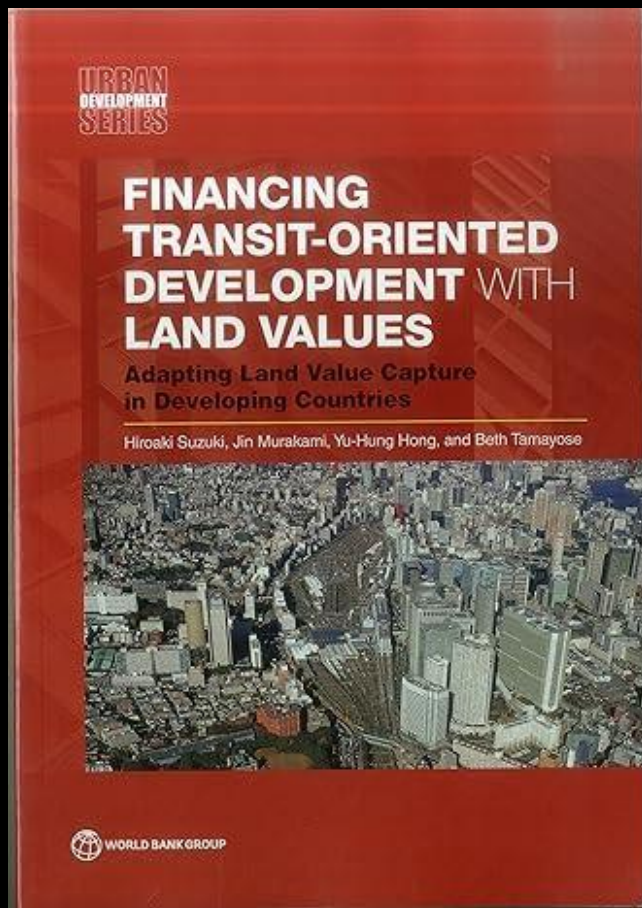
 **TOD**  
ACADEMY

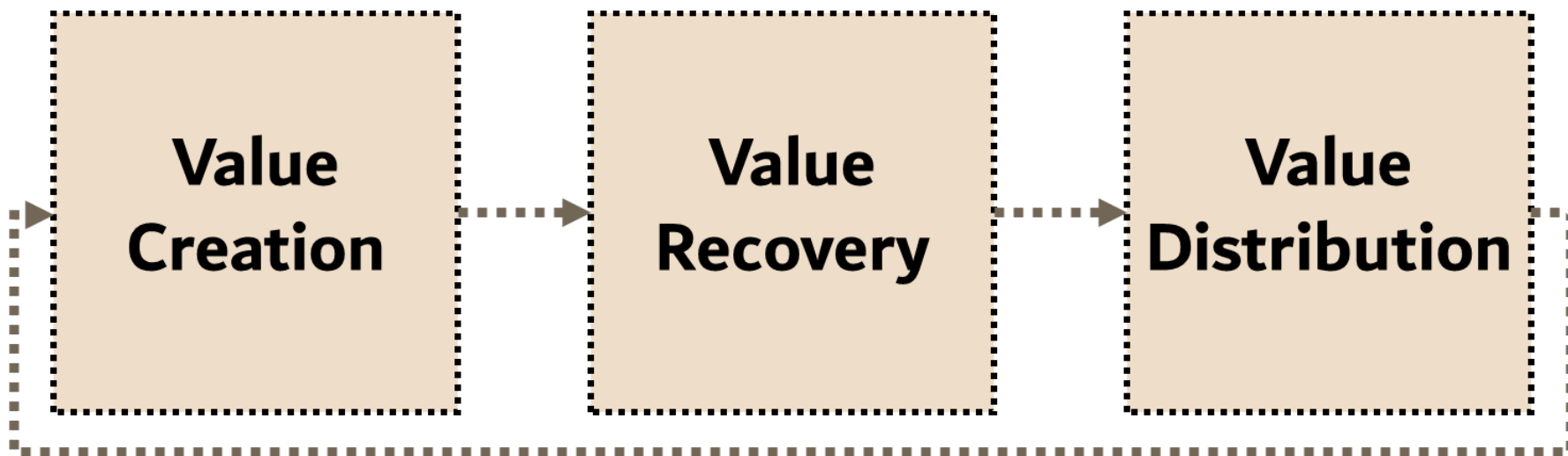
北京交通大学国土空间  
与交通协同发展研究院  
Transit Oriented Development  
Academy of Beijing Jiaotong University

“Public actions should yield public benefits.”









## Infrastructure Levy

A tax or fee on landowners whose land value increases due to government-initiated infrastructure investments.

## Developer Obligation

A cash or in-kind contribution by developers to cover the cost of new public infrastructure and services needed for their development.

## Charges for Development Rights

Cash or in-kind contributions paid for the right to exceed a set development baseline.

## Land Readjustment

A practice where fragmented land parcels are pooled for joint development.

## Strategic Land Management

The practice where governments actively engage in buying, developing, selling, and leasing land to meet public needs and recoup land value increments generated by public actions.

