

Implementing Transit-Oriented Development- an International Perspective

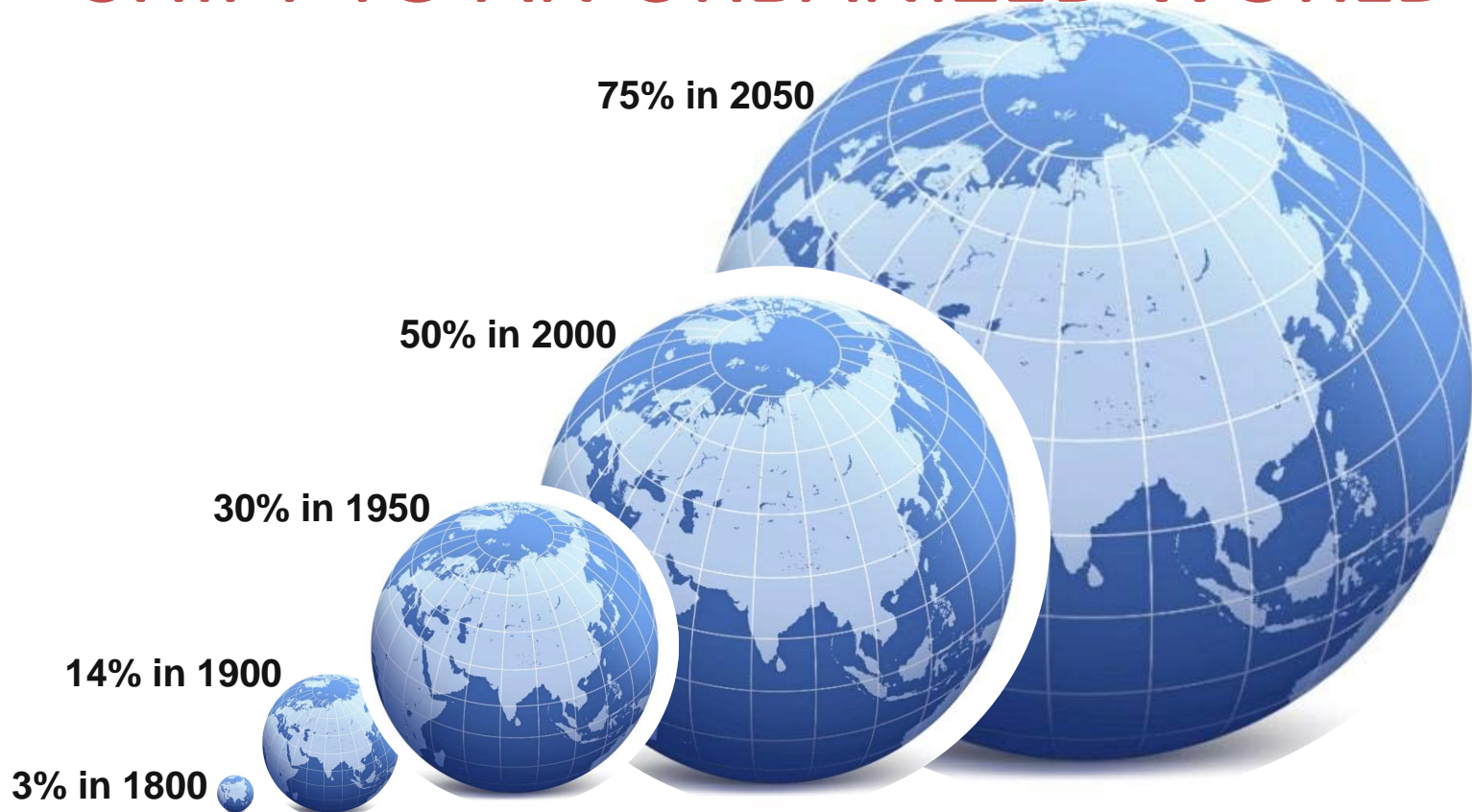




URBANIZATION

THE CONTEXT

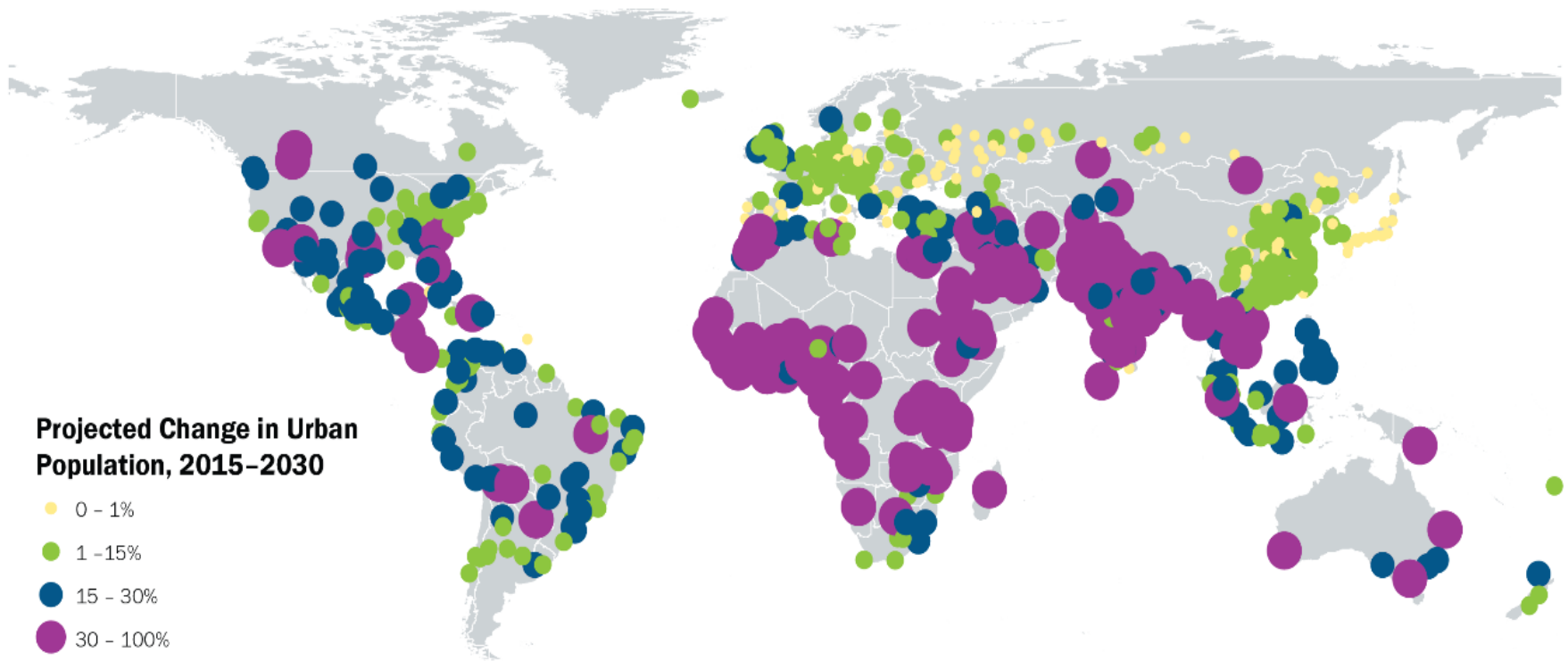
