How can you implement TOD Corridors in your City?

The TOD Corridor Supplementary exercise:
Set of guiding questions to start, listing entry points, actors involved, main regulations and financing sources (among others) for TOD Corridor planning & implementation.

Image Source: WRI with WB adjustments
Module Quiz

1. Which of the following choices is NOT one the building blocks of TOD delivery presented in this course?
   a. Political leadership and vision  
   b. Stakeholder engagement  
   c. Institutional structure  
   d. Efficiency  
   e. Financing

2. Which of the following statements on institutional structure of TOD implementation is true?
   a. Because TOD projects are public goods, they should be delivered solely by the public sector.
   b. The Public-Private Board is an institution that includes various public-private arrangements, and it can participate in decision making, project oversight, and assurance.
   c. Steering committees are the most formal institutional arrangement to monitor implementation, resolve problems, and provide advice on project-related issues.
   d. There is no real estate development department installed in the Washington Metropolitan Area Transit Authority (WMATA).

3. Which one of the following choices is a voluntary land assembly tool?
   a. Land readjustment  
   b. Valuation of public land  
   c. Expropriation  
   d. The right of preemption
4. What are regulatory instruments?
   a. Zoning and land use planning, administrative restrictions, and legislation
   b. Design standards, building codes, and legislation
   c. Design standards, administrative restrictions, and building codes
   d. Zoning and land use planning, building codes, and design standards

5. Which of the following instrument is NOT designed to promote TOD?
   a. Density bonus
   b. Upzoning
   c. Mono land-use
   d. Transferrable development rights
MODULE 4: DESIGN COMPONENTS OF TOD

Transit Oriented Development at a Corridor Scale
Module Objective and Outline

Objective:
The objective of this module is to introduce participants, particularly people without an urban design or architecture background, to a variety of design concepts that are central for successful TOD project implementation. After completing this module participants will be familiar with design vocabulary commonly used in TOD projects, and will be able to utilize these concepts when designing and implementing TOD corridor projects.

Outline:
1. Density
2. Quality Public Transit
3. Non-motorized Transportation
4. Vehicle Demand Management
5. Mixed-use Development
6. Neighborhood Centers & Active Ground Floors
7. Public Spaces and Natural Resources
8. Community Identity and Heritage
9. Resilience
Module Structure: Design Components of TOD

1. Density
2. Quality Public Transit
3. Non-motorized Transportation
4. Vehicle Demand Management
5. Mixed-use Development
6. Neighborhood Centers & Active Ground Floors
7. Public Spaces and Natural Resources
8. Community Identity and Heritage
9. Resilience

WRI EMBARQ Mexico. TOD Guide for Urban Communities. 2014.
1. Density

Design and urban planning strategies for increased density:

- Increased FAR
- Smaller minimum plots
- Facilitated land consolidation
- Density bonuses and incentive zoning
- Construction of micro-units
- High quality amenities
Focused Densities Along a Corridor in Curitiba, Brazil

2. Quality Public Transit

Design strategies for quality public transit:

• Hierarchized public transit system
• Integrating transit with the urban footprint
• Viability of & access to public transit
• Public transit infrastructure


A bus corridor in Beijing, China
Complete Hierarchy of Public Transit

- **Metro Lines**
- **BRT Lines**
- **Feeder Bus Lines**

**Type of Connection**
- Metro to metro connection
- Metro to bus connection (BRT or feeder)
- Bus to bus connection (BRT or feeder)
Integrating Transit with the Urban Footprint

Viability of & Access to Public Transit

Public Transit Infrastructure: Connecting mass transit and buses

Public Transit Infrastructure: Elevated Connections

Design strategies for NMT:

- Continuous road layout
- Internal connectivity
- Pedestrian and cycling networks
- Sidewalks and bike paths
Continuous Road Layout

Internal Connectivity

Pedestrian and Cycling Networks

Sidewalks and Bike Paths

Bike Lane:
Two Lanes: 2.5 m
One Lane: 1.5 m

Service Zone: 0.6 m

Pedestrian Zone: 1.5 m

Front-of-building Zone: 0.4 m

4. Vehicle Demand Management (VDM)

Design strategies for VDM:

- Optimization of daily commutes
- Road safety
- Parking management

A traffic intersection in Beijing, China

Optimization of Daily Commutes

Parking Management

Design strategies for mixed-use and efficient buildings:

- Strategic location of neighborhood and regional facilities

Mixed-use buildings in Berlin, Germany

Regional and Neighborhood Facilities

6. Neighborhood Centers & Active Ground Floors

Design strategies for neighborhood centers and active ground floors:

• Neighborhood centers and local economic development
• Active ground-floors and public-private transitions

A busy retail and commercial area in Peru

Neighborhood Centers and Local Economic Development

Active Ground-floors and Public-private Transitions

Active Ground-floors

Public-private Transitions

Design strategies for public spaces and natural resources:

- Strategic green areas
- Public space networks
Strategic Green Areas

Public Space Networks
8. Community Identity and Heritage

Design strategies for community identity and heritage:

- Place identity
- Shared community streets

Public space in Mexico City, Mexico

Place Identity

Cultural

Environmental

Heritage

Architectural

Shared Community Streets

Model Zoning Codes

Image Source: Toronto Str
https://www.flickr.com/photos/greaterlononauthority/9495607/ or
City resilience describes the capacity of cities to function, so that the people living and working in cities survive and thrive no matter what stresses or shocks they encounter. [Rockefeller Foundation]

Design strategies for increased resilience:
- Avoid areas of high risk
- Design robust corridors
- Maximize redundancy of connections


Module Quiz

1. Which of the following statements is NOT true?
   a. TOD aims to bring housing and jobs closer together.
   b. TOD prioritizes public transit and NMT over private vehicle usage.
   c. TOD aims to separate residential and commercial zoning.
   d. Public and green space are important components of TOD design.

2. Which of the following statements is NOT true?
   a. Sidewalks can be divided into three zones, or segments.
   b. Trees and vegetation should not be included in any zone of the sidewalk.
   c. Pedestrian zones should be free of all obstacles, well maintained, and wide enough to accommodate pedestrian flow and users of all abilities.
   d. Service zones of a sidewalk can include street furniture and service infrastructure.

3. When conducting a local economic analysis, which of the following economic sector(s) should be analyzed?
   a. Primary
   b. Secondary
   c. Tertiary
   d. All of the above

4. In what ways do cities benefit from creation of public space and the conservation of natural resources?
   a. Risk mitigation (e.g. protection from flooding, landslides and mudslides)
   b. Ecosystem services (e.g. rainwater water filtration and purification, aqueduct and water table recharge, production of oxygen and CO2 sequestration)
   c. Health benefits
   d. All of the above
5. Which of the following descriptions defines redundancy in a resilient system?
   a. Spare capacity purposely created within a system so that it can accommodate disruption, extreme pressures or surges in demand
   b. Well-conceived, constructed and managed physical assets, so that a system can withstand the impacts of hazard events without significant damage or loss of function
   c. The need for broad consultation and engagement of communities, including the most vulnerable groups
   d. The ability to rapidly find different ways to achieve goals or meet needs during a shock or when under stress

6. When defining place identity, which of the following characteristics should be considered?
   a. Environmental
   b. Historical
   c. Cultural
   d. All of the above

7. Approximately _______% of the primary façades of all commercial ground floors that border the sidewalk or a public space should be transparent, and occupied by windows, displays and doors.
   a. 15%
   b. 25%
   c. 40%
   d. 60%
MODULE 5: INVESTING IN TOD

Transit Oriented Development at a Corridor Scale

MAASSEN, ANNE, INDIRA MASULLO, AND JULIÁN SOSA. “A BUSINESS MODEL FRAMEWORK TO ACCELERATE TRANSIT-ORIENTED DEVELOPMENT (TOD) INVESTMENTS IN EMERGING CITIES.” WORLD RESOURCES INSTITUTE. FORTHCOMING 2017.
Module Objective and Outline

• **Objective:** At the end of this module, you will understand and identify the elements of a business model for sustainable investments in TOD projects that need to come together for a corridor TOD investment

• **Outline**
  - The TOD investment
  - Business model approach for TOD
  - The business model framework
    - Investment components
    - Delivery mechanisms
    - Funding sources
    - Financial products
Financing TOD: Some Lessons Learned

- At the corridor scale, it can be difficult to structure manageable transaction sizes.
- Institutional and contractual frameworks are needed as a basis for productive commercial relationships and to guide decision-making.
- It is important to unlock and capture funding sources to pay back investments, and to not purely rely on public budgets to fund infrastructure and services.
- Third party finance is likely to be essential for the kind of capital-intensive, and upfront investments like TOD.

TOD Investments

The TOD of Fruitvale Village in California, U.S.A.

**TOD investment:** the allocation of resources by public, private, and other stakeholders that are expected to generate the range of benefits associated with TOD.
When considering financing strategies for TOD corridor development, what needs to be financed?

- **Investment Size: Large**
  - Capital costs for BRT, LRT, or metro systems
  - Often paid by public sector, but funding can be raised through capturing land value uplift and real estate improvements

- **Investment Size: Small-Medium**
  - Local street improvements & sidewalk/NMT infrastructure
  - Can be paid by developers in strong markets or by local government

- **Investment Size: Varies**
  - Consists of construction costs of residential/commercial buildings
  - Most costs to be paid by developer, but public subsidy sometimes required if weak market or affordable housing is required
A business model is a framework that includes all of the elements that make it possible for an investment to generate a return. A TOD business model is a framework that includes all the elements that allow a TOD investment to generate [social, economic, environmental and financial] return.
Why take a business model approach to TOD investments?

TOD business model framework can help build and create:

• **Capacity**: Systematic understanding of options
• **Dialogue**: Common language for stakeholder dialogue
• **Innovation**: Creation of context-specific approaches
The Business Model Framework

How to mobilize investment capital?

What to invest in?