Infrastructure  
Levy

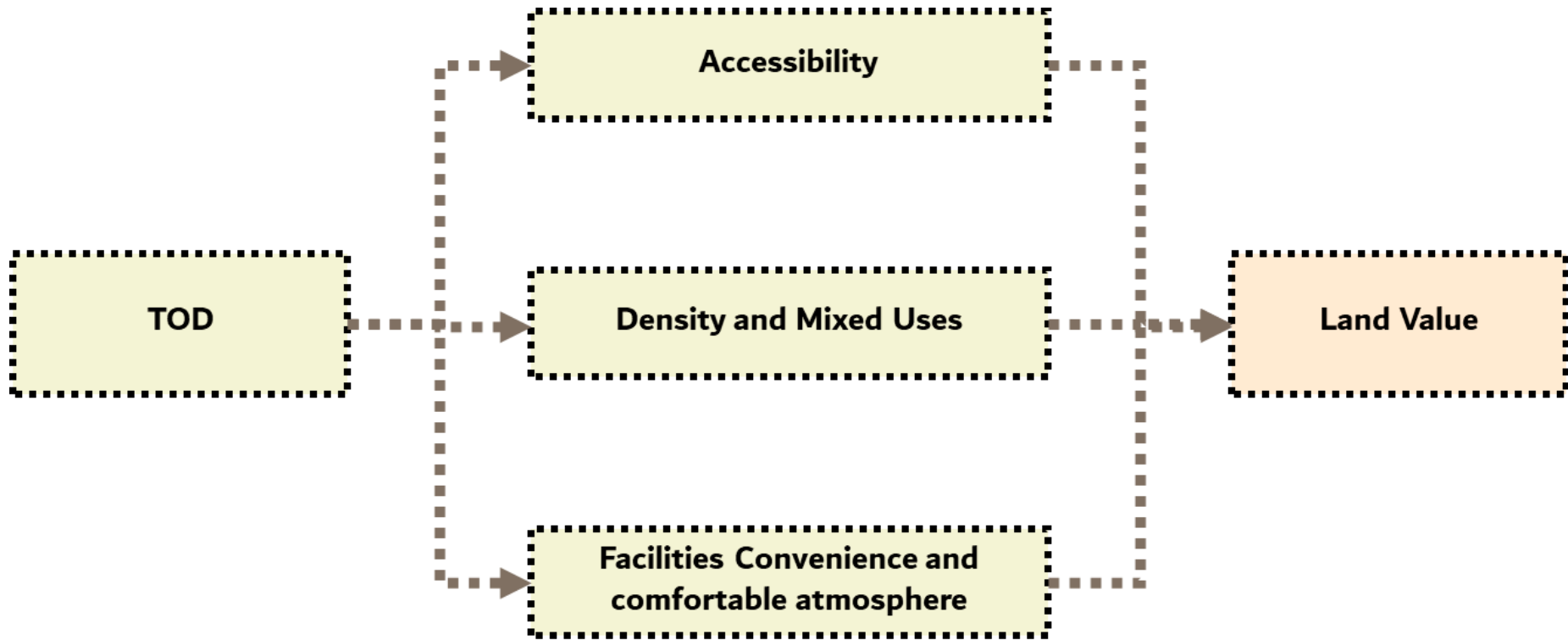
Developer  
Obligation

Charges for  
Development  
Rights

Land  
Readjustment

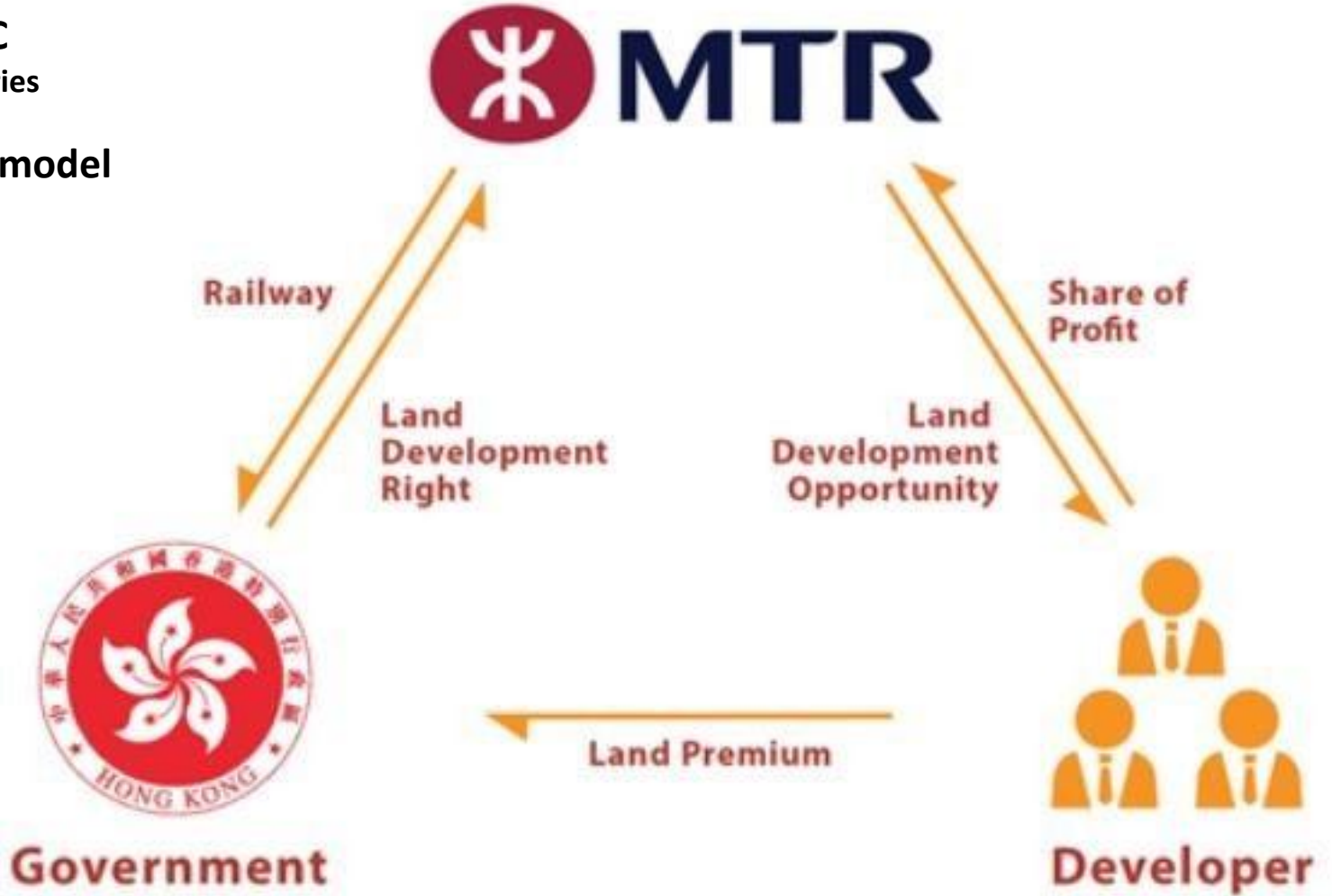
Strategic Land  
Management





TOD + LVC  
Successful stories

Rail + Property model

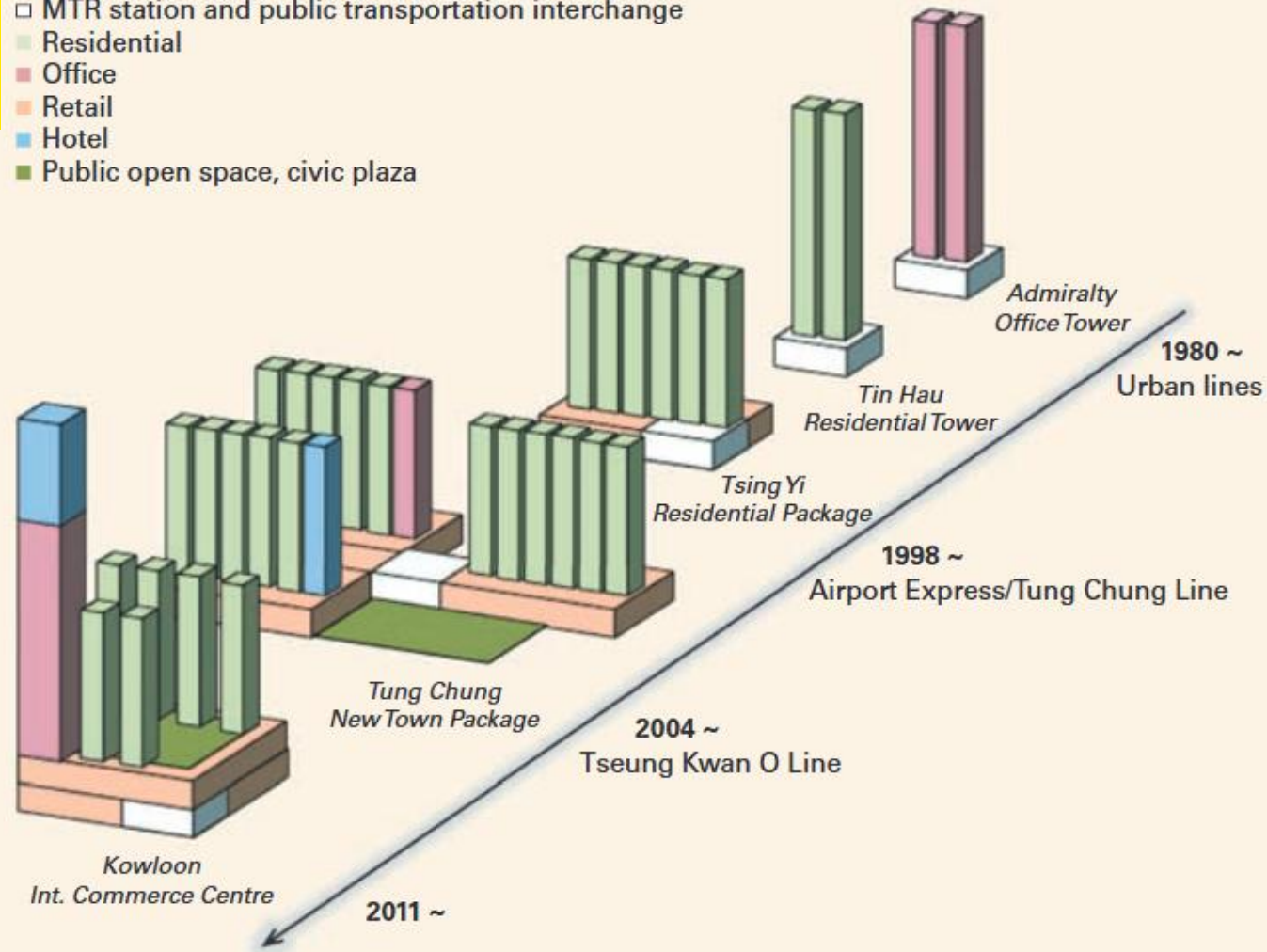


Metrorail News. (n.d.). Innovative financing for urban rails. Retrieved January 9, 2025, from <https://metrorailnews.in/innovative-financing-for-urban-rails/>

**TOD + LVC**  
 Successful stories

**Rail + Property model**

- MTR station and public transportation interchange
- Residential
- Office
- Retail
- Hotel
- Public open space, civic plaza



Suzuki, H., J. Murakami, Y.-h.  
 Hong and B. Tamayose (2015).  
 Financing Transit-Oriented  
 Development with Land Values:  
 Adapting Land Value Capture in  
 Developing Countries.