SHIFT TO AN URBANIZED WORLD



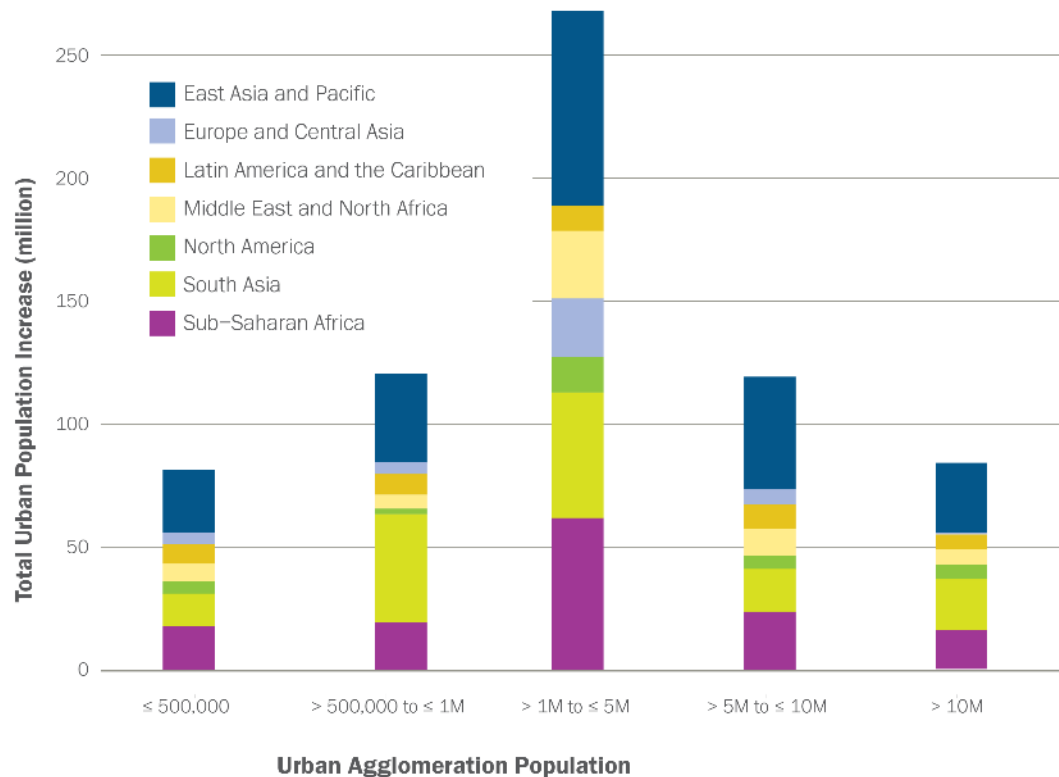
THE EXTRAORDINARY URBANIZATION CHALLENGE

- Globally, 800 million per decade
- India's urban population will double to 800 million by 2050