How to structure implementation?

How to pay for it?
The various assets and processes that generate cost and revenues over the course of a TOD investment
There are three different types of investment components:

- **Tangible assets**: material infrastructures, technology, equipment that must be manufactured, bought, built, and installed. It includes:
  - Land, horizontal infrastructures, and vertical constructions
- **Intangible assets**: non-material factors that must be part of the investment to achieve desired benefits. It includes:
  - Resource efficiency, accessibility, inclusiveness, safety, cultural preservation
- **Processes**: procedures and actions associated with planning, implementation, and maintenance
Corridor scale
Investment components

**Tangible assets**
- Land
- Transit Track (Bus Lanes, Railways etc) and Transit stations
- Roads, street networks, pedestrians, bike lanes,
- Other TOD related investments (station plaza, bus terminal, public amenities, etc)
- Public and private buildings
- Public utilities

**Intangible assets**
- Articulated Density
- Public safety
- Walkability
- Mixed land use
- Cohesive Community
- High Quality Public places and Cultural heritage

**Processes**
- Feasibility studies
- Detailed engineering and investment cost estimate
- Financing arrangement
- Securing lands and site preparation
- Procurement and construction
- Monitoring and evaluation
- Operation and Maintenance
- Community engagement (all through critical stage from planning to implementation)
The commercial, contractual, and institutional arrangements exist to distribute the responsibilities and risks of the investment.
Three types of delivery mechanisms used for a TOD investment:

- **Contracts**: contracts that determine how the revenues and costs arising from the investment components are distributed
- **Legal entities & structures**: Legal entities dedicated to the implementation of a TOD investment
- **Institutional frameworks**: Laws and institutional arrangements that set enabling conditions for TOD investments to take place

The Pearl District, a TOD district in Portland, U.S.A.

Funding Sources

Investment revenues
- Service charges
- Land value capture
- Air right sales
- Own source revenue

Investment incentives
- Grants
- Fiscal incentives

Revenues, and other non-reimbursable monetary support, that can be used to repay the costs of the investment components
Funding sources: investment revenues

- **Investment revenues**: revenues generated by the TOD investment itself, in the form of direct payments received in return for products and services
  - Investment revenues include: *service charges, land value increments, and air right sales*
- **Service charges**: revenues obtained from charges applied to the use of transit services and from charges related to real estate assets
  - Farebox revenues
  - Real estate leasing
  - Betterment levies

---

Plaza Alfonso López, Manizales, Colombia: a TOD project that utilized betterment levies to enable investment

Land value capture: revenues gained by capturing some of the land value created through public sector intervention (FAR increase or changes in regulations) as well as public and private sector investments (transit, TOD investments)

- Public mechanisms include: Land readjustment, urban redevelopment, land sale/lease at post-rail prices; property and land tax, special assessment tax, tax increment financing, exaction and impact fees
- Private mechanism harnesses increased land value based on preferential access to land

Kowloon Station, Hong Kong: a TOD project where stakeholders utilized post-rail land value capture
**Funding sources: investment revenues**

**Sale of air rights**: transfer or sale of development rights through the auctioning of development rights. In Sao Paulo, the difference between the basic FAR and the maximum FAR is sold through auctioning. Authorities can also provide density bonuses (FAR increase beyond the zoning code) in exchange of direct payment or provision of affordable housing and public space by private developers.
Funding sources: investment incentives

NoMa District, Washington D.C.: a TOD project where tax credits were used to attract new tenants to the area


Investment incentives: incentives intended to induce stakeholder investment for TOD projects, by reducing the overall investment, through provision of grants and/or fiscal incentives:

- **Grants**: contributions to a TOD investment in monetary or physical asset form that can be received from public or private budgets. **Public grants** play a particularly important role in TOD investment

- **Fiscal incentives**: incentives, typically given in the form of reduced tax rates, tax exemptions and differed tax, provided by governments.
Funding sources: own source contribution

Own source contribution: existing public or private budgets that are directly mobilized for a TOD investment.
Options for mobilizing investment capital that come at a cost for the financial service provided.
Financial products

• TOD investments typically require third party capital, or financial products, to achieve adequate financing

• TOD investments often combine equity and debt—this combination is known as an investment’s capital structure

• When forming a TOD investment’s capital structure, stakeholders must take into account costs of capital

• The higher the risk of a TOD investment, the higher the costs of capital
**Financial products: equity**

**Equity**: a monetary contribution used to fund TOD investments that is obtained in return for an ownership share in the future profits of the investment.

Two different types of equity exist:
- **Direct equity**: a direct investment made by equity investors in a TOD project.
- **Indirect equity**: an investment made by equity investors in funds or a portfolio of projects.

![Pyramid diagram showing the hierarchy of investors with equity at the top, followed by community & philanthropic investors, commercial banks & institutional investors, and public sector (government, agencies, banks) at the bottom.](image-url)
**Loans**: monetary contributions obtained from creditors with specified conditions for repayment of the initial amount of money borrowed and interest

**TOD investments** often utilize commercial and concessional loans

- **Commercial loans**: loans provided to TOD investments with interest rates at market value; repayment required in a fixed time period
- **Concessional loans**: loans provided to TOD investments that often have interest rates below market rate; more flexible repayment schedules allowed
<table>
<thead>
<tr>
<th>Type of loan</th>
<th>Concessionality</th>
<th>Seniority</th>
<th>Targeted</th>
</tr>
</thead>
<tbody>
<tr>
<td>Commercial</td>
<td>None</td>
<td>Senior</td>
<td>No</td>
</tr>
<tr>
<td>Concessional</td>
<td>Lower interest rates/ longer maturities</td>
<td>Senior or junior</td>
<td>No</td>
</tr>
<tr>
<td>Subordinated</td>
<td>None</td>
<td>Junior</td>
<td>No</td>
</tr>
<tr>
<td>Syndicated</td>
<td>None, but larger amount of capital leveraged</td>
<td>Senior</td>
<td>No</td>
</tr>
<tr>
<td>Acquisition</td>
<td>Longer maturities, favorable interest rate</td>
<td>Senior</td>
<td>Higher loan to value ratio</td>
</tr>
<tr>
<td>Construction/Bridge</td>
<td>No: short-term, high interest rates, backed by real assets</td>
<td>Senior</td>
<td>Yes: short-term real estate financing</td>
</tr>
<tr>
<td>Takeout</td>
<td>No: characteristics of mortgages</td>
<td>Senior</td>
<td>Yes: long-term real estate financing</td>
</tr>
</tbody>
</table>
## Financial products: bonds

<table>
<thead>
<tr>
<th>Type</th>
<th>Debt recourse</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>General obligation bond</td>
<td>Full recourse to the issuer; therefore, same credit rating applies as to the issuer’s other bonds.</td>
<td>In the USA, three counties in the state of Virginia (Arlington, Fairfax, Loudoun, and Prince William) issued a general obligation bond to support the extension of a 23-mile Metrorail between Fairfax County and Loudoun County.</td>
</tr>
<tr>
<td>Revenue bond</td>
<td>Revenue streams from the issuer, such as taxes or user fees, provide repayment for the bond.</td>
<td>In the Pearl District in Portland, Oregon, tax increment finance bonds were used to finance the Central City Streetcar, backed by property taxes on land value increments.</td>
</tr>
<tr>
<td>Project bond</td>
<td>Recourse is only to the project’s assets and revenue.</td>
<td>In 2012, Mid-American Energy issued one of the earliest “green project bonds,” a 28-year bond to specifically finance the Topaz solar project, a 550 MW solar power plant in California.</td>
</tr>
<tr>
<td>Securitized bond</td>
<td>Recourse is to a group of financial assets that have been grouped together as collateral.</td>
<td>The Hawaii State Government issued a Green Bond/ asset-backed security in November 2014 for loans to install distributed solar panels, connectors, and storage.</td>
</tr>
</tbody>
</table>

Source: WRI, adapted from research based on Green City Bonds Coalition (2015)
Financial products: de-risking products

De-risking products: products designed to lower the costs of finance by reducing the likelihood that an investor will not receive a return on investment. TOD products can access guarantees and insurance for de-risking purposes, which include:

- Credit guarantees
- Revenue guarantees
- Political risk insurance
The business model framework: A recap

Tangible Assets

Intangible Assets

Processes

Equity

Debt

De-risking products

Investment components

Financial products

Delivery mechanisms

TOD INVESTMENTS

Funding sources

Investment revenues

Investment incentives

Own source revenue

Institutional frameworks

Legal entities & structures

Contracts
Module Quiz

1. With the construction of a new metro line, Delhi government officials hope to improve accessibility and connectivity for residents. What type of investment component are accessibility and connectivity?
   a. Tangible assets
   b. Intangible assets
   c. Processes

2. Public-private partnerships can typically be categorized under what type of delivery mechanism?
   a. Implementation vehicle
   b. Transaction-level contract
   c. Institutional framework

3. TOD stakeholders in Tokyo, Japan use funds gained from land value capture to finance construction of a new railway station. Under the business model framework, under what element can land value capture be categorized?
   a. Financial products
   b. Funding sources
   c. Investment components
   d. Delivery mechanisms
4. At what stage of a TOD investment do stakeholders typically utilize the financial product of equity?
   a. Implementation stage
   b. Maintenance stage
   c. Pre-development stage
   d. Operation stage

5. To finance construction of transit-oriented affordable housing, TOD stakeholders in San Francisco, USA are able to access a loan with reduced interest rates and a flexible repayment schedule. What kind of loan have these TOD stakeholders utilized?
   a. Concessional loan
   b. Commercial loan
MODULE 6: SEQUENCING FOR IMPLEMENTATION

Transit Oriented Development at a Corridor Scale
Module Objective and Outline

**Objective:** Understand the series and order of steps to undertake the planning and implementation of a TOD corridor project, including which steps should happen concurrently by different stakeholders

**Outline:**

1. Regional master planning
2. Project consultation/preparation – *choosing a corridor*
3. Transit infrastructure & operational design
4. Financing gap analysis & proposed business model
5. Detailed physical design & strategy
6. Land assembly & integration
7. Implementation & coordination
TOD Corridor Planning & Implementation: An Idealized Overview

1. Regional Master Planning
2. Project Consultation & Preparation (Corridor Selection)
3. Transit Infrastructure & Operational Design
4. Financing & Business Model
5. Station Area Prioritization & TOD Plan
6. Land Assembly & Integration
7. Implementation

But in the real world, many of these steps must happen concurrently to ensure a good end-result and timely implementation.
TOD Implementation & Coordination
Key Players & Roles in Public/Private Sectors for TOD Planning & Implementation

**Transit Development:** Transport planners who forecast and plan infrastructure and transit services for expected travel demand, and transport engineers who deliver the infrastructure.