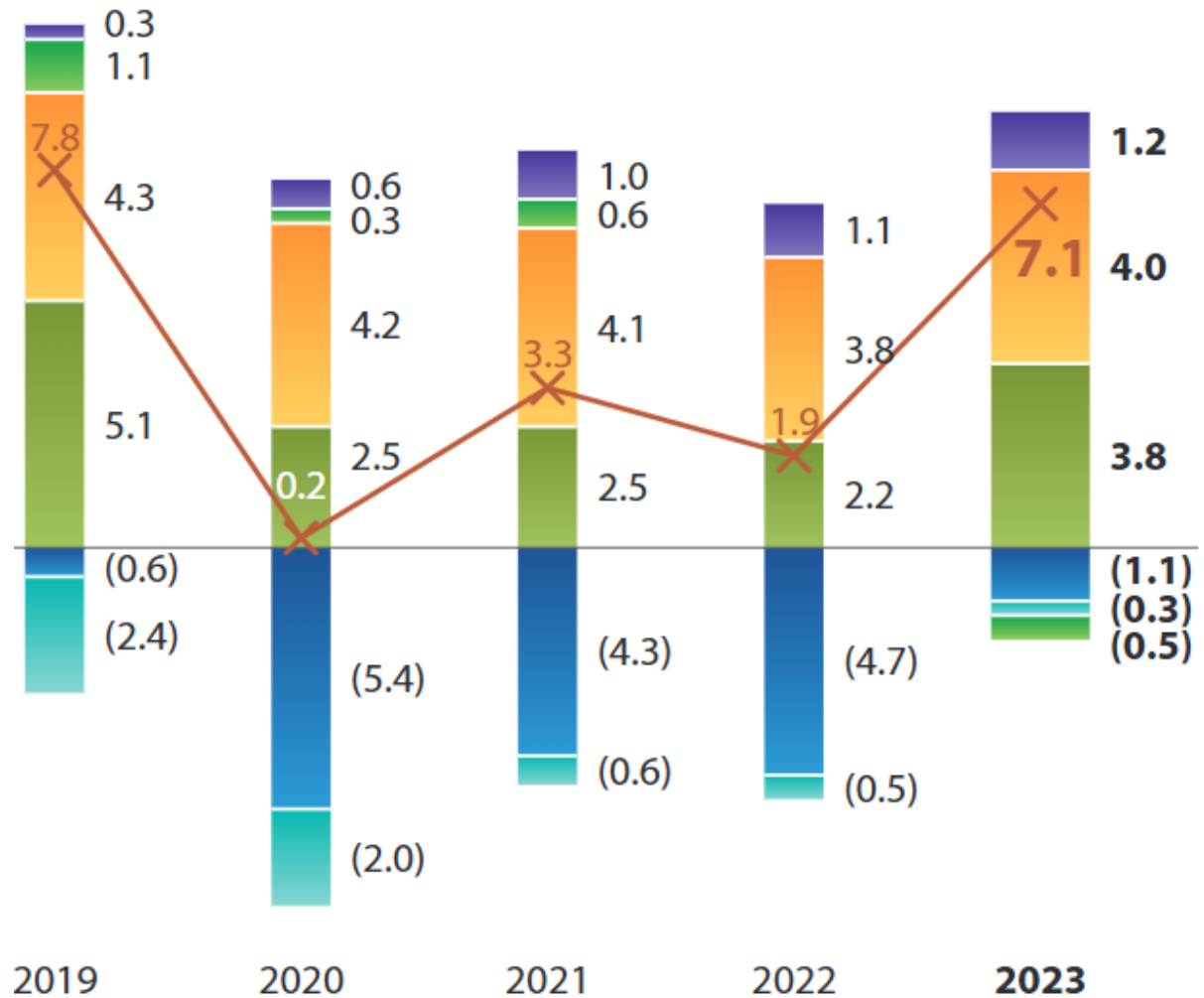
Source: Based on Cervero and Murakami 2009.  
 Note: MTR = Mass Transit Railway.

**TOD + LVC**

Successful stories

**Rail + Property model**

- ✗ Total Recurrent EBIT
- Share of Profit of Associates and Joint Ventures
- Mainland China and International Railway, Property Rental and Management Subsidiaries
- Hong Kong Property Rental and Management Businesses
- Hong Kong Station Commercial Businesses
- Hong Kong Transport Operations
- Other Businesses, Project Study and Business Development Expenses



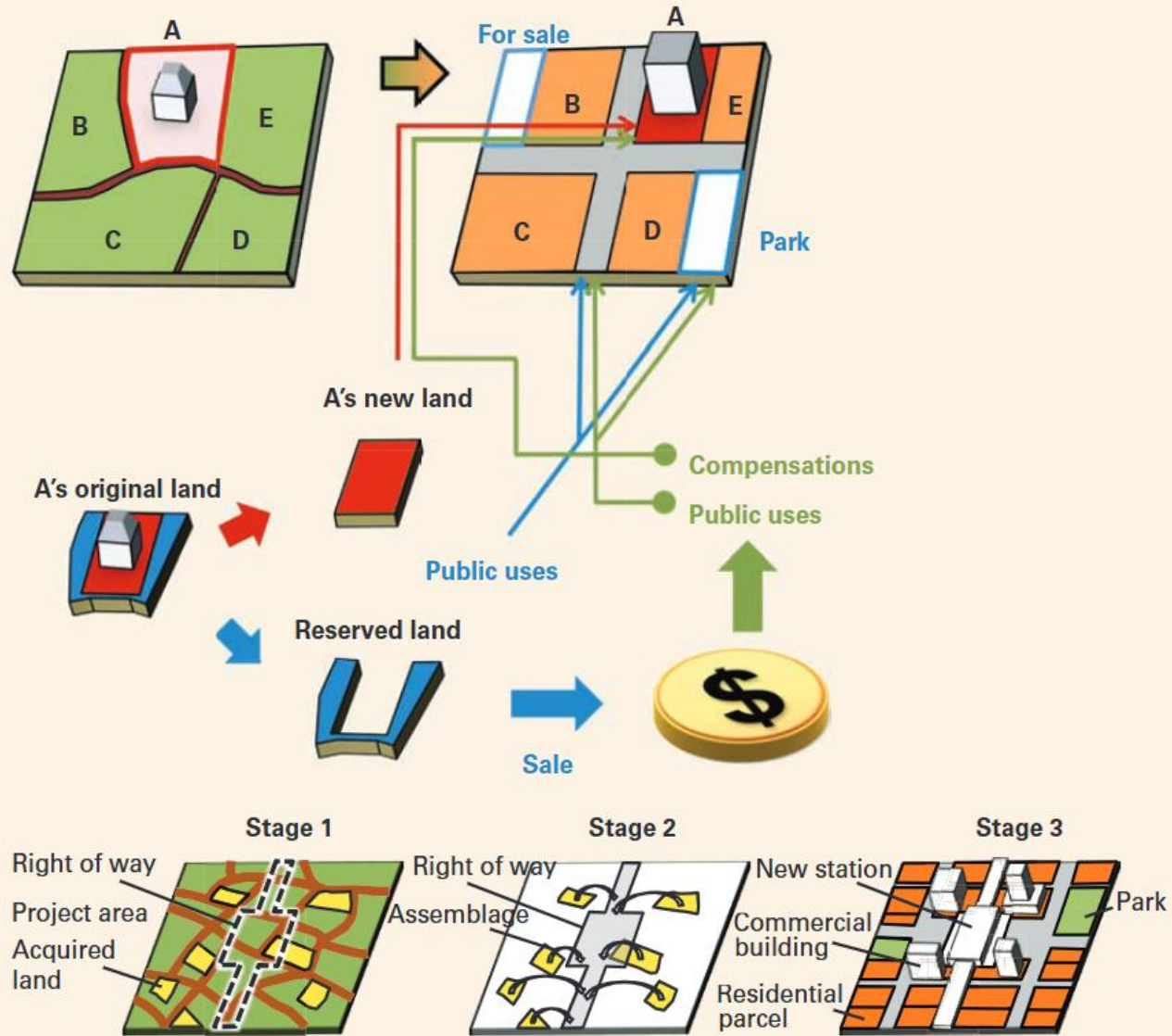
MTR Corporation. (n.d.). Profit and loss statement: Total recurrent EBIT (HK\$ billion) from 2019 to 2023, with HK\$1 ≈ USD 0.13. Retrieved January 7, 2025, from [https://www.mtr.com.hk/archive/corporate/en/investor/profit\\_en.pdf](https://www.mtr.com.hk/archive/corporate/en/investor/profit_en.pdf)