2015-2030 – unprecedented urban growth especially in S. Asia & Africa



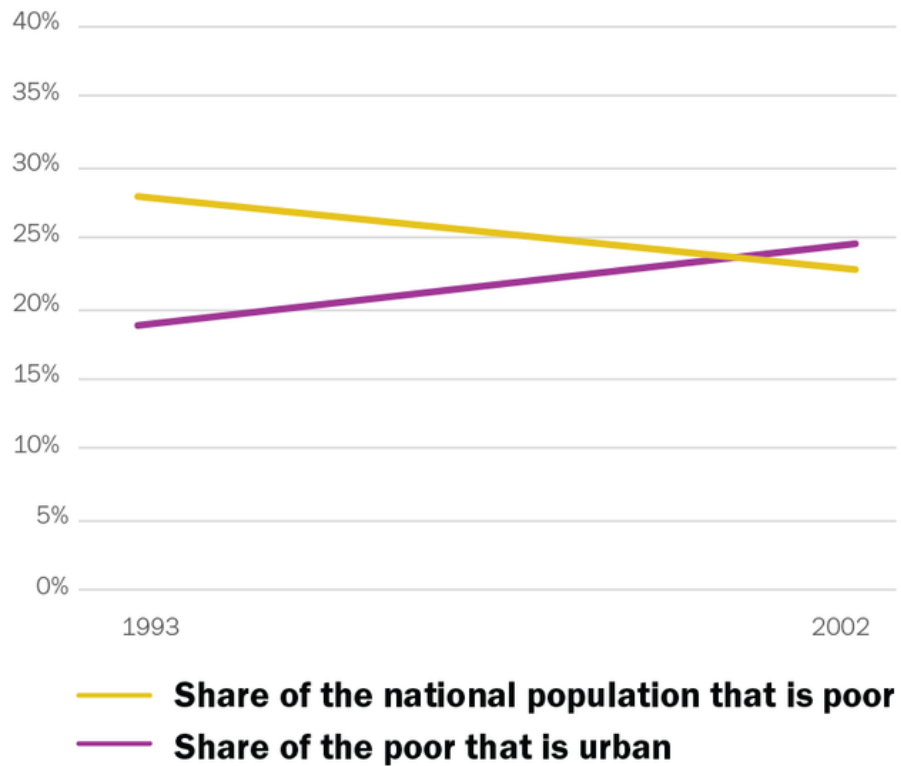
Medium-sized cities will grow the most



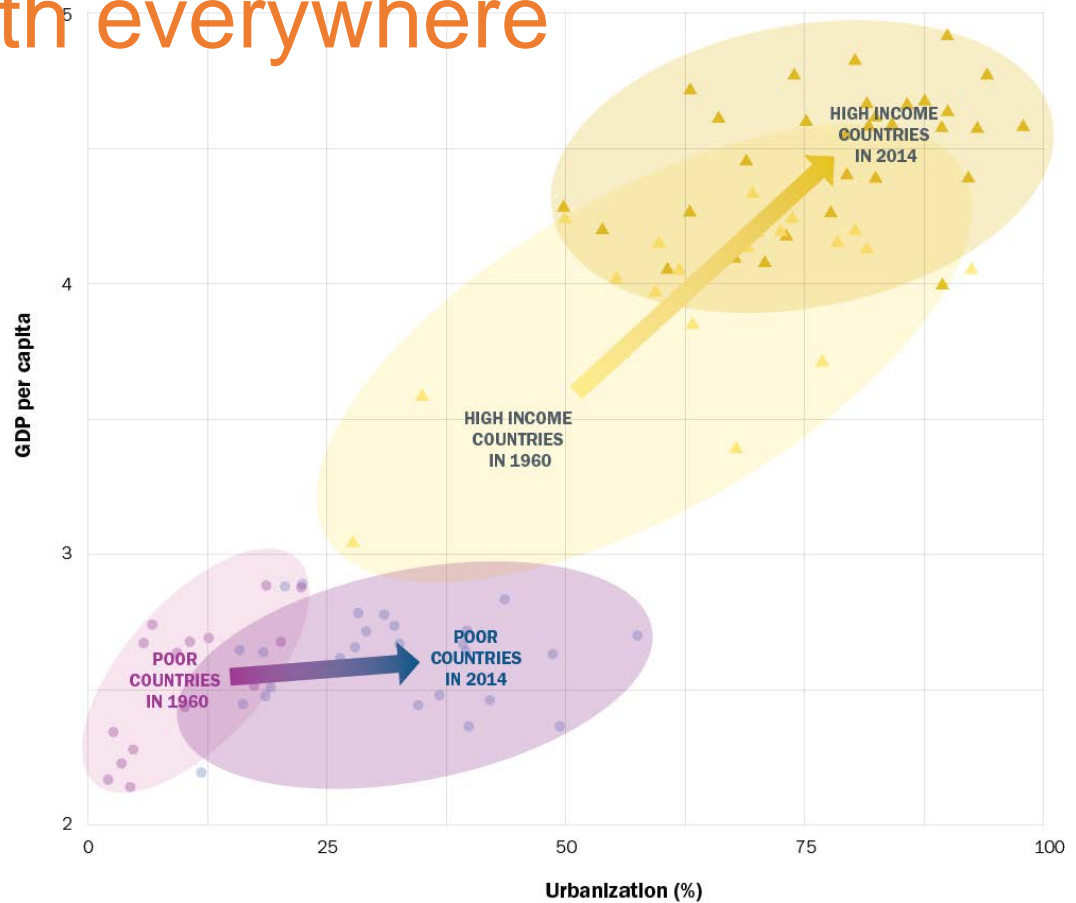
Note: N = 1,692 urban agglomerations (populations ≥ 300,000 inhabitants).

Sources: United Nations (2014); World Bank country classification.