**Urban Development:** Urban planners who coordinate zoning and the overall vision for the city and region.

**Economic Development:** Economic development officials who promote the city and region to businesses and coordinate incentives.

**Real-estate developers** who conceptualize, finance, and construct new buildings and building complexes.

**Local businesses** who locate within a city based on accessibility to target market and other amenities.
Concurrent Actions & Key Decisions

Pre-consultation, Planning, and Strategy Development

- Decision on Corridor Location
- Decision on Financing & Cross-Subsidy
- Decisions on Phasing & Implementation Logistics

Transit Infrastructure Construction & Operations/Network Design

Land Use Strategy, Urban & Public Space Design, & Zoning/Regulation of Buildings

Economic Strategy & Consultation with Real-estate Developers on Land Assembly & Phasing
Each Role Is Needed at a Different Stage of TOD Planning & Implementation

Pre-consultation & strategy development

- Urban planners
  - Inventory potential redevelopment sites
  - Assess economy & potential growth areas

- Economic development officials
  - Determine transit tech
  - Finalize route and stations

- Real-estate developers
  - Finalize cost estimates for transit infra
  - Economic development officials
  - Finalize cost estimates for transit infra
  - Finalize transit service changes for integration
  - Confirm street infra to be changed
  - Discuss phasing of dev & contribution to infrastructure/incentives needed

Transport planners

- Finalize route and stations
- Operations plan for transport integration
- Refine station designs for transfers & NMT
- Confirm street infra to be changed
- Create branding strategy & market corridor
- Finalize transit service changes for integration

Implementation of TOD corridor

- Operations plan for transport integration
- Refine station area plans with stakeholders
- Confirm street infra to be changed
- Discuss phasing of dev & contribution to infrastructure/incentives needed

- Developers assess potential real estate projects in corridor
- Discuss high-potential redev sites at stations
- Refine station area plans with stakeholders
- Discuss phasing of dev & contribution to infrastructure/incentives needed
- Finalize transit service changes for integration
Applying this Process Framework

Has the TOD corridor been selected?

Have the location of transit stations been chosen?

Do you have a investment budget and business plan?

Does the TOD corridor have a clear design vision?

Is land assembled for implementation?

Transport planners, urban planners, and economic development officials should collaborate on an update of the master plan to determine where new transport capacity is needed/growth is happening (Slide 10)

Urban planners, transport planners, and economic development officials should consult one another on where stations and interchanges should be and where there is prime land that can be readily redeveloped. (Slides 17-21)

Transport planners should finalize cost estimates, check against available budget. Consult with economic development officials and real-estate developers on strength of market, and how LVC techniques would impact interest. (Slides 27-29)

Urban planners should work with community stakeholders, landowners, and economic development officials and real-estate developers and local businesses to craft a workable and coherent vision with a plan that can evolve over time as the market changes. (35-37)

Urban planners should collaborate with economic development officials and landowners to combine parcels and prepare supplementary infrastructure, and resolve any regulatory hurdles that would slow down redevelopment. (Slide 38)

All team members should monitor implementation and coordinate to ensure development proceeds according to vision. (Slides 39 onward)
TOD Corridor Project Planning and Implementation Process: An Overview

**Step 1: Regional Master Planning**
- 1. Translation of City’s vision into a regional master plan
- 2. Periodic review and update.

**Step 2: Project Consultation/Preparation**
- 1. Project team
- 2. Project area analysis
- 3. Corridor assessment
- 4. Corridor selection
- 5. Technology selection
- 6. Corridor redevelopment strategy
- 7. Stakeholder engagement

**Step 3: Transit infrastructure & Operational design**
- 1. Network and service design
- 2. System capacity and speed
- 3. Infrastructure & technology
- 4. Customer service
- 5. Modal integration

**Step 4: Financing & Business Model**
- 1. Financing Business Model
- 2. Business and institutional structure
- 3. Transit costs and revenues
- 4. Mass transit & TOD marketing

**Step 5: Station Area Prioritization & TOD Plan**
- 1. Station area prioritization (3V Model)
- 2. Station-area TOD plan
- 3. Affordable housing strategy

**Step 6: Land Assembly & Integration**
- 1. Land & Feasibility Assessments
- 2. Construction plan
- 3. Real Estate Market Positioning and Maintenance
- 4. M&E

**Step 7: Implementation**
1. Regional Planning

• City’s vision should be turned into a regional master plan for metropolitan area

• Regional master plan defines:
  • Key growth strategies & locations to accommodate new development
  • Overall urban structure & growth patterns
  • Long-term transit plans to build over time
  • Broad framework for more specific corridor/implementation plans

• Regional master plan should be periodically reviewed and updated
2.1 Set up Core Project Team

• Form a multidisciplinary project team (including economic, urban planning, and transport officials)

• Obtain funding for planning & coordination activities

• Ensure all officials are on the same page on corridor vision & strategy
2.2 Project Area Analysis

• Analysis of the TOD project area
  • Socio-economic: population, demographic, economic base, income, race and ethnicity, etc.
  • Transport: transport mode, road network, road width, traffic volume, parking conditions, pedestrian safety facilities, traffic accidents, etc.
  • Urban: land use, urban services, infrastructure, roadside facilities, urban service facilities, degraded areas, development potential areas, etc.
  • Environment & culture: cultural property, heritage, water, natural and protected landscapes, agricultural land to be preserved, street trees, natural resources, etc.
  • Risk analysis: areas prone to natural disaster

• Transit demand analysis [Demand size; origin and destination]
  • Quick assessment method
  • Full transportation model

• Land use analysis
  • Determine the limits of the transit catchment areas and TOD neighborhoods and map land use
2.3 Corridor Assessment: Transit Development

Preliminary questions for Transport planners

- Current travel patterns and 30-50 year projections? Will proposed new transit infrastructure be adequate to handle this demand?
- What informal transit exists along the corridor? How many people will switch modes? Can they be leveraged as an integrated first mile-last mile solution to extend reach?
- What kind of parking regulations exist currently? Can they be changed to promote transit use?
2.3 Corridor Assessment: Urban Development

Preliminary questions for Urban planners

- When will the master plan be revised? Can zoning be adjusted in this area specifically?
- Are there procedures for creating special overlay districts and/or land value capture? Enabling legislation needed?
- What is the current spatial structure of the city? Where is most growth occurring? How does the proposed TOD/transit corridor match up?
- Design: Are there good examples? Should a best practice guidebook be published?
2.3 Corridor Assessment: Economic Development

Preliminary questions for Economic development officials

• What is the overall economic climate in the city and the country?
• Which areas are experiencing job growth and residential growth?
• What new growth needs to be accommodated and where?
• How does the corridor fit in the economic development strategy?
• What are real-estate vacancy rates?
• Can the new transit/TOD corridor have a coherent public identity for marketing?
• What high-visibility sites/government-owned sites are available for redevelopment? How can a compelling vision be communicated to developers?
• What are the financing gaps in supporting TOD?
2.4 Corridor Selection

Factors for corridor selection:

- Customer demand
- Network advantages
- Roadway characteristics
- Ease of implementation
- Land availability and zoning
- Costs and budget
- Political considerations
- Social equity
- Environmental impact
2.4 Corridor Selection

- Define regional vision
- Identify corridor and community vision

**Identify Goals**

- Translate goals to criteria
- Rank and weight criteria

**Establish Criteria**

- Evaluate and rank corridors based on multi-criteria analysis
- Prioritize corridors

**Evaluate Corridors**

- Identify stakeholders (including the public) and roles
- Assign an unbiased facilitator to steward process and information sharing
- Encourage participation at each stage

**Engage Stakeholders**

**Additional Steps**

- Evaluate modes
- Conduct Impact analysis
- Select route

Step 2. Consultation & preparation
2.5 Select appropriate transit technology

- **Mass rapid transit technology options:**
  - Metro rail
  - Light rapid transit (LRT)
  - Monorail
  - Suburban rail
  - Bus rapid transit (BRT)

- **Factors to consider:**
  - Traffic demand
  - Geographic conditions, available land & urban development patterns
  - Capital costs (infrastructure and land)
  - Operational costs
  - Design and implementation
  - Performance
  - Economic, social and environmental impacts

Image Source: WRI.
2.6 Determine (re)development strategy

Depending on the city’s context and corridor selection, there may be large parcels of land that could be redeveloped with a TOD design, or implementation may need to be gradual because the corridor is largely already built up.