# الاراضي العربية ادارة Arab Land Initiative

**TOD + LVC**  
Successful stories

## Tsukuba Express Integrated land readjustment

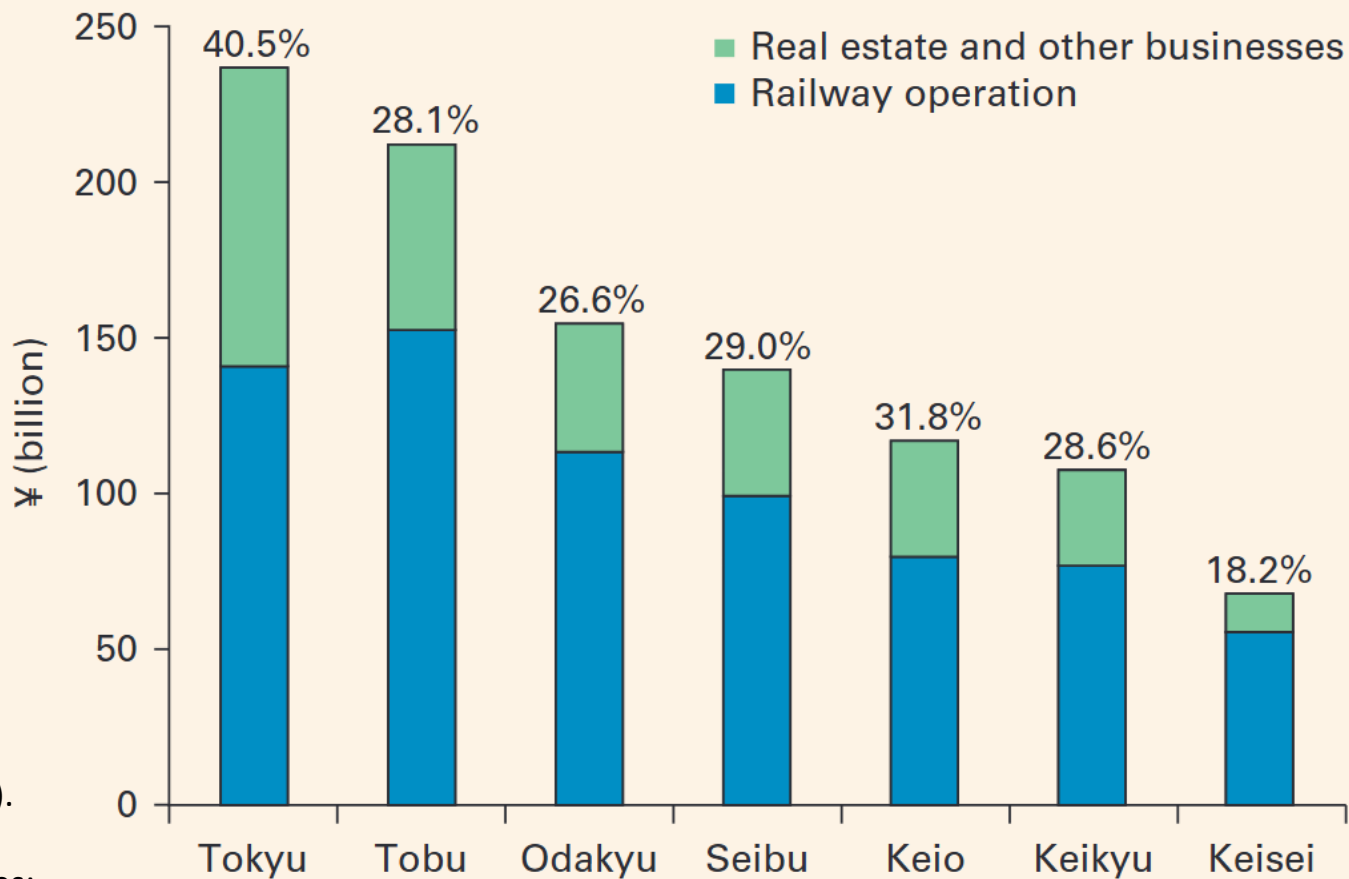


Source: Adapted from the Chiba Prefectural Government 2009.

Suzuki, H., J. Murakami, Y.-h.  
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**TOD + LVC**  
 Successful stories



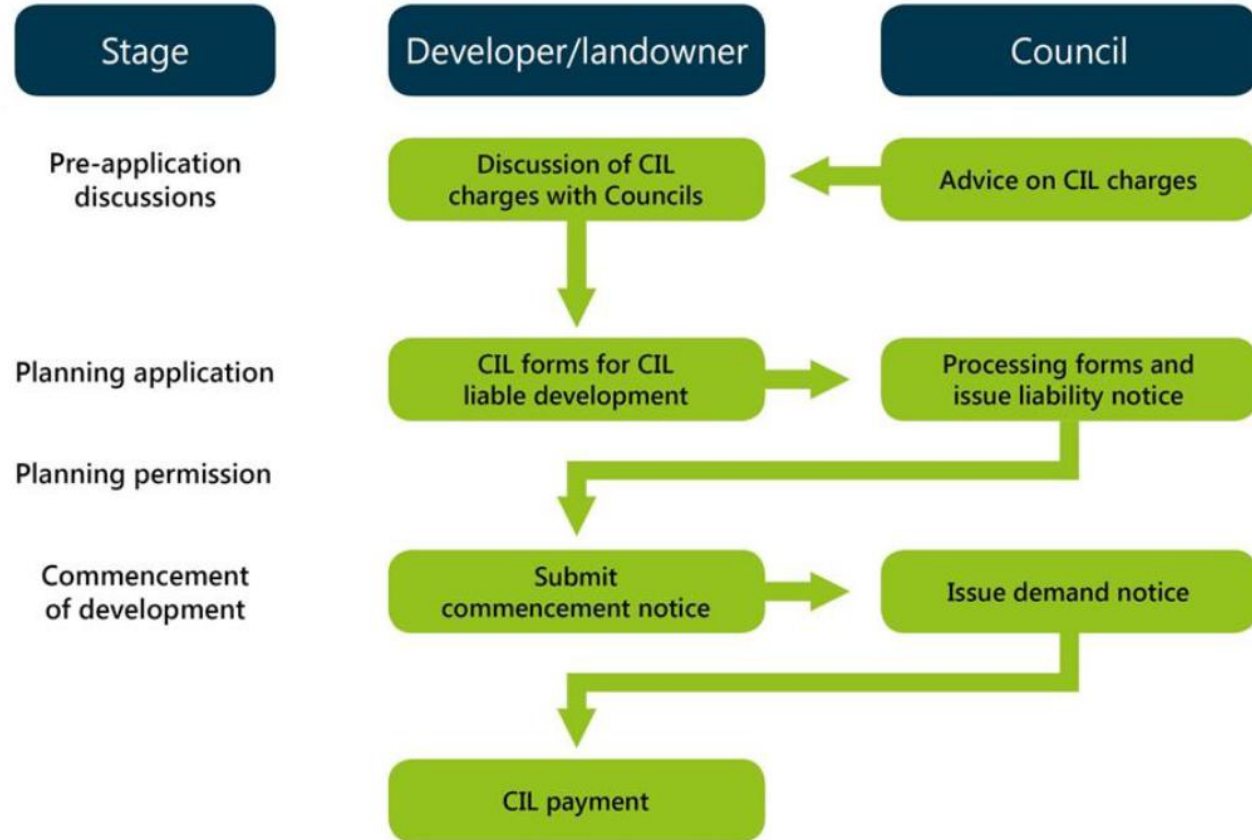
Suzuki, H., J. Murakami, Y.-h. Hong and B. Tamayose (2015). Financing Transit-Oriented Development with Land Values: Adapting Land Value Capture in Developing Countries.