More of the poor will live in cities



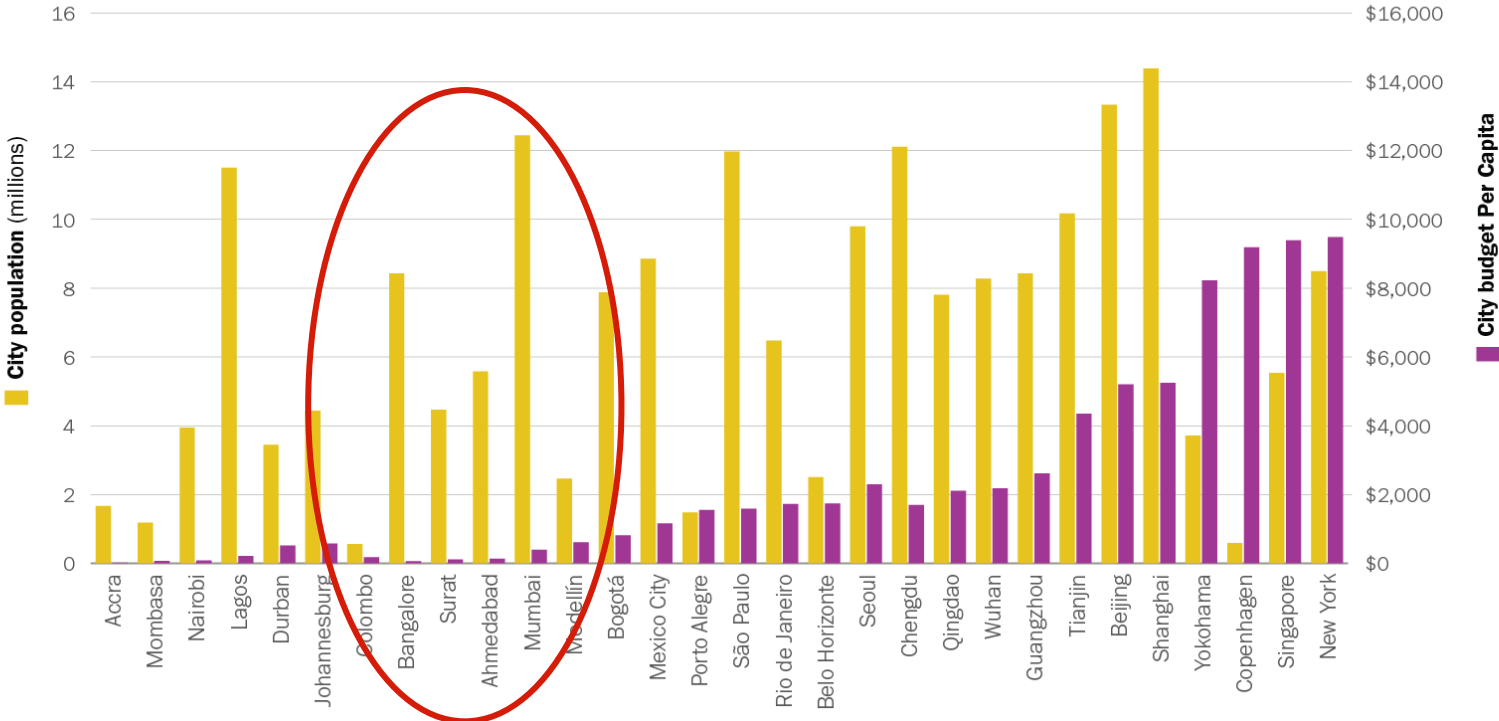
Urbanization will NOT be accompanied by economic growth everywhere



DRASTIC CHANGES IN CITIES

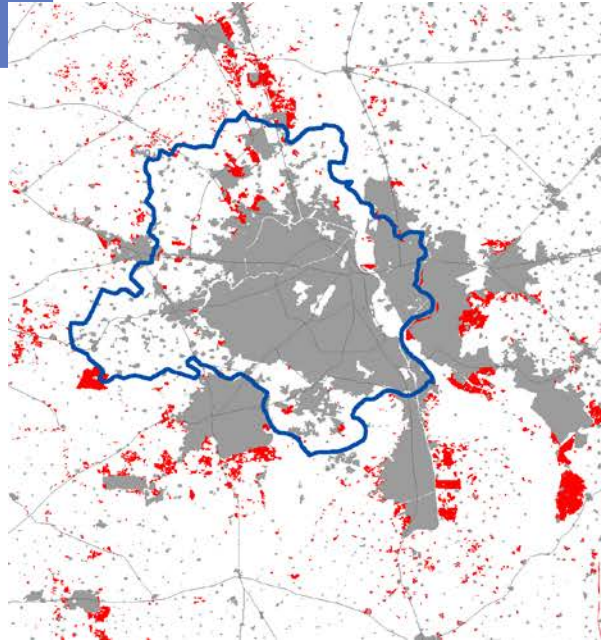
Globally, urban
infrastructure will more
than
DOUBLE
in the next 15 years

The fastest-growing cities will have the least public resources

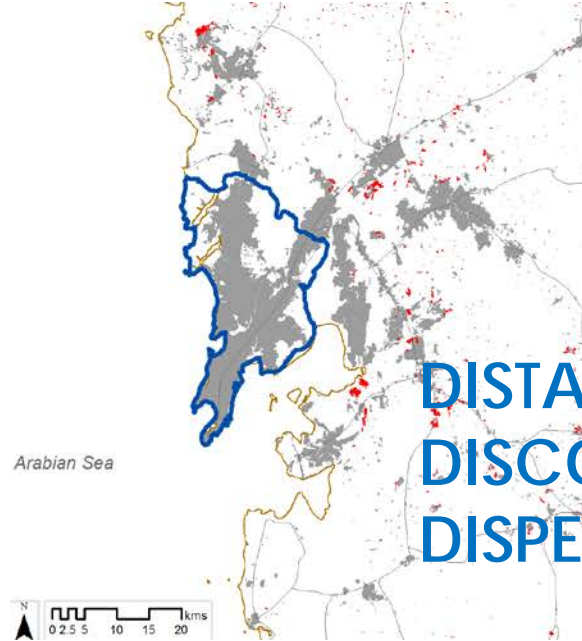


Source: Authors' compilation from various sources. Note: Budget data represent years 2010 to 2016.