Small parcels / evolutionary design and planning

Large transformative projects

Ballston-Rosslyn Corridor, Arlington, USA

Westfield Stratford City, London
2.7 Stakeholder engagement

- Communicate project effectively from the outset to avoid NIMBY and fear of gentrification
- Stakeholder analysis
- Media strategy

Objectives of consultation:
- Explain significance of project to various stakeholders, gain momentum and support
- Gather additional information about opportunities and constraints
- Collect more granular information about the issues and needs of TOD corridor neighborhoods/station areas
- Finalize the objectives to be achieved by the corridor
2.7 Stakeholder engagement
3.1 Network and Service Design

• **Network design decisions (applies to BRT):**
  • Closed vs. open system
  • Trunk-feeder vs. direct services
  • Express/limited stops

![Diagram showing Direct Services Configuration vs. Trunk-feeder Configuration]
3.1 Network and Service Design

- Network design decisions (applies to Metro):
  - Plan for suitable capacity
  - Integrate with network
  - Express/limited stops

Source: QuantUrb, CASA
A competitive public transport system is one that competes in terms of:

- Total time traveled
- Comfort
- Safety
- Cost
- Convenience

The BRT system in Beijing, China

# 3.3 Infrastructure and Technology

## Factors that shape design and engineering

- Cost
- Functional attributes
- Climatic conditions
- Topographic conditions
- Cultural preferences
- Operational characteristics
- Customer service

## System components

- Busways
- Stations and intermediate transfer stations
- Terminals and depots
- Control centers
- Traffic control signals
- Integration facilities
- Public utilities
- Landscaping
- Asphalt/concrete
- Vehicle technology
- Fair collection and verification systems
3.4 Customer Service

- Timely information
- Clear signage
- Professional staff
- Good illumination
- Security personnel
- Cleanliness
- Aesthetic appearance

A well-designed station with clear signage in Ahmedabad’s Janmarg BRT network

3.5 Modal Integration

- TOD corridors should be integrated with other transport options
- Last mile connectivity:
  - Pedestrian safety and quality of walking experience
  - Integration of mass transport corridors with biking systems
  - Taxis, shared services, and other intermediate paratransit options.

4.1 Business Model for Funding and Financing (Ref. Module 5)

**Step 4. Financing & business plan**

What to invest in?
- **Tangible Assets**
- **Intangible Assets**
- **Processes**

How to mobilize investment capital?
- **Equity**
- **Debt**
- **De-risking products**

How to pay for it?
- Investment revenues (e.g. Transit fares & Land Value Capture)
- Investment incentives
- Own source revenue

How to structure implementation?
- **Institutional frameworks**
- **Legal entities & structures**
- **Contracts**
4.2 Business and Institutional Structure

A business plan must make key decisions regarding:

- **Institutional structure for implementation**
  - What arrangements, contracts, and legal basis distribute risks and responsibilities?
  - Special purpose agency or single existing department?

- **Capital investment for transit infrastructure**
  - What is the financing gap between cost estimates and available resources?
  - Can a Public-Private Partnership (PPP) be used for delivery and operations?

- **Transit system operations [e.g. BRT, LRT, or Metro]**
  - Business structure for operations (e.g. competitive tender with public oversight)?
  - Incentive structure (e.g. pay operator by km or by number of passengers)?

- **Land developments along the corridor & value capture**
  - Sell public land? Use regulatory and tax incentives to attract investments?
  - Create a one-window office to deal with projects in the corridor?
  - Value capture mechanism to cross-subsidize public transit?
4.3 Transit Operations: Expected Costs and Fare Revenue

- Understand dynamics of cost components and expected revenues of the transit system:

- **Expected costs:**
  - Fixed operating costs [personnel, insurance, safety, offices, etc.]
  - Variable operating costs [fuel, parts, maintenance, etc.]
  - Repayment of capital [ex. vehicle depreciation and cost of infrastructure capital investment and land purchase, etc.]

- **Expected revenues:**
  - Fare revenue (based on expected ridership and ticket prices)
  - Ancillary and advertising revenue (e.g. ads in vehicles and stations, leases for station shops, etc.)

- **Questions:**
  - Should the mass transport system operate with or without subsidies? What kind? How big?
  - How should the revenues be distributed between the various actors involved in the mass transit system?
4.4 Mass Transit & TOD Marketing

- Mass transit marketing scheme
  - Name and logo
  - Media strategy: information kiosks, demonstration stations, direct community outreach

- Consistent branding for TOD neighborhoods [place making strategy]
  - Business Improvement Districts (BIDs)

London’s metro system has an easily-recognizable brand

5.1 Station Area Prioritization Model: The 3 Value (3V) Framework

Different station areas offer different TOD potential. Economic and social benefits of TOD, including financial gains from land value capture, can be maximized by understanding and leveraging the interplay between node, place and market potential values.

- Identify development potential (scale, type, timing) based on three values.
- Develop planning and implementation measures and prioritize limited public resources
- Develop and communicate with stakeholders a vision for the city

5.1 Station Area Prioritization
Model: The 3V Framework

**Node value:** value based on a station’s location in the network

**Place value:** value based on a station’s urban qualities

**Market potential value:** value based on a station’s economic potential

5.1 Station Area Prioritization

Model: Node Value (London tube)

- Hub, Interchange, Single station
- Diversity of connectivity
- Node Accessibility/Centrality
- Intensity of node activity

5.1 Station Area Prioritization Model: Place Value

- Mix of land uses
- Density of social infrastructure
- Compactness
- Physical form and street patterns
- Walkability and bikability

5.1 Station Area Prioritization Model: Market Potential Value

- Economic attractiveness for developers (job densities/accessibility; people density)
- Land and real estate opportunities (FAR/unbuilt land)
- Market prices and activity
- Land shortage at city level

5.2 Finalize station area TOD plans, given corridor strategy

- Determine appropriate density levels at each station node, given 3V-based analysis and current market demand
- Incorporate stakeholder and developer input
- Codify design guidelines and eventual public space network into zoning regulations
- Finalize incentives and affordable housing goals for each area (see more on this in Module 7)

Excerpts from World Bank Da Nang TOD corridor plans (corridor-level at left and station-level at right)
5.3 Affordable Housing Strategy

6.1 Land & Feasibility Assessments

• Pre-development:
  • Detailed design
  • Land use and potentiality
  • Market analysis
  • Financial plan

• Land use strategy and acquisition
  • Leasing public land to private sector
  • Eminent domain/preemptive right/right of first refusal
  • Private sector acquisition
  • Land readjustment
7.1 Construction Plan

• Finalize executive projects and detailed designs
• Prepare documentation for investment, bidding, and procurement processes
• Ensure construction plan includes both physical work and procedures to minimize disruptions in the city
  • Road closure, noise management
• Establish procedures for changes and renegotiations
• Oversee implementation
7.2 Real Estate Market Positioning and Maintenance

- Property commercialization
  - Residential Rental and sales
  - Retail [finding the right fit for the community]
  - Carparking provision

- Maintenance
  - Public spaces and local roads: municipal budgets
  - Private spaces: owners
  - Business Improvement Districts (BIDs)

Downtown Crossing, a BID in Boston, USA

Systematic monitoring and evaluation (M&E) improves project outcomes and fosters transparency and collaboration by providing objective and quantifiable indications of performance. Monitoring is an ongoing process in which stakeholders receive feedback on a project, while Evaluation is an independent process by which stakeholders receive feedback on an ongoing or completed project.

Project outputs (e.g., # of new bicycle parking spaces) are differentiated from project outcomes (e.g., mode shift from car to bicycle commuting as a result of the project). Performance indicators are units of measure to understand results, set out at the beginning of a project. Active approaches include surveys and interviews of stakeholders to determine attitudes, while Passive approaches include Smartcard, mobile phone, and remote sensing data. On-site observation also plays a role.

Feedback is essential to identify strengths and weaknesses to take corrective action. TOD Corridor – various impacts include:

- **Mobility**: Access to jobs and amenities, reduce automobile dependency, average travel times
- **Social**: Social equity, improved health
- **Environmental**: Local air quality, greenhouse gas emissions, conservation of green/natural spaces
- **Economic**: Agglomeration and access to employees, local economic growth, property values
Module Quiz

1. Which one of the following statements is TRUE?
   a. Common mass rapid transit options are: metro rail, light rapid transit, monorail, suburban rail, standard bus systems, bus rapid transit and taxi sharing systems.
   b. The choice of transit technologies should be consistent with local conditions, taking into account capital costs; operational costs; design and implementation; performance; and economic, social and environmental impacts.
   c. The project team consists of local government officials and technical consultants who only provide expertise on design and engineering of the project.
   d. Consumers’ behavior will adjust according to what transit vehicles is available to them, so there is no need to take demand into consideration when conducting project area analysis.

2. Which one of the following statements is FALSE?
   a. The operational design decisions will depend on the kind of mass transportation technology the system is based.
   b. The comparative advantage of a mass transport system to a car-competitive service is its capacity and speed.
   c. To consumers, sophisticated design and vehicle technologies are the most important considerations.
   d. Clear signage, system maps, electronic displays and digital voice announcements, professional staff, high-quality illumination, and the presence of security personnel are all important factors enhancing passengers’ experience in using mass public transport systems.

3. Which one of the following is NOT a key factor in the design and engineering of infrastructure and technology?
   a. Sophistication
   b. Cost
   c. Functional attributes
   d. Climate conditions
   e. Cultural preferences
   f. Operational characteristics
Module Quiz

4. Which of the following statements is FALSE?
   a. The first step to provide an effective service is to prove a safe route to transit.
   b. High quality pedestrian access is a key feature of TOD neighborhoods, which can be designed through design factors such as directness and connectivity, aesthetics, ease of movement, legibility, safety and security.
   c. Provision of affordable housing along the corridor is an important aspect of the corridor strategy to ensure there are a diversity of residential options and residents living within walking distance of the transport corridor.
   d. Corridors can be designed and implemented in isolation.

5. Which of the following statements on the business plan of TOD implementation is FALSE?
   a. A business plan includes an institutional structure, a business structure for mass transport, incentive structures and land development along the corridor.
   b. Investment proceeds and investment incentives are funding sources over the course of the investment.
   c. A mass transport marketing scheme includes the name, logo, media strategy, information kiosks, demonstration stations and direct community outreach.
   d. The 3V framework of station area prioritization model includes time value, place value and market value.