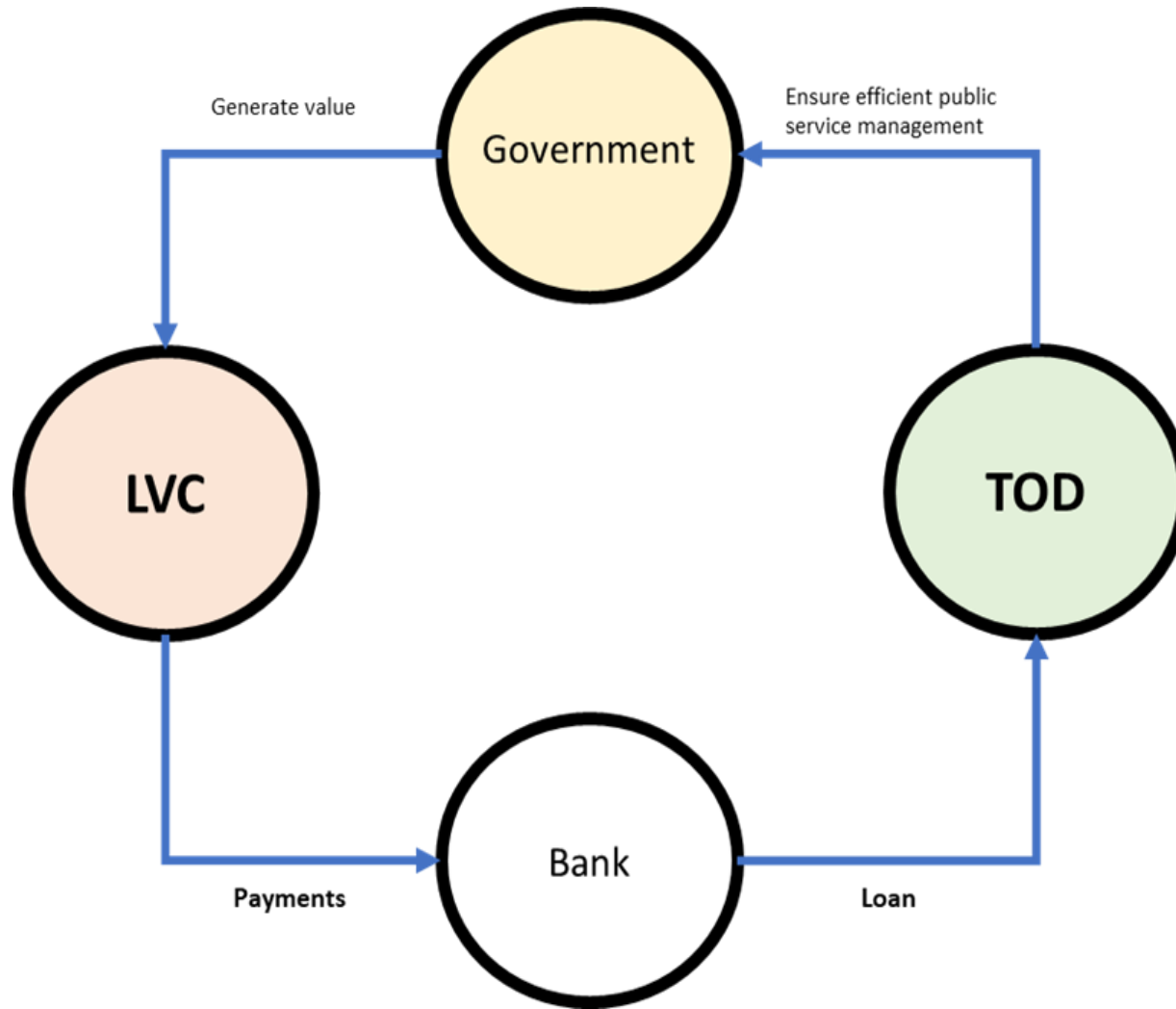
Source: Data from Association of Japanese Private Railways 2013.

# الاراضي العربية Arab Land Initiative

## TOD + LVC Successful stories

Stakeholder  
engagement and  
transparency





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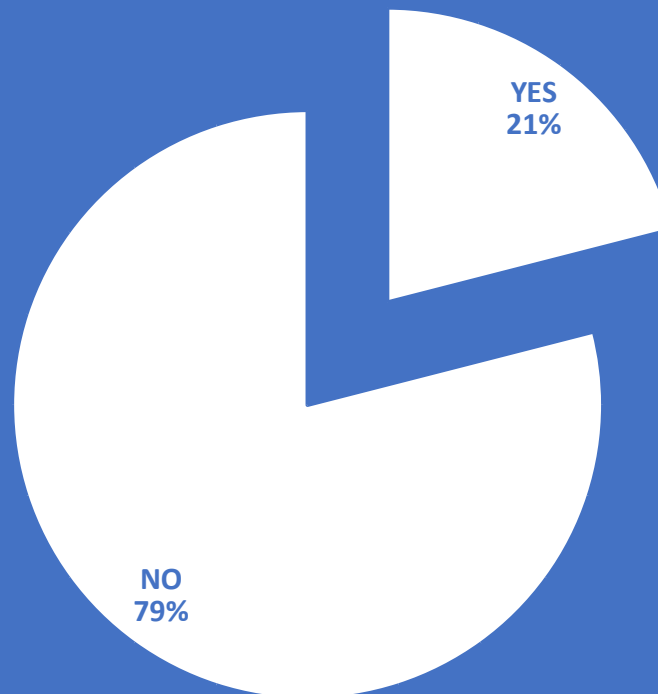
**OUR**

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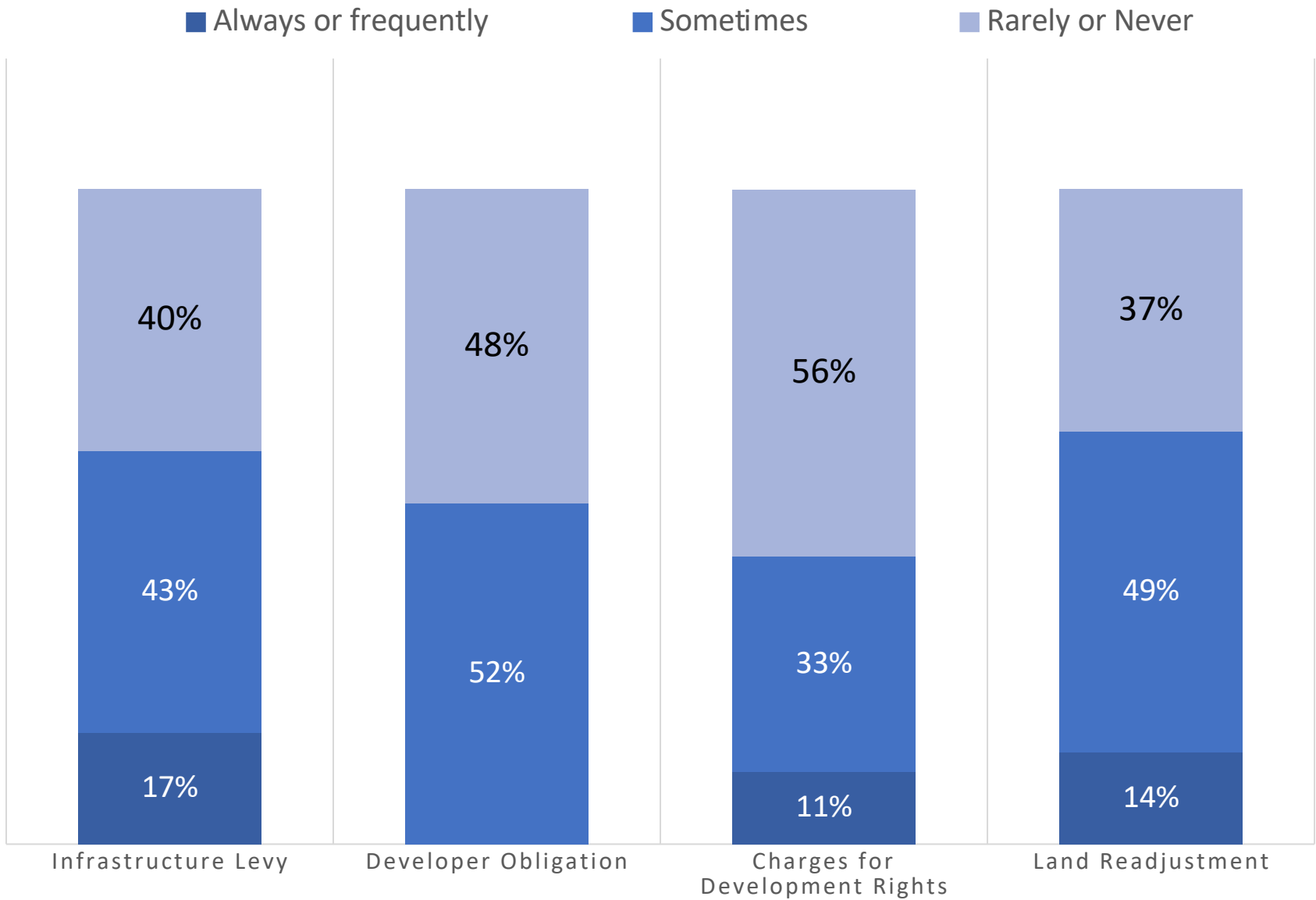
**solutions**