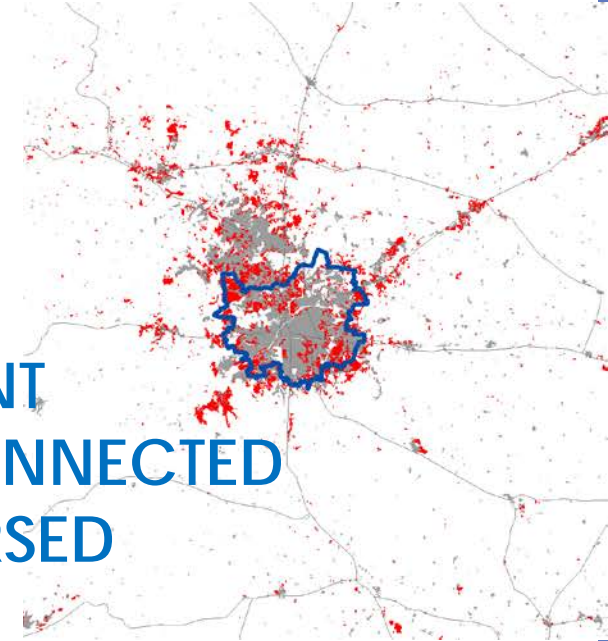
Urban Expansion in Indian Cities



Delhi NCR
54 sqkm/ year






Mumbai
5 sqkm/ year



Pune
42 sqkm/year

**DISTANT
DISCONNECTED
DISPERSED**

-  Municipal Boundary
-  Urban Area (2005-06)
-  Urban Area (2011-12)

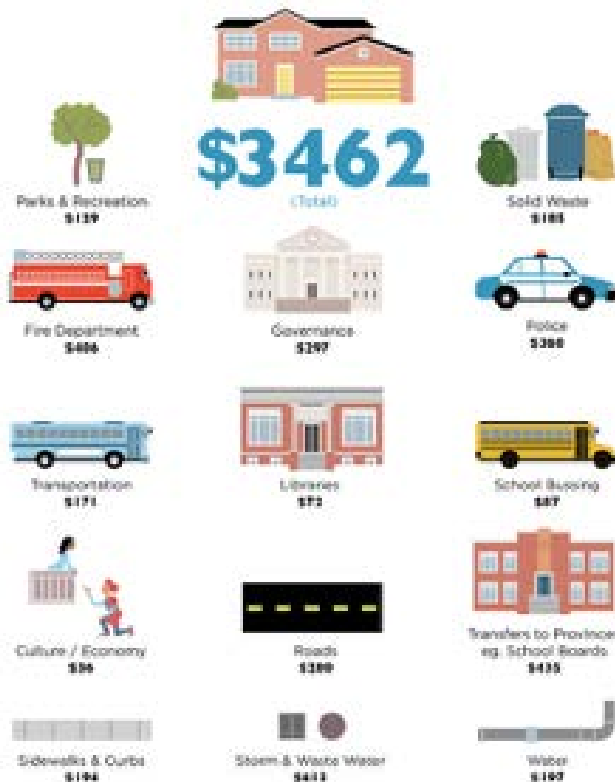
- Rapid growth in satellite towns of Delhi (Gurgaon, Noida, Grt Noida, Faridabad etc)
- Mumbai, little movement in peripheries, but witnessing inner city redevelopment
- Pune capitalising on Mumbai's slow down, attracting new economies like IT/ ITES

Source: Generated by WRI India using data from Bhuvan NRSC

High Cost of Sprawl

Suburban

City's Annual Cost, per Household



SP Sustainable Prosperity

For more data and more reports, visit thecostofsprawl.com
Data based on Halifax Regional Municipality

Urban

City's Annual Cost, per Household



SP Sustainable Prosperity

For more data and more reports, visit thecostofsprawl.com
Data based on Halifax Regional Municipality

Additional Costs of Urban Sprawl



Image Source: World Bank. Over 2 kilometers of the primary and secondary wastewater networks of Singapore have been repaired or rehabilitated. World Bank Photograph. Accessed August 11, 2016. <https://www.flickr.com/photos/worldbank/8075126711/in/album-118764476016651/>
City Photo. Traffic. Photograph. Flickr. December 13, 2006. Accessed November 9, 2016. <https://www.flickr.com/photos/cityphoto/4341131616/sizes/1>
Chik/918. Traffic. Photograph. Flickr. January 11, 2005. Accessed November 9, 2016. <https://www.flickr.com/photos/chik/115140404/sizes/1>
Dapico. Pollution. Photograph. Flickr. February 17, 2011. Accessed November 9, 2016. <https://www.flickr.com/photos/dapico/548094010/sizes/1>

Impact on the Urban Poor

Urban Sprawl and automobile-dependency have a number of adverse effects on the urban poor:

- Sprawling cities remain largely inaccessible to the urban poor
- Urban poor are often concentrated on periphery of city, sometimes in informal settlements
- Difficult to access economic opportunities located in city center



Urban sprawl in Mexico City, Mexico

URBAN SPRAWL IS COSTLY

\$1 trillion

Urban sprawl costs
the United States
alone per year

GLOBAL CLIMATE CHANGE TARGETS ARE NOT POSSIBLE WITHOUT THE TRANSFORMATION OF CITIES

23% of global GHG emissions are from transport

70% of GHG emissions come from cities



THIS?



Image: Flickr/RodrigoSolon

OR THIS?