6. Which of the following is NOT part of the scope of the land assembly and/or implementation phases of TOD projects?
   a. Land & feasibility assessments
   b. Construction plan
   c. Regional planning exercise
   d. Real estate market positioning and maintenance
   e. Monitoring and evaluation

7. Which of the following statements is FALSE?
   a. Monitoring and evaluation is only considered during the final step of project implementation
   b. Monitoring and evaluation systems provide objective and quantifiable indication of a project’s overall performance
   c. Monitoring and evaluation provides feedback to identify strengths and weaknesses allowing practitioners to take corrective action
   d. Monitoring and evaluation of a TOD corridor should track social, environmental and economic impact
MODULE 7: INCLUSIVE TOD: AFFORDABLE HOUSING AND JOB CREATION

Transit Oriented Development at a Corridor Scale
Module Outline and Objectives

Objectives:
At the end of this module, the participant will be able to:

• Understand the obstacles to inclusive TOD and strategies used to address them, with an emphasis on affordable housing and business dynamics
• Cite several examples of innovative approaches that have worked in various contexts

Outline:
1. Inclusive TOD challenges
2. Housing strategy tools for inclusive TOD
3. Job creation, local economic development, and training
Part 1: Challenges for Inclusive TOD

Inclusive TOD Challenges: Need for Broader Definition of Affordability (H+T)
Inclusive TOD Challenges: Gentrification and Displacement

Chinatown, Kuala Lumpur, Malaysia
High land prices around stations
- Limited funding for affordable housing
- Complex financing structures
- Sites often require land assembly and rezoning
- Community opposition (NIMBY)
- High cost of collaboration between public, private and nonprofit sectors

Source: Based on TOD 201
Inclusive TOD > TOD

**Benefits of TOD**
- Provides Housing And Mobility Choices
- Improves Environmental Performance
- Results In Infrastructure Cost Savings
- Helps Support Healthy Lifestyles
- Strengthens Transit Systems
- Creates Lasting Value
- Reduces Greenhouse Gas Emissions

**Additional Benefits of Mixed-Income TOD**
- Offers Truly Affordable Housing
- Stabilizes Transit Ridership
- Broadens Access To Opportunity
- Relieves Gentrification Pressures

**Benefits of Mixed-Income Neighborhoods**
- Provides Needed Housing
- Helps Deconcentrate Poverty
- Integrates Low Income Households Into Society
- Helps Workforce Stability

Source: TOD 201
Local Economic Development at Corridor Scale
Accommodating existing informal sector workers, such as food hawkers, is a way to provide safer locations where needed services and job opportunities are available. One such example of this are the neighborhood hawker centers in Singapore.
Location of Affordable Housing in the Corridor

Recap: Inclusive TOD = provision of affordable housing and Access to jobs and opportunities

Two broad options to locate new housing:

<table>
<thead>
<tr>
<th>Option 1</th>
<th>Option 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Affordable housing at every station area</td>
<td>Affordable housing distributed along the corridor, with good accessibility to job markets</td>
</tr>
</tbody>
</table>

Diagram:

- Option 1: Affordable housing at every station area
- Option 2: Affordable housing distributed along the corridor, with good accessibility to job markets
Part 2: Housing Strategy Tools for Inclusive TOD
Two Complementary Approaches for Affordable Housing

**Preservation**
- There are multiple, appropriate preservation opportunities
- There is high potential for displacement of existing renters, so a wide range of rental arrangements must be available
- New production opportunities are relatively scarce

**Production**
- Key income groups are being underserved by the existing housing stock
- There are multiple opportunity sites for new development
  - Redevelopment of underutilized sites,
  - Vacant lots,
  - Joint public/private development

Source: Based and adapted from Mixed-income housing TOD action guide
Housing Preservation Strategies and Tools

1. Protect against immediate renter displacement
2. Homeownership assistance (housing demand)
3. Preserve existing subsidized housing and low-cost rental housing
Housing Preservation: Tools to Protect Against Immediate Displacement

1. Condominium conversion tools
2. First-Right-of-Refusal Laws for Tenants and Nonprofits
3. Clarity of eviction rules
4. Pre-project land tenure formalization

Renovated council housing in the United Kingdom.
The capacity of low- and moderate-income households to own housing in TOD neighborhoods can be increased through:

1. Targeted homeownership Assistance
2. Limited Equity Housing Co-ops (shares)
Housing Preservation: Subsidized Housing and Low-Cost Rental Housing

Community Land Trusts

How does a community land trust work?

Various sources of public and philanthropic capital...

...are used by community land trusts...

...to acquire homes in a geographic focus area.

Community land trusts tweak the normal process of homebuying...

A new resident buys their house outright...

They pay an annual fee to the CLT to support its operations...

...and the CLT retains permanent ownership of the land.

...but leases the land underneath from the CLT.

...to make housing permanently affordable.

Current resident sells their house at a price set by the CLT, earning a portion of the increase in value of their home...

...while the CLT retains the land.

A new resident buys the house at a price that's been kept affordable...

...and agrees to the same requirements around resale.

Case Study: National Baan Mankong Program, Thailand

The Baan Mankong Housing Program in Thailand provides an example of an innovative collective ownership cooperative program for housing for the poor.

1. Link affordable housing production to market-rate development
2. Reduce the cost of housing production
3. Remove site-specific development obstacles
4. Provide land acquisition assistance for affordable housing
5. Increase the availability of subsidy funding and financing for affordable housing in transit districts
6. Zone for a diversity of housing types, including rentals
Housing Production: Link Affordable Housing Production to Market-Rate Development

Inclusionary zoning – different specifications

i. Percentage required

ii. Income targeting

iii. Mandatory vs voluntary requirement (in-lieu-fee)

iv. Formula to calculate the fees

Incentive-based zoning

I. Density bonuses

II. Greater height or floor-area allowances

III. Parking space reductions

Housing Production: Reduce the Cost of Housing Production

- Reduced parking requirements
- Fast-track permitting
- Fee-waivers, reductions and deferrals
- Regulatory accommodation for small sites
- Allow for and promote incremental housing

Case Study: Incremental Housing in Quinta Monroy, Chile

• Economically efficient “half a good house” model of Alejandro Aravena and ELEMENTAL

• Pioneered in Chile, also used in Mexico and Brazil
Housing Production: Remove Site-Specific Development Obstacles

- Tax forgiveness
- Brownfield remediation

Housing Production: Provide Land Acquisition Assistance for Affordable Housing

- Public land dedication and write-downs
- Joint public-private developments
- Land banking
- Land readjustment

Housing Production: Land Readjustment

Before

Exchange

After

Reserved land (future budget for project)

Public Facility (Road, Park, etc.)

Project cost for land readjustment (development of land, public facility)

Income from sales of reserved land

Public budget

Source: Kazuko Ochizuco, TTILIT
Housing Production: Increase the Availability of Subsidy Funding and Financing

Targeted financing sources:

- USA: Low-Income Housing Tax Credit (LIHTC)
- TOD Funds
- Brazil: Outorga Onerosa do Direito de Construir (OODC)
Housing Production: Diverse Zoning, Including Rentals

- Comprehensive long term plans: General plan/master plan/structural plans
- Station and local area plan
- Overlay zones
Participants in the Jozi@work program in Johannesburg, South Africa

Part 3: Job Creation, Local Economic Development, and Training

Local Economic Development Strategies and Tools

1. Community Development Financial Institutions (CDFI)
2. Local and minority hiring and training
3. Anchor institutions and public facilities
4. Cluster-based economic development
Community Development Financial Institutions (CDFI)

- **CDFIs** are largely non-governmental financial institutions that provide different types of financial services in targeted underserved areas with which they develop deep community relationships.

- **Examples:**
  - CDFI Fund (US Federal institution)
  - City First Bank of D.C. (Local lending bank in the Washington, D.C. area)
  - Social banks and microfinance lenders, such as the Grameen Bank, Aga Khan Agency for Microfinance, and SEWA (India)
Workforce Development Programs

- Local and minority workforce hiring and training programs can prove critical for providing vital economic opportunities for individuals and local businesses

- Inclusive economic programs can include:
  - Percentage goals for local hiring (ex: construction work)
  - Capacity building and training
  - Cooperatives and incubators
  - Minority business loans

Some of the most common challenges these types of programs face include:
- Lack of dedicated political leadership
- Lack of monitoring to ensure compliance from businesses
- Strong labor pushback
- Challenges in scaling
Anchor institutions are large, established businesses, organizations, and institutions—most commonly universities and hospitals—that shape and bring value to their communities, often seen as rooted economic drivers of the neighborhood.

Examples:
- Libraries in the Comunas of Medellín (Medellin, Colombia)
- University of Brasilia & Catholic University of Brasilia (Brasilia, Brazil)
- DC USA, Columbia Heights (Washington, D.C.)

Social urbanism connected low-income neighborhoods, regularized informal settlements, and provided high quality services and public facilities such as libraries around improved transport facilities such as escalators and cable cars.
Cluster-based Economic Development

- **Cluster-based economic development** - the agglomeration of related businesses and institutions
- **Examples:**
  - Software and computer services cluster in Bangalore, India
  - Apparel industry outside Santo Domingo in the Dominican Republic
  - Aerospace industry in Queretaro, Mexico
Module Quiz

1. Gentrification often involves:
   a. An increase in rents
   b. An increase property taxes
   c. The displacement of poorer residents
   d. A shift in an urban community towards wealthier businesses and residents
   e. All of above

2. The Baan Makong Program in Thailand empowers poor communities to take ownership of their housing development through:
   a. New land acquisition laws
   b. Private investment
   c. Community cooperative land ownership
   d. Government loans for rent payments

3. Housing production and housing ___________ are two complementary strategies used to encourage affordable housing options.
   a. Assembly
   b. Preservation
   c. Development
   d. Subsidization

4. Which of the following are ways to reduce the cost of housing production?
   a. Regulatory accommodations for Small Sites.
   b. Fast-track permitting
   c. Reducing parking requirements
   d. Fee-waivers, reductions, and deferrals
   e. All of the above
5. Alejandro Aravena’s firm ELEMENTAL teamed up with Chile’s Ministry of Housing and Urban Planning to reinvent Quinta Monroy, an informal settlement in the city of Iquique, by providing:
   a. Furniture, bedding, and household goods
   b. A spacious and clear lot for the family to build their own home
   c. The physical foundation of a home in a rowhouse style
   d. A housing unit made of a used shipping container

6. Overlay zones:
   a. Prevent new development in designated areas in order to preserve the current zoning classifications.
   b. Are superimposed over a targeted area for development and modify the underlying zoning classifications
   c. Preserve urban areas of historical importance and value.
   d. Are superimposed over Business Improvement Districts to map out tax credits.