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Legal definition of LVC in 60 countries (OECD, Lincoln Institute of Land et al. 2022)

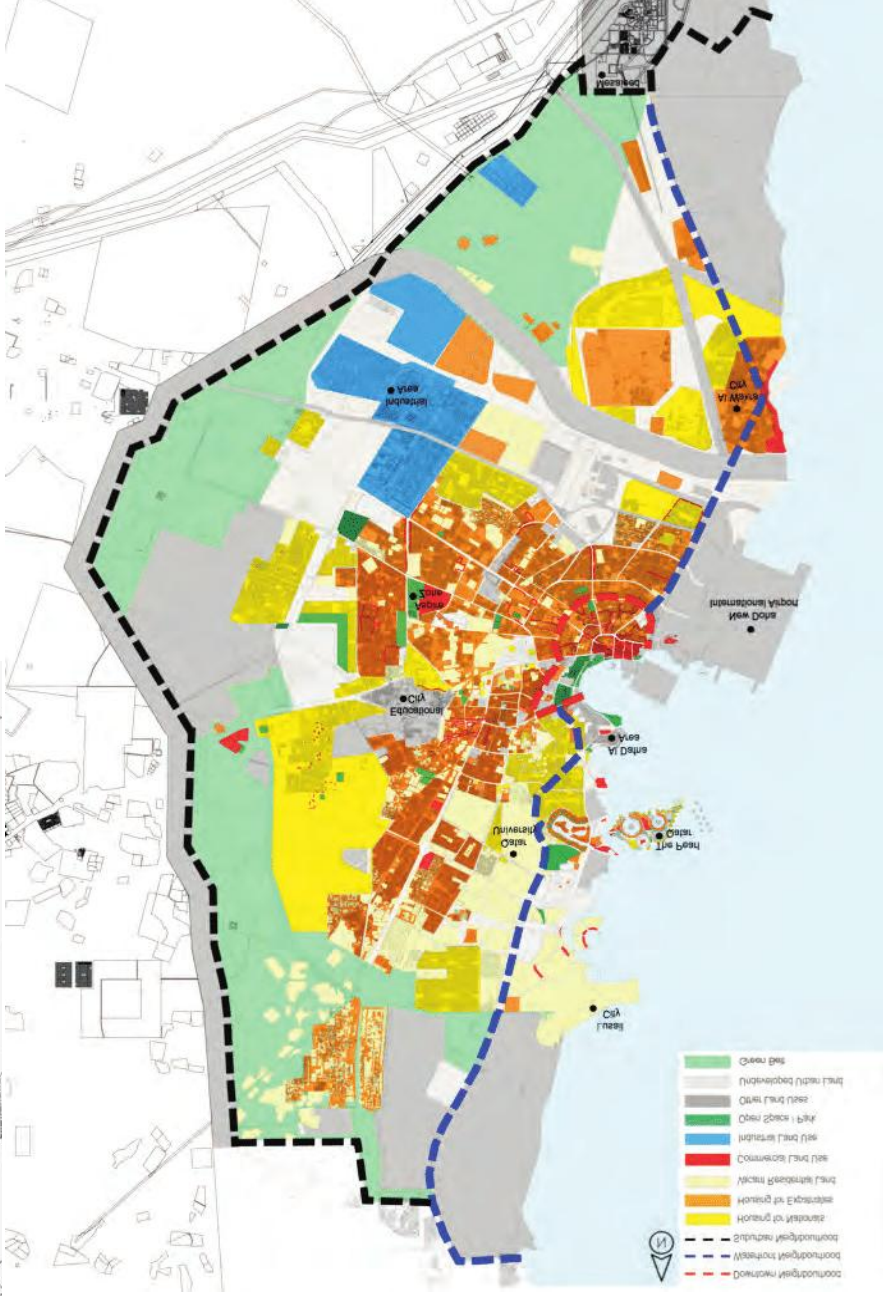
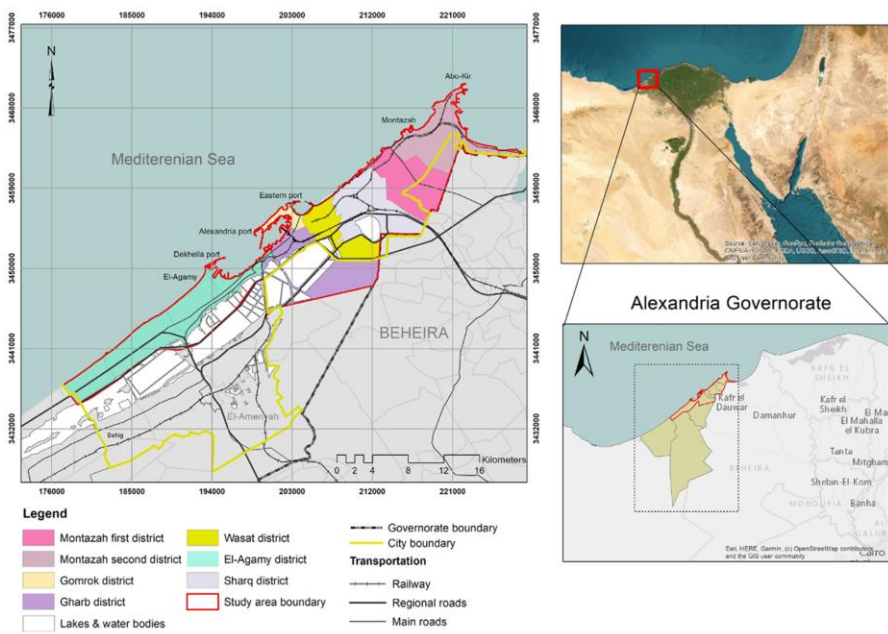




Frequency of appeals against the use of LVC (OECD, Lincoln Institute of Land et al. 2022)







Sources:  
**Strategic Urban Plan (SUP) for Alexandria City**  
**Dubai Urban Master Plan 2040**  
**Qatar National Vision 2030**