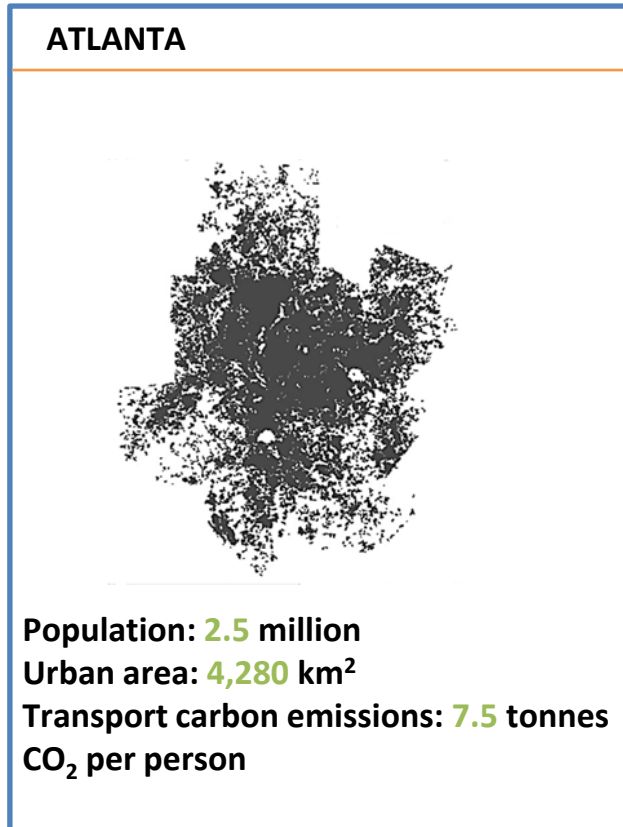




BACKGROUND

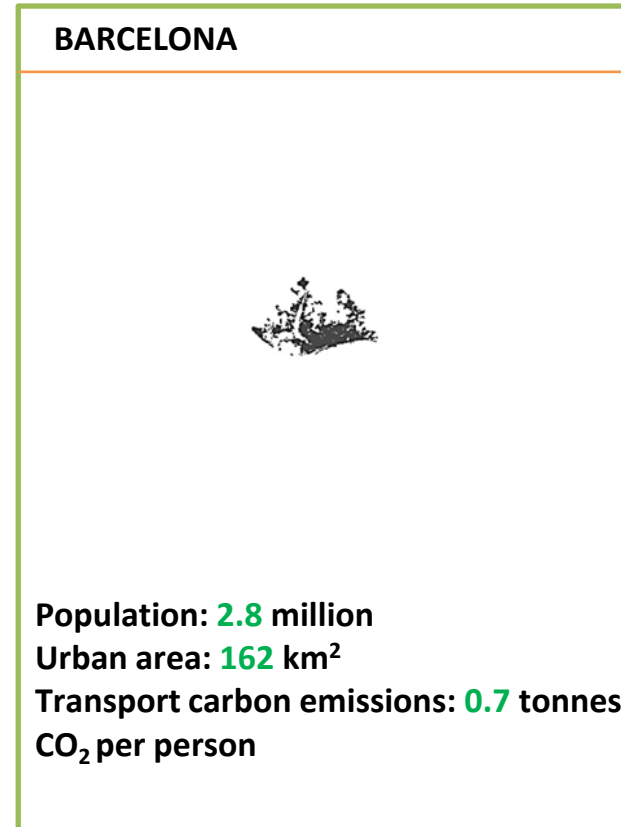
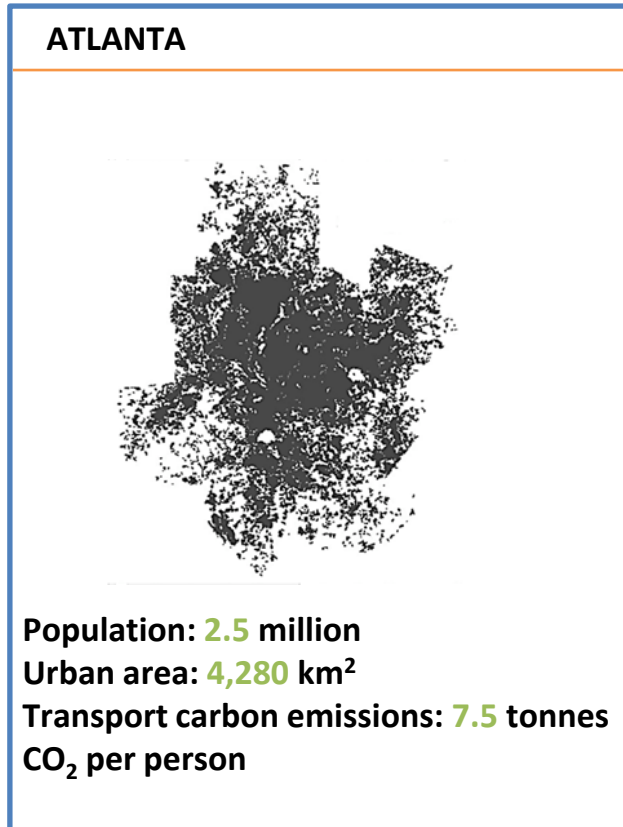
POINT OF DEPARTURE

HOW WE BUILD CITIES MATTERS



Source: Bertaud and Richardson, 2004, Kenworthy (2003) cited in Lefevre, B. (2009)

HOW WE BUILD CITIES MATTERS



Source: Bertaud and Richardson, 2004, Kenworthy (2003) cited in Lefevre, B. (2009)

A photograph of a busy city street, likely in China, featuring several tall, modern skyscrapers. In the foreground, a curved pedestrian bridge with a green railing is visible, with many people walking across it. The sky is overcast.