7. True or False: Anchor institutions rely on community support for success.
   a. True
   b. False

8. Often, affordability is thought of in narrow terms as simply the cost of housing. However, a more meaningful measure of affordability is housing costs plus the costs of:
   a. Utilities
   b. Groceries
   c. Transportation
   d. A and C
MODULE 8: MONITORING AND EVALUATING TOD PROJECTS

Transit Oriented Development at a Corridor Scale
Objective:
After completing this module, participants will understand the application of monitoring and evaluation systems to TOD corridor planning and implementation.

Outline:
1. Elements of Monitoring and Evaluation Systems
2. Performance Indicators
3. Measurement Models for TOD Implementation
Elements of M&E Systems

The Basics: Monitoring vs. Evaluation

**Monitoring**: an ongoing process in which stakeholders receive feedback on a project

- Feedback should include a review not only of actions taken to complete the project (outputs), but also of the effectiveness of these actions in achieving the project’s goals (outcomes).

**Evaluation**: an independent process by which stakeholders receive feedback on an ongoing or completed project

- Through evaluation, stakeholders receive objective feedback

Elements of M&E Systems

Project Output and Outcome

**Project output:** particular goods or services provided by a project intervention

**Example:** increasing the number of bicycle lanes in a neighborhood

**Project outcome:** extent to which a project has achieved long-term, wide-scale desired objectives

**Example:** Using the same project as an example, an impact evaluation might attempt to measure whether car use has been replaced with bicycle use as a direct consequence of this project.
Elements of M&E
The Benefits of M&E Systems

- Ensure successful project implementation
- Improve project outcomes
- Foster transparency and collaboration

Because TOD implementation is a complex process that involves multiple stakeholders, and because TOD is often implemented incrementally, an M&E system is needed to ensure success

Elements of M&E Systems
Designing and Implementing M&E Systems

- **Performance indicators**: unit of measure to understand project results of a project, set out at beginning of project
- Different methodologies can be used to collect data on actual outputs and outcomes of a project
  - **Active approaches**: Surveys and interviews of stakeholders to determine opinions and attitudes on progress of project
  - **Passive approaches**: Smartcard, cellphone, and remote sensing data – getting easier and less expensive with technological progress
  - **On-site observation** of project progress
How do different stakeholders measure project success?

**Developers:**
- Access to sufficient land for development
- Timely processes
- Profitable development
- Return on Investment

**Elected Officials:**
- Economic development: increased economic activity
- Finance: Increased land value → Increased tax revenue
- Housing: creation of affordable housing

**Urban Planners:**
- Diverse land uses
- Attractive urban design and public spaces
- Improved quality of life

**Financiers:**
- Clear processes
- Clear payback periods and revenue flows
- Return on Investment

**Transport Planners:**
- Improved accessibility
- Increased transit ridership
- Improved financial returns

**Citizens:**
- Improved quality of life
- Better connectivity via transit system
- More vibrant economy and city
Elements of M&E Systems
Monitoring & Evaluation of TOD Corridors

- M&E systems and performance indicators must take into account different scales of TOD implementation
- At the corridor-level, performance indicators can include:
  - Diversity in development: mixed use, mixed income along the corridor
  - Number of people able to access a corridor
  - Development stimulated in the influence zone of the corridor
A Review of TOD Benefits

**Mobility Benefits**
- Increase access to jobs and amenities city wide
- Improve access to a low cost transport solution (public transit/walkable urban space/bicycle infrastructure)
- Reduce automobile-dependency

**Social Benefits**
- Revitalize neighborhoods
- Promote social equity through creation of mixed-income housing near transit
- Increase accessibility for less mobile.
- Improve health and increase physical activity through creation of walkable neighborhoods

**Environmental Benefits**
- Lower air pollution and GHG emissions by reducing automobile-dependency and urban sprawl
- Reduce energy consumption
- Conservation of green and natural spaces

**Economic Benefits**
- Increase agglomeration and access to employees
- Encourage economic resilience through diversity
- Energize local economy
- Increase property values along corridors to help fund needed infrastructure
- Reduce infrastructure costs
- Reduce transport cost

Image Source: WRI.
Performance Indicators
Measuring for Mobility Outputs and Outcomes

TRAVEL BEHAVIOR
Output Performance Indicators:
• Changed parking rules (such as limits, pricing, and location)
Outcome Performance Indicators:
• Automobile usage, measured in VKT
• Mode share
• Auto ownership
• Transit use

ROAD SAFETY
Output Performance Indicators:
• Number of redesigned street intersections and crossings
• Km of bicycle lanes
Outcome Performance Indicators:
• Vehicular speeds on roads
• Public perception of pedestrian and bicycle safety
• Number of vehicular accidents and fatalities

TRANSIT SERVICE & QUALITY
Output Performance Indicators:
• Number of transit options
• Integration of multi-modal options within transit stations
• Frequency of transit service
Outcome Performance Indicators:
• Total area accessible in 45/60 mins
• Percentage of jobs accessible in 45 mins by public transport+NMT
• Satisfaction levels
• Changes in travel time

ACCESSIBILITY & WALKABILITY
Output Performance Indicators:
• Number of high-density developments located within a station-area
• Change in length and width of unobstructed sidewalks/footpaths
Outcome Performance Indicators:
• Walkability Score
• Number of pedestrian and bicyclist accidents
Performance Indicators

Automobile Use: VKT

Performance Indicators

Mode Share Targets in Vancouver, Canada

Mode Share

By 2040, at least two-thirds of all trips will be made on foot, bike, or transit. The total number of trips by sustainable modes will grow significantly, while motor vehicle volumes will slightly decline.

- **2008**: 40% of all trips on foot, bike, or transit
- **2020**: At least half of all trips on foot, bike, or transit
- **2040**: At least two-thirds of all trips on foot, bike, or transit

Performance Indicators
User Satisfaction Surveys

Janmarg User Survey: 25th Month of Operations

Staff in Uniform
Ticket payment easy
Stops clean
Prices fair
Service is reliable and comfortable
Behaviour of staff is good and helpful
Behaviour of driver is good and helpful
Driven safely
Clean buses
Good frequency
Safe to cross road

Service Rating, on a scale of 0 (Poor) to 10 (Excellent)
Performance Indicators
Measuring for Social Outputs and Outcomes

NEIGHBORHOOD REVITALIZATION
Output Performance Indicators:
• Number of community facilities, amenities, and educational services within a project area
• Redesigned streetscapes, public spaces, and building facades throughout a project area
• Number of mixed-use developments within a project area
Outcome Performance Indicators:
• Public perception of a project area

SOCIAL EQUITY
Output Performance Indicators:
• Number of affordable housing units
• Interconnection designed for the less mobile
Outcome Performance Indicators:

SOCIAL CAPITAL & CITIZEN PARTICIPATION
Output Performance Indicators:
• Number of community outreach programs
Outcome Performance Indicators:
• Residents’ involvement in community projects and initiatives

Outcome Performance Indicators:
• Improved access to transit and services for all socioeconomic groups
• Diversity within a project area, including racial, ethnic, gender, religious, & socioeconomic diversity of local residents, business-owners, and workers
• Increase accessibility for less mobile

Image Source: WRI.
Performance Indicators
User Feedback and Monitoring

- Neighborhood Associations
- User Assessments and Surveys

Image Source: WRI.
Performance Indicators
Measuring for Environmental Outputs and Outcomes

**REDUCED EMISSIONS**

Output Performance Indicator:
- Transport system and land use prioritizing transit and NMT
- Establishment and implementation of low emission zones around metro stations

Outcome Performance Indicator:
- Number of days of good air quality
- Overall GHG intensity of transport
- Overall energy intensity of transport

**CONSERVATION OF GREEN AND NATURAL SPACES**

Output Performance Indicator:
- Creation/maintenance of park and/green space as a result compact urban development in TOD areas
- Infill and brownfield reclamation

Outcome Performance Indicator:
- Habitat conservation through preservation of ecological areas
- Increased tree cover and reduced heat island effect

Image Source: WRI.
Performance Indicators
Measuring for Economic Outputs and Outcomes

LOCAL ECONOMIC DEVELOPMENT
Output Performance Indicators:
• Number of training sessions on entrepreneurship
• Number of neighborhood or local area plans approved
• Additional economic activity and investment

Outcome Performance Indicators:
• Sales numbers for local business
• Number of retail and commercial businesses in a project area
• Number of jobs
• Number of vacant buildings or units
• Estimated amount of private investment in a project area

INCREASED PRODUCTIVITY
Output Performance Indicators:
• Number of compact, high-density developments within a project area

Outcome Performance Indicators:
• Number of accessible employees
• Cost of transport compared to GDP

REAL ESTATE MARKETS
Output Performance Indicators:
• Number of submitted construction plans
• Number of completed new projects along corridor
• Sq. meters built in project area

Outcome Performance Indicators:
• Property values
• Property tax generation
Performance Indicators

Property Values

THE TOD INDEX

Home Values
$ per s.f.