# الاراضي العربية مبادرة

## Arab Land Initiative

**OUR  
challenges  
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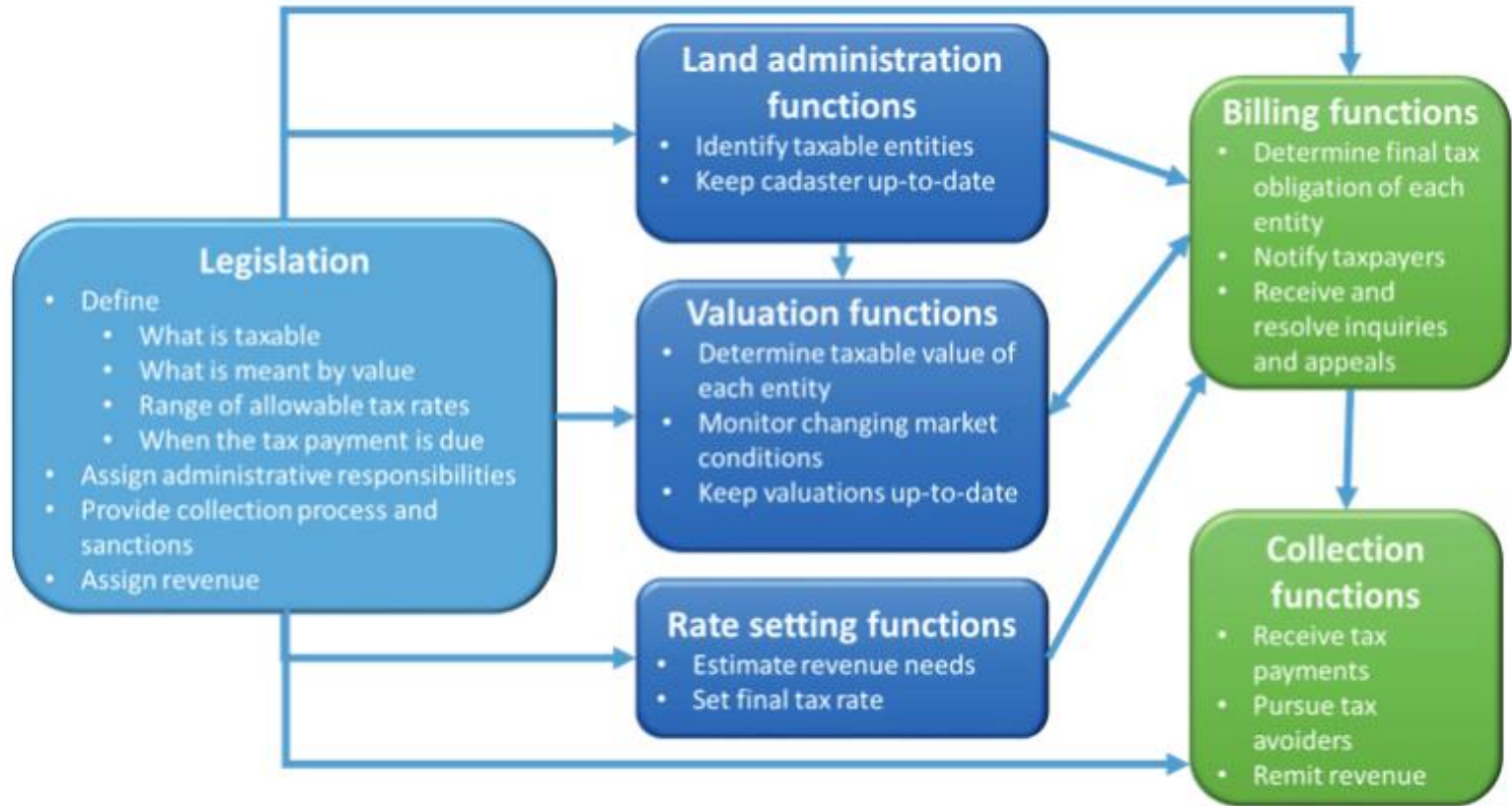
Instrument	Description
Betterment Levy	<ul style="list-style-type: none"> <li>Governed by Betterment Levy Law 222/1955.</li> <li>Imposes a charge on buildings and lands benefiting from value increases due to public actions (e.g., infrastructure improvements, plan approvals).</li> <li>Rate: 50% of the value increase.</li> <li>Revenues are considered local revenues.</li> </ul>
Developer Exactions	<ul style="list-style-type: none"> <li>Building Law 119/2008, Article 45 allows cities to charge building permit fees (max EGP 1000).</li> <li>Governors can increase the fee by 3% annually.</li> <li>Article 51 allows the state to require up to 33% of land for public facilities.</li> </ul>
Special Assessments	<ul style="list-style-type: none"> <li>Used for agricultural improvements (e.g., irrigation, drainage).</li> <li>Governed by Agricultural Irrigation and Drainage Law No. 12/1984 (amended).</li> <li>Benefiting landowners repay construction costs (+10% administrative fee) over up to 20 years.</li> <li>Tax reflects increased rental value.</li> </ul>
Real Estate Tax	<ul style="list-style-type: none"> <li>Building Tax Law 2008 reformed outdated property valuations and expanded the tax base.</li> <li>Presidential Decree No. 117 of 2014 amended the law to improve collection, increase revenues, and discourage speculation.</li> </ul>

Instrument	Local Name	National Legal Provision	Responsible Entities	Frequency
Developer Obligations	Developer Exactions	Articles 49, 51, and 52 of Law 119/2008	Local governments and special-purpose bodies	Always
Charges for Development Rights	None	Law 119/2008	Local governments and special-purpose bodies	Frequent
Infrastructure Levy	Betterment Levy	Law 222/1955	Local governments	Frequent
Land Readjustment	None	Articles 20 and 24 of Law 119/2008	National government, local governments, NGOs, and private stakeholders	Moderate
Strategic Land Management	None	Article 3 of Law 100/1964	All levels of government	Frequent

Egypt: Main Land Value Capture (LVC) Instruments (OECD, UN habitat, and the Lincoln Institute)



**OUR  
 challenges  
 OUR  
 solutions**



Leveraging Land in the Arab Republic of Egypt" by UN-Habitat

**OUR**  
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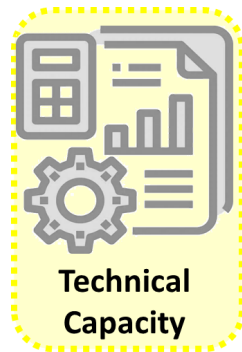
**Legal  
Frameworks**



**Technical  
Capacity**



**Community  
Resistance**



**OUR**  
challenges  
**OUR**  
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**Centralized Systems:**

Limited local autonomy restricts the implementation of LVC policies.

**Informal Development:**

Widespread informal practices undermine regulations and infrastructure planning.

**Administrative Constraints:**

Limited resources and inefficient systems impact monitoring and enforcement.

**Fragmented Systems:**

Absence of integrated land management tools reduces efficiency.

**Public Trust:**

Citizens often hesitate to support LVC initiatives due to concerns about transparency and accountability in how revenues are used.

**Cultural Sensitivities:**

Land's social and familial significance can make introducing taxes or fees a sensitive issue.

**Perceived Inequities:**

Exemptions for certain properties or groups can create a sense of unfairness, limiting public acceptance.