A NEW URBAN PARADIGM: COMPACT, CONNECTED, COORDINATED AND RESILIENT

\$3 trillion savings on
infrastructure 2015-2030
6% in GDP savings in cities



COMPACT CITIES HAVE FASTER GROWING ECONOMIES

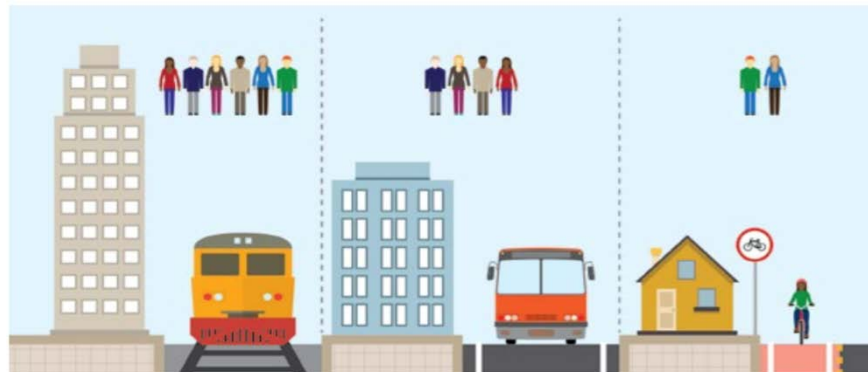


STRATEGY

TRANSIT-ORIENTED DEVELOPMENT (TOD)

TRANSIT-ORIENTED DEVELOPMENT (TOD)

- **Walkable:** Proper integration of non-motorized modes of transit
- **Mixed-use:** Planned mix of commercial and residential buildings
- **Mixed-income:** Inclusive TOD through affordable housing
- **High-density:** More housing units near transit stations to increase transit ridership
- **Access to Mass Transit:** Residents must have access to reliable transit
- **Access to Opportunities:** Jobs, services, housing, recreation, public space

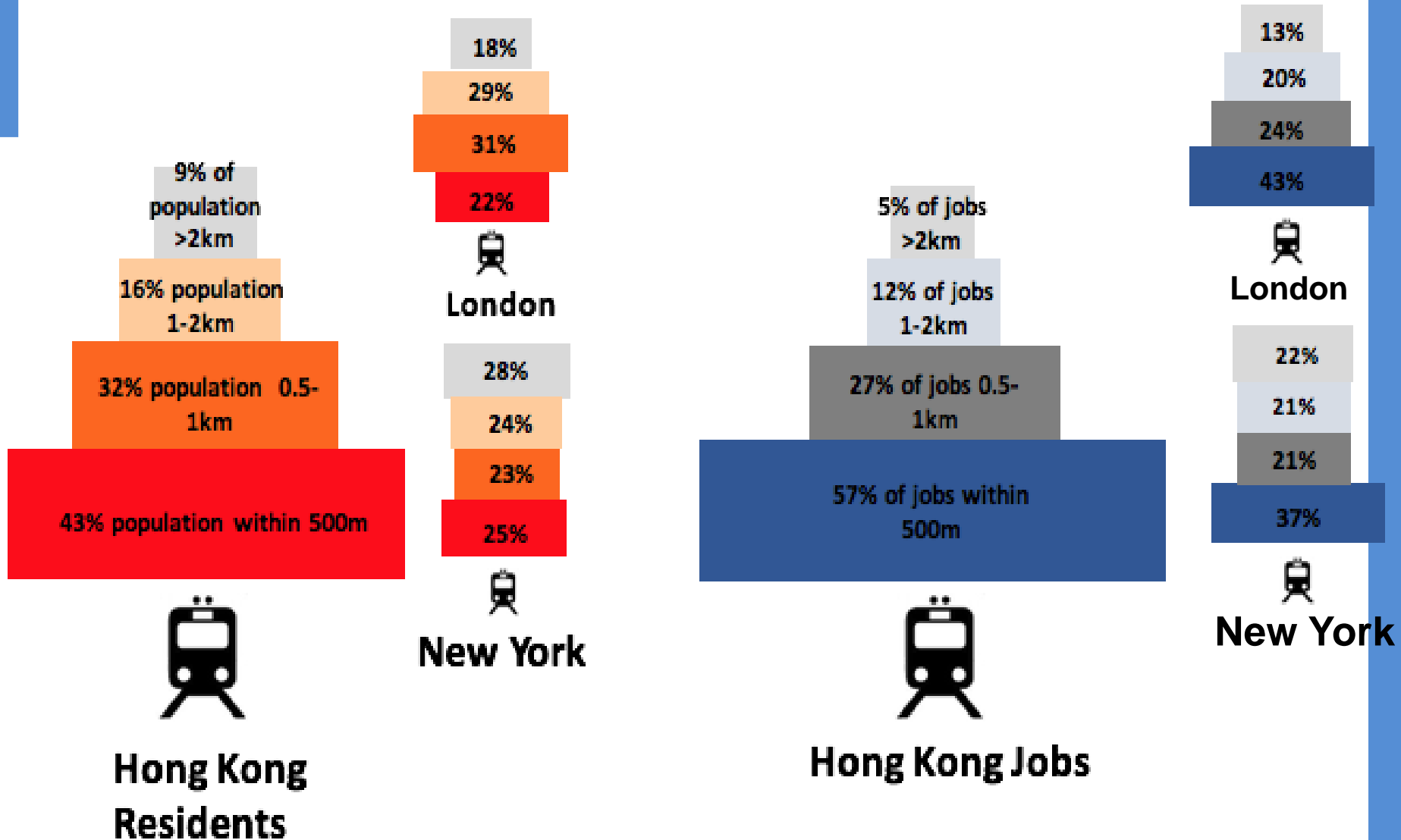


History of TOD



Like many cities in Europe, the city center of Florence, Italy, is dense and walkable.