Measurement Models for TOD Implementation

1. The TOD Standard: Institute for Transportation & Development Policy

2. LEED for Neighborhood Development: U.S. Green Building Council

3. Safe Access Manual: WRI EMBARQ India
The TOD Standard
Institute for Transportation & Development Policy

Walk
Principle 1
15 points

Cycle
Principle 2
5 points

Connect
Principle 3
15 points

Transit
Principle 4
TOD Requirement

Mix
Principle 5
15 points

Densify
Principle 6
15 points

Compact
Principle 7
15 points

Shift
Principle 8
20 points

LEED for Neighborhood Development
U.S. Green Building Council (USGBC)

Credit Categories:
• Smart Location and Linkage
• Neighborhood Pattern and Design
• Green Infrastructure and Buildings
• Innovation
• Regional Priority

LEED-ND

Final Thoughts on M&E Systems

- When creating a M&E system for a TOD project, the project owner must:
  - Establish project goals, in collaboration with other project stakeholders
  - Set output and outcome performance indicators
  - Collect data on outputs and outcomes at regular intervals
  - Integrate feedback into project implementation
Module Quiz

1. City officials in Boston, Massachusetts are carrying out a project to decrease the number of parking spots in the Beacon Hill neighborhood. In the short-term, they hope to reduce the number of parking spaces on streets in this neighborhood; in the long-term, they hope to decrease automobile use among residents of the neighborhood. How should long-term reduction in automobile use be evaluated?
   a. Reduction in automobile use should be measured by an outcome evaluation.
   b. Reduction in automobile use should be measured by an output evaluation.

2. Why are M&E systems particularly important to ensure TOD project success?
   a. TOD projects are typically implemented incrementally, and can take years to complete.
   b. TOD projects require coordination between multiple stakeholders.
   c. The stakeholders involved in TOD projects can have competing goals and timelines.
   d. All of the above. [ ]

3. Stakeholders involved in a project in downtown Bogotá hope to reduce automobile-dependency through the installation of a bike-share program. What might stakeholders use as performance indicators of decreased automobile use? Select all that apply.
   a. A hedonic price model
   b. VMT/VKT
   c. A measured increase in employment opportunities
   d. Mode share
4. City officials in Bangkok, Thailand are trying to convince a real estate developer to invest in the construction of a new, high-density apartment building located near a rail corridor. The developer is concerned that it will not receive a return on its investment. What tools might city officials use to convince the developer to invest? Mark all that apply.
   a. The TOD Index
   b. User surveys and assessment
   c. VMT/VKT
   d. Hedonic price models

5. The city of Delhi, India has just begun operation of a new BRT. What is the best way city officials can collect data on user satisfaction with this new BRT?
   a. Qualitative interviews with bus riders
   b. User surveys and assessments
   c. On-site observation of bus operations

6. Which of the three evaluation systems discussed in this module were explicitly designed for the evaluation of TOD projects? Select all that apply.
   a. The TOD Standard
   b. LEED-ND
   c. Safe Access Manual
Bringing a TOD Corridor Together: A supplementary exercise

The purpose of this exercise is to bring together the concepts and ideas laid out in the modules and provide a structure for practitioners to contextualize and apply these concepts to their own cities. Through a series of questions, structured in the six overarching themes and ten thematic building blocks presented in Module 3, this exercise will guide the user to consider the full range of topics that must be explored for effective TOD corridor development. The questions outlined here are not intended to be exhaustive, but comprehensive enough for the user to understand how the TOD Corridor Course can be applied in his or her city, identify potential barriers that may exist, and use proven solutions to overcome them, both for the short and long-term.

1. Government Regulation
This section explores the political, institutional, regulatory and stakeholder environments that must be considered to enable and gain support for a TOD corridor. Identifying who must be involved (from public, private, and civil sectors) and who share a common vision of transit-oriented development can help build strong coalitions of support that can overcome opposition and other obstacles.

TOD projects often fail as current regulations may prohibit many of the core components of a TOD project, such as mixed-use zoning. Furthermore, these projects often move more slowly through planning approval processes, as they can be more complex and unfamiliar than non-TOD projects, serving as a disincentive to developers. Understanding institutional structure and regulations at the start provides the necessary foundation for efficient TOD project implementation. This preparatory process can also highlight where adjustments could be made to regulation and institutional structure, to enable more supportive policies that would allow TOD projects to be fast-tracked in the future.

Political Leadership and Vision
High ranking leaders that are champions of TOD have often served as the catalyst for successful TOD initiatives. Consider who will make good allies and who will need convincing, keeping in mind the long-term implementation process of TOD projects and the need to withstand changes in political administrations. Map these actors and develop a long-term plan to unify across a common vision for TOD and insulate against political cycles. Questions to consider include:

- Is there existing political will for TOD?
- Who are the main public actors (national, state/provincial, municipal, local) who must be involved and what are their positions on TOD? Consider jurisdictional boundaries within the corridor.
- How can changes in political leadership and vision affect progress of the project?

Institutional Structure
Implementing TOD projects at a corridor level requires the coordination of multiple public sector entities across different levels of government. However, too often, these sectors work in silos and fail to align
efforts to achieve common goals. At the minimum, TOD projects demand the harmonization of transportation and land use planning. Map relevant public sector actors and their powers along with the existence of any institutional arrangements that bring together multiple sectors across a common project. Ideally these institutional arrangements will convene representatives from the private sector and civil society – harnessing wider support and a common vision. This process will help determine whether existing institutional structures are conducive to cross-sectoral coordination and inclusion of private sector and civil society, and if not, it can help clarify any needed interventions to establish more coordinated institutional structures going forward. Questions to consider include:

- Who are the main institutional public sector actors (including national, provincial, metropolitan and local level) that must be or should be involved (e.g. transportation, land use planning, housing, water, environment, public works, and economic development)?
- Does/will the corridor stretch across multiple jurisdictions? What are the potential jurisdictional barriers?
- Are there existing institutions, such as line agencies or special purpose vehicles, which are used to convene multiple sectors around a development project?
  - What is the capacity of these institutions and their staff?
  - What powers are entrusted within these entities?
  - Do these entities engage private sector and civil society groups (e.g. Public Private Partnerships)?

Regulatory Environment

At their best, urban planning policy and regulatory tools, such as zoning and building codes, can create compact vibrant cities that exemplify the positive social, economic and environmental benefits of TOD. But at their worst, they can serve as barriers which undermine the principles of TOD and instead create sprawling, inefficient and lifeless urban areas. Failure of the regulatory environment to promote TOD is often the result of a disconnect between sectors, most notably transportation and land use. Reflect on the current regulatory environment in your city and determine whether there are any inconsistencies between the principles of TOD and existing building codes, zoning and land use plans. Are long-term transportation and land use plans integrated across a common vision? Identifying these inconsistencies early on is worthwhile as it allows for preemptive action to overcome obstacles and move toward a more integrated and TOD conducive regulatory environment. Questions to consider include:

- Are transport and land use plans supportive of the economic vision for the city?
- Are long-term transportation and land use plans integrated?
  - If not, are they consistent with each other? How can they be made consistent?
  - Do long-term plans express a vision that supports TOD?
  - Are local and corridor plans consistent with the broader city-wide and regional plans?
When is the master plan being revised? Can zoning be adjusted for the TOD corridor areas specifically?

- How well do current policy and regulatory tools (e.g. zoning and building codes) foster and incentivize TOD? Reflect on the design components (module four) featured later in this exercise.

- What can be done to update outdated regulatory tools that disincentives or prohibits TOD in the short-term? In the long-term?

- Are there procedures for creating special overlay districts and/or land value capture policies? Is enabling legislation needed?

- What kind of parking regulations exist currently? Can they be changed to promote transit use?

- Is there a way to ensure that stakeholder concerns (addressed below) are taken into account to update or revise regulations and policies?

**Stakeholder Engagement**

TOD projects that genuinely engage the private sector and civil society are more successful in garnering enduring support. This is essential in overcoming the uncertainty that can arise due to political cycles that often bring new administrations and priorities. While it can be tempting to focus the greatest attention on those private sector and civil society groups that support TOD projects, stakeholder engagement requires the involvement of all parties, regardless of their position on TOD. Many TOD schemes got postponed by lack of communication and consultation with people currently living on sites to be developed, creating fears of displacement. Furthermore, there must be a meaningful engagement strategy and processes that allow for active participation by stakeholders which is transparent, inclusive and which incorporates stakeholder feedback into project goals and implementation. Map the relevant stakeholders and assess the effectiveness of existing stakeholder strategies to develop an inclusive stakeholder engagement process. Questions to consider include:

- Who are the relevant stakeholders from the private sector and civil society?

- Are there established stakeholder engagement processes that are transparent, inclusive and that incorporate feedback from stakeholders?

  - What engagement techniques have been used to successful achieve good representation from the community and private sector as well as ongoing communication in both directions?

  - Does the city have a grievance redressal mechanism for complaints about the project?

2. **Physical**

This section explores the impact of TOD on the built environment through the lenses of design and infrastructure. With its cornerstone principles of increasing density, most intensely around transit; promoting mixed-use development that is serviced by high-quality public and non-motorized transportation; prioritizing public space for people and transit over personal vehicle; and creating
networks of green and public spaces, TOD developments shape both the public and private realm to be more compact, connected, and coordinated. However, ensuring that TOD projects are successful means careful consideration of infrastructure requirements needed to sustain increased densities.