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# **Four-step LVC+TOD**

## **A Framework for Action**

Planning and  
Identification

Policy  
Alignment

Stakeholder  
Engagement

Monitoring and  
Evaluation





## Planning and Identification

- Urban Analysis
- Feasibility Studies
- Resource Mapping

Policy  
Alignment

Stakeholder  
Engagement

Monitoring and  
Evaluation

## Planning and Identification

- Urban Analysis
- Feasibility Studies
- Resource Mapping

## Policy Alignment

- Land Use Policies
- Legal Frameworks
- Zoning Adjustments

## Stakeholder Engagement

## Monitoring and Evaluation

## Planning and Identification

- Urban Analysis
- Feasibility Studies
- Resource Mapping

## Policy Alignment

- Land Use Policies
- Legal Frameworks
- Zoning Adjustments

## Stakeholder Engagement

- Public Consultations
- Private Sector Engagement
- Community Feedback

## Monitoring and Evaluation

## Planning and Identification

- Urban Analysis
- Feasibility Studies
- Resource Mapping

## Policy Alignment

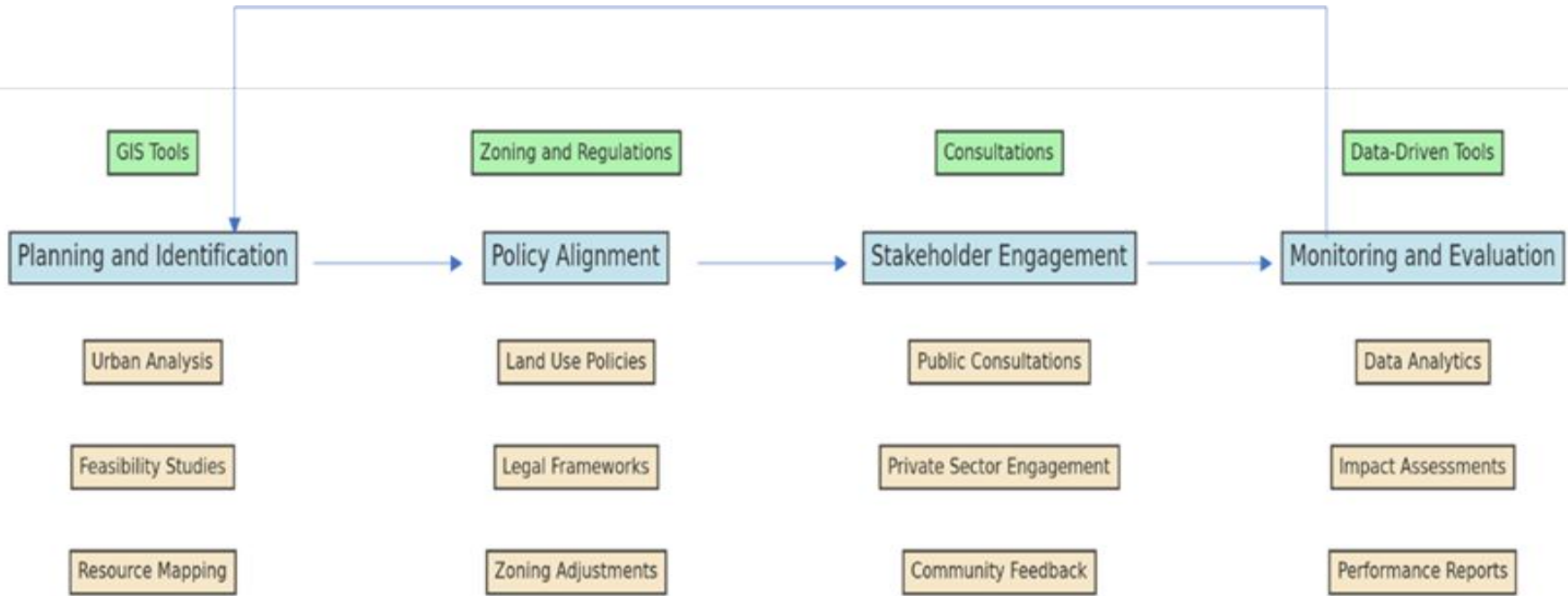
- Land Use Policies
- Legal Frameworks
- Zoning Adjustments

## Stakeholder Engagement

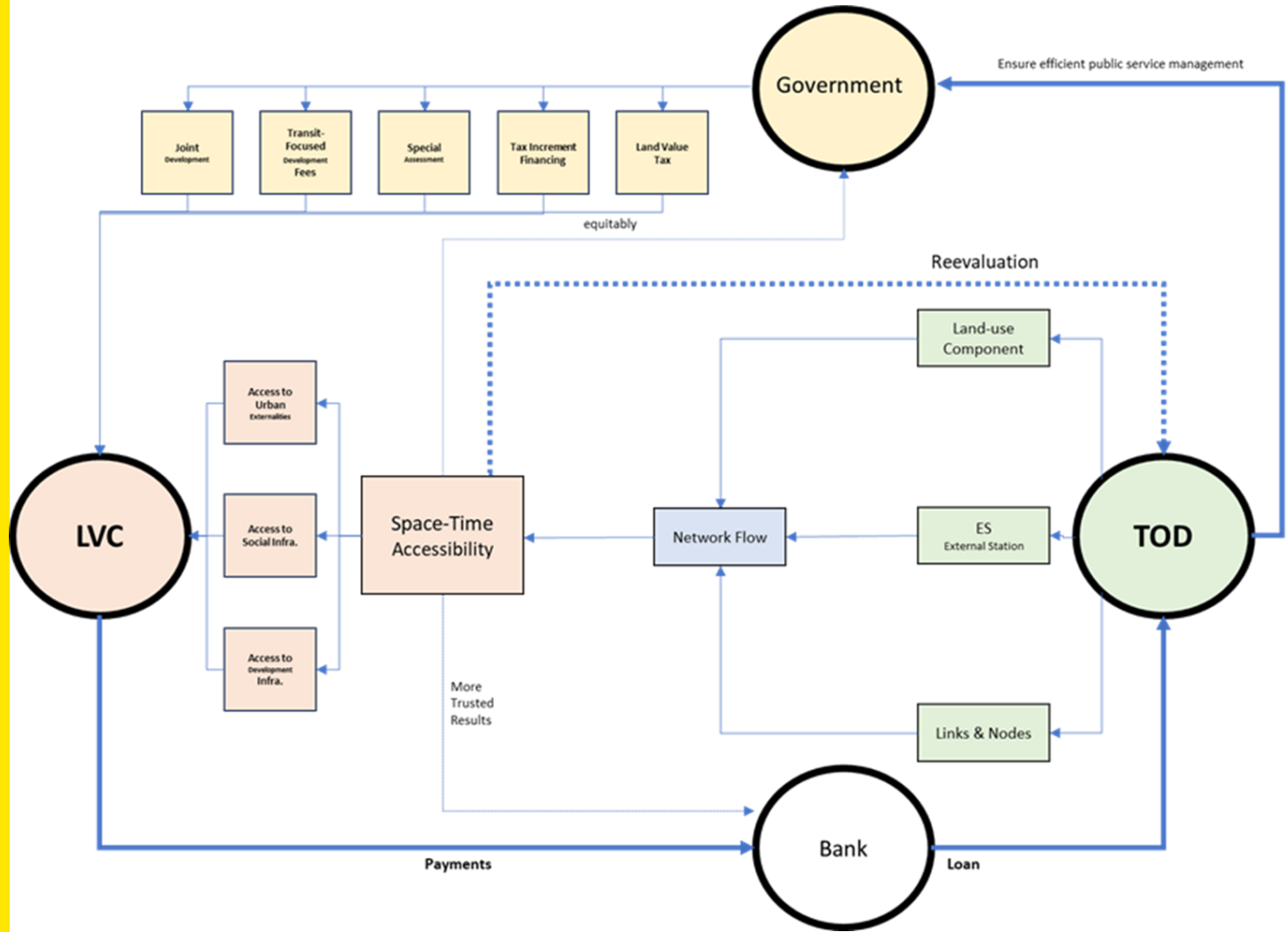
- Public Consultations
- Private Sector Engagement
- Community Feedback

## Monitoring and Evaluation

- Data Analytics
- Impact Assessments
- Performance Reports



Four-step LVC+TOD  
 A Framework for Action



## Mechanism Recommendations Aligned with LVC-TOD Framework

Developer Obligations	<ul style="list-style-type: none"> <li>• Leverage Special Assessments to directly link developer fees to specific infrastructure projects.</li> <li>• Use spatial tools like GIS to assess the impact of projects and prioritize funding for transit-oriented initiatives.</li> <li>• Ensure transparency and stakeholder trust</li> <li>• .</li> </ul>
Charges for Development Rights	<ul style="list-style-type: none"> <li>• Apply Transit-Focused Development Fees strategically in high-demand TOD zones identified through space-time accessibility analysis.</li> <li>• Enhance land registry systems and integrate accessibility metrics to justify charges and align with TOD objectives.</li> </ul>
Infrastructure Levy	<ul style="list-style-type: none"> <li>• Introduce Tax Increment Financing (TIF) to capture future property value increases over time.</li> <li>• Allow for phased reinvestment into transit and infrastructure projects.</li> <li>• Communicate the long-term benefits to stakeholders and align incentives between municipalities and governorates.</li> </ul>
Strategic Land Management	<ul style="list-style-type: none"> <li>• Implement Joint Development approaches, such as Hong Kong's Rail + Property model, where public agencies and private developers share risks and benefits.</li> <li>• Ensure preemptive land freezing and transparency during zoning or rezoning processes to prevent speculation.</li> </ul>

# THANK YOU!

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المملكة المغربية  
ROYAUME DU MAROC



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MINISTÈRE DE L'AMÉNAGEMENT DU TERRITOIRE NATIONAL  
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