**Design**

TOD directly shapes urban form to create compact, connected and coordinated cities. However, these projects also strive to create livable, vibrant and inviting communities that are in high demand. Striking the right balance to achieve well-planned TOD requires careful attention to design. The design components of TOD include densification of urban areas, high-quality and connected networks of public transit and non-motorized transport, mixed-use development, creation of public and green spaces, preservation of community identity, and resilience. Evaluate current conditions within the TOD corridor to determine how well it characterizes each of these design principles. This will help focus efforts to better facilitate TOD design and allow for a more strategic plan of action. Questions to consider include:

- Do areas around public transportation contain or allow for higher densities? If not, is there a plan to increase the capacity of the existing systems to absorb the higher density?
- Does the public transit corridor connect to residential and employment hubs within the urban core?
- Is the public transit corridor well-connected with other major and secondary transit corridors?
- Does the corridor contain complete networks of sidewalks and bike paths that are connected to transit stations and accessible even to the less mobile?
- Are sidewalks of ample size to properly accommodate the service, pedestrian and front-of-building zones? Are these zones properly utilized?
- Are vehicle demand management strategies in place? Do they promote improve road safety? Reduce parking requirements?
- Do buildings along the corridor and at station areas contain a mix of uses? Does the TOD corridor contain and connect a variety of regional and neighborhood facilities?
- Are design principles such as active ground floors and public-private transitions adequately implemented? Are there good examples of these principles from developments elsewhere in the city or country? Should a best practice guidebook be published?
- Are networks of public and green space well-distributed across a corridor?
- Is place identity and cultural heritage preserved?
- Are streets made available for community events?
- Is the TOD corridor placed in an area of low risk for natural disasters?
  - Are corridors designed to handle some degree of risk?
  - Are stakeholders aware of appropriate behavior in response to a disaster?
Are redundancies incorporated into corridor design?

Infrastructure (Transit + Other)
When thinking about TOD infrastructure, public transit is most commonly addressed. While this is an important component of TOD it is only one of several infrastructure requirements that are needed to support TOD. Non-motorized transport infrastructure (walking and cycling networks), for example, is critical in providing last mile connectivity and promoting local trips through more sustainable means. With increased density comes increased pressure on drinking water, wastewater, stormwater, electricity, gas and other urban infrastructure. Furthermore, cost considerations for brownfield versus greenfield development must be weighed. Identify existing infrastructure and determine whether it is complete and able to handle increased demand. Questions to consider include:

- What type of transportation will current and future ridership support?
- What informal transit exists along the corridor? How many people will switch modes? Can informal transit be leveraged as a first mile-last mile solution?
- Are principles of complete streets – roads that safely accommodate all users – applied across the corridor?
- What is current capacity for non-transport related infrastructure (e.g. water, sewage, stormwater management)?
  - Will current infrastructure be able to handle increased demand?
- What are the costs of development in greenfields compared with brownfields?
- What additional social services (e.g. health, education, and daycare facilities) must be provided with increased density?

3. Financing
One of the greatest barriers to TOD projects is financing. Because these projects, especially at a corridor level, require coordination between multiple stakeholders and over long periods of time, projects can quickly lose momentum or never get off the ground. Therefore, it is necessary to understand the challenges and devise a business model for TOD investments. Questions to consider include:

- What investment components make up the TOD investment? What kinds of infrastructure must be built?
- What funding sources can be unlocked over the course of the investment (e.g. land value capture, joint development, etc.)?
- Can the timing of financing be optimized to reduce its cost (for example payment for land delayed until permitting is over)?
- What financial products exist to mobilize third party capital (e.g. equity, debt, de-risking products/guarantees)?

• What arrangements, contracts and legal basis, distribute risks and responsibilities? How should implementation be structured?

4. Land
Land is often the most valuable asset a city possesses to make TOD happen. It can be used strategically, and as a tool to place the different players on the same table. Many funding and financing tools covered in this course can be used to harness land assets to generate resources for transit investment. Finally, given the variety of land-ownership regimes, diverse tools and cooperation between different entities is key to assemble land for TOD corridor projects.

• Where are the public landholdings (e.g. city, state/provincial, national, public railway-owned)? Who are the other major landowners in the corridor?
• What is the market value of the land?
• Is there a cadaster in place (e.g. a comprehensive register of property holdings)?
• Which voluntary and involuntary tools can the city use for land acquisition?
• Will the TOD station areas require land parcel amalgamation to be attractive for private sector investment?

5. Social, Economic & Environmental Assessment to Support Social Inclusion, Local Economic Development, and Resilience Goals
The concept of Inclusive Transit-Oriented Development (TOD) can be defined as a TOD with an explicit intention to provide equitable access to housing and opportunities through offering affordable housing and mixed-use. Inclusive TOD is concerned with not only the implemented outcome of an inclusive physical development but also an inclusive process of design and development of the TOD. Understanding the socio-economic context is important for achieving social inclusion goals to assure that the corridor provides housing and associated services for all income levels, as well as mixed-use to generate jobs and help create a vibrant economy and spaces. An understanding of the environmental context helps ensure climate-resilient development and growth as well the risks that must be addressed.

• What are the demographics of the corridor? Does this data exist?
  o Household income?
  o What are the travel modes and behavior at household level?
• Are growth dynamics likely to displace existing residents and businesses?
  o Are there policies in place to assist the displaced (both residents and businesses)?
  o What are policies and incentives to ensure that affordable housing is available along the corridor?
• What are the economic conditions for TOD?
  o What is the overall economic climate in the city and country? Where is employment and housing growth projected?
1. How is the current residential and commercial real estate market functioning (e.g. average prices, vacancy rates)? How is this likely to change with the development of the corridor?
2. Are current regional and neighborhood facilities sufficient to meet current and future local demand? Are these considered in the broader planning and budget processes to ensure well serviced areas that will attract investment around the corridor?
3. How can the new transit/TOD corridor fit into the region’s overall economic development strategy? Can it have a coherent public identity and a compelling vision to attract investment?

- What are the environmental considerations for a TOD project?
  1. Is the land to be developed protected and/or environmentally sensitive?
  2. Does an environmental impact assessment need to be completed? Does the area need to be remediated (e.g. brownfield development)?
  3. What are the positive environmental impacts of the TOD corridor project?
  4. Are stakeholders aware of the risks and how to respond should a disaster occur (government, private sector, and citizens)?

While the questions addressed here are often not considered, as they are viewed as “soft,” the overall success of the TOD corridor development project depends heavily upon them, and thus these considerations should not be overlooked.
Essential Reading

Module 1: TOD as a strategy to achieve a sustainable city

Module 2: TOD Corridors

Module 3: The Building Blocks of TOD

Module 4: Design and Urban Planning Components of TOD


**Module 5: Investing in TOD**


[https://openknowledge.worldbank.org/handle/10986/21286](https://openknowledge.worldbank.org/handle/10986/21286)

**Module 6: Sequencing for Implementation of TOD Corridor**


ITDP. Guía de implementación de políticas y proyectos de desarrollo orientado al transporte. Hacia ciudades bajas en emisiones. 2015. 
[http://mexico.itdp.org/wp-content/uploads/Gu%C3%ADa-de-implementaci%C3%B3n-de-proyectos-DOT1.pdf](http://mexico.itdp.org/wp-content/uploads/Gu%C3%ADa-de-implementaci%C3%B3n-de-proyectos-DOT1.pdf) (In Spanish)


**Module 7: Housing strategies and local economic development tools for inclusive TOD**

[https://www.livingcities.org/resources/259-steps-to-avoid-stalled-equitable-tod-projects](https://www.livingcities.org/resources/259-steps-to-avoid-stalled-equitable-tod-projects)


**Module 8: Monitoring and Evaluating TOD Projects**


**Comprehensive List of Resources**

*Bold listings are in the Essential Reading list above*

**Module 1: TOD as a strategy to achieve a sustainable city**


Module 2: TOD Corridors


Module 3: The Building Blocks of TOD

Governance

Planning Processes


**Land Acquisition**


Module 4: Design and Urban Planning Components of TOD

**TOD Strategic Plans**


“Guide for TOD (Twin Cities).” Metropolitan Council. 2006. [http://metrocouncil.org/getattachment/7f95e0f4-2909-4d0e-81cb-b19ca205a454/..aspx](http://metrocouncil.org/getattachment/7f95e0f4-2909-4d0e-81cb-b19ca205a454/..aspx).


**Transportation**


https://islandpress.org/book/the-transit-metropolis


“Hubli City Bus and Auto-Rickshaw Service Analysis.” The Hub, EMBARQ India.  


Pai, Madhav, Ranjit Gadgil, Anjali Mahendra, Shweta Vernekar, Rebecca Heywood, and Radha Chanchani.


Non-Motorized Transit


Castillo-Manzano, José I., Lourdes Lopez-Valpuesta, and Juan P. Asencio-Flores. “Extending Pedestrianization Processes outside the Old City Center; Conflict and Benefits in the Case of the City of Seville.” Habitat International 44 (2014): 194-201. doi:10.1016/j.habitatint.2014.06.005.


Leather, James, Herbert Fabian, Sudhir Gota, and Alvin Mejia. “Walkability and Pedestrian Facilities in Asian
“Public Bicycle Sharing Scheme for Mysore - Station Locations.” The Hub, EMBARQ India. http://wricitieshub.org/sites/default/les/Public%20Bicycle%20Scheme%20for%20Mysore-Station%20Location%20Analysis_0.pdf.

Public Space and Street Design

Module 5: Investing in TOD

Financing


Suarez Castaño, Rodrigo. “Colombia’s TOD NAMA: Using Climate Funds to Catalyze Transformational
**Land Value Capture**

Doherty, Matthew. “Funding Public Transport Development through Land Value Capture Programs.” The School of Cooperative Individualism.


Vetter, David Michael, and Marcia Vetter. “Land-Based Financing for Brazil’s Municipalities (Land Lines

Module 6: Sequencing for Implementation of TOD Corridor


Station Area Prioritization
MARTA. Transit-oriented development guidelines.
ITDP. Guia de implementacion de politicas y proyectos de desarrollo orientado al transporte. Hacia ciudades bajas en emisiones. 2015

Module 7: Housing strategies and local economic development tools for inclusive TOD


Martins, Bruno, Eduardo Lundberg, and Tony Takeda. “Housing Finance in Brazil: Institutional...


“We Call These Projects Home: Solving the Housing Crisis from the Ground Up.” Right to the City. May 1, 2010.


Module 8: Monitoring and Evaluating TOD Projects