The Case for TOD



Bangalore: 60% jobs within 60 mins



ADAPTATION of
TRANSIT ORIENTED DEVELOPMENT

INTERNATIONAL PRACTICES

Objectives for TOD

ECONOMIC

- Guide urban growth and new real estate development
- Spur economic growth
- Support local economic development and revitalization

SOCIAL

- Enhance equity along the corridor
- Increase accessibility and mobility for low-income households
- Reduce road accidents

ENVIRONMENTAL

- Reduce energy consumption and GHG emissions
- Reduce air pollution
- Preserve green space

Arlington County, United States

TOD as a **ECONOMIC** model to improve productivity

High Density Mixed Use around Transit Stops (Greenfield)

Rosslyn-Ballston corridor
2.5 miles, 5 metro stations.

Mixed Land Use—

Commercial: *Office, retail, hotels*

Residential: *Single-family, townhouse, condos, high-rise*

26% of the county population lives in the Metro corridor.

Metro corridor takes up **8%** of county land

The North American

Model: High Density, Mixed Use around Transit (focused on better productivity)

Image Courtesy: Reconnecting America Flickr Stream

Copenhagen, Denmark

Mode share of bicycle trips for
work or education trips **52%**

TOD as a **LIVABILITY** and
ACCESSIBILITY model to improve
QoL

Regional transport system

Green fingers

Decentralised concentration along
transport corridors

Pedestrian and bicycling priority

The European Model: Mid
Density, Mixed Use around
public spaces connected
with Transit, Biking and
Pedestrian facilities (focused
on better livability).

Image Courtesy: Amsterdamed, Flickr Stream

Curitiba, Brazil

TOD as means to INTEGRATE
LAND USE AND TRANSPORT
to improve connectivity

Integrated land use and transit

Mixed land use

Inclusion of affordable housing

Protect historic city center

Contain urban sprawl

Passengers per day on the BRT

system **2.7 million**

**The South American
Model:** High Density
corridors connecting parts of
the city (focus on Integrate
land use and transport).

Hong Kong SAR, China

TOD as a CO_DEVELOPMENT model to create funding for development

High quality pedestrian infrastructure in R+P developments

2001-2005 property development accounted for **52%** of MTRC revenues

41% of population lived within 500 m of a rail station in 2002

Image Courtesy: Design for Health, Flickr stream

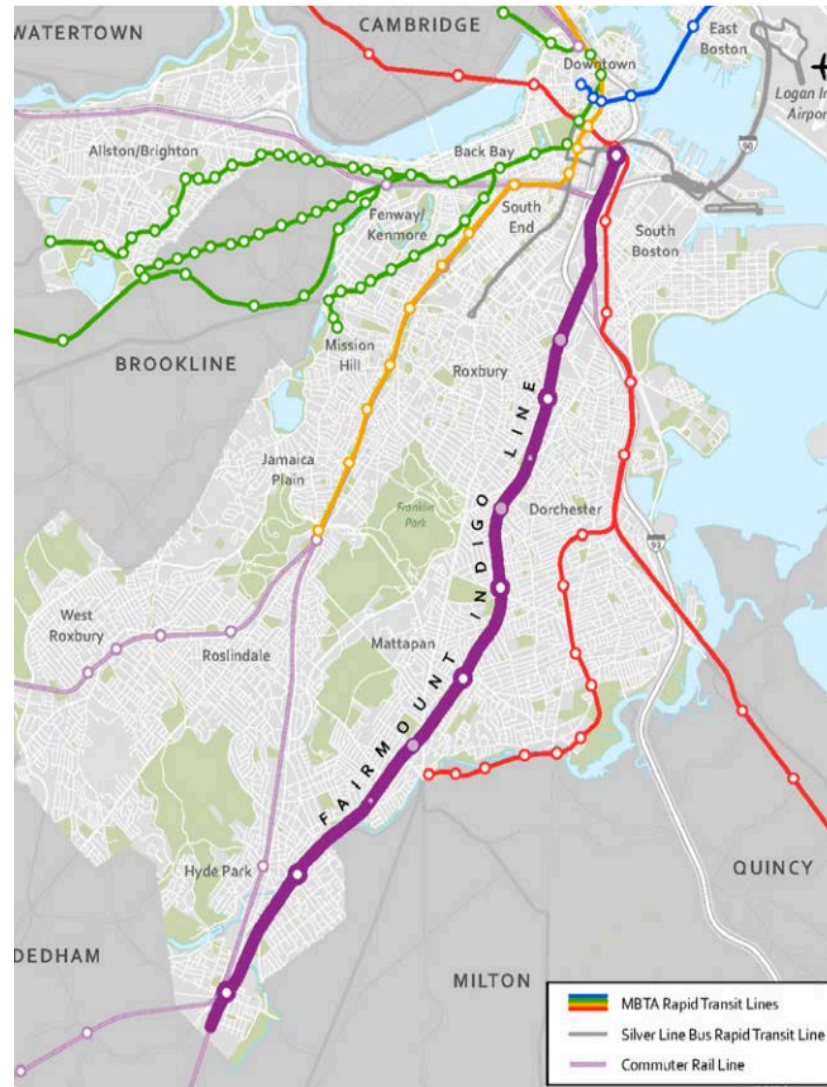
The Asian Model: Co-development model to begin with, focused on leveraging real estate around transit to create funds for development.



SCALES OF TOD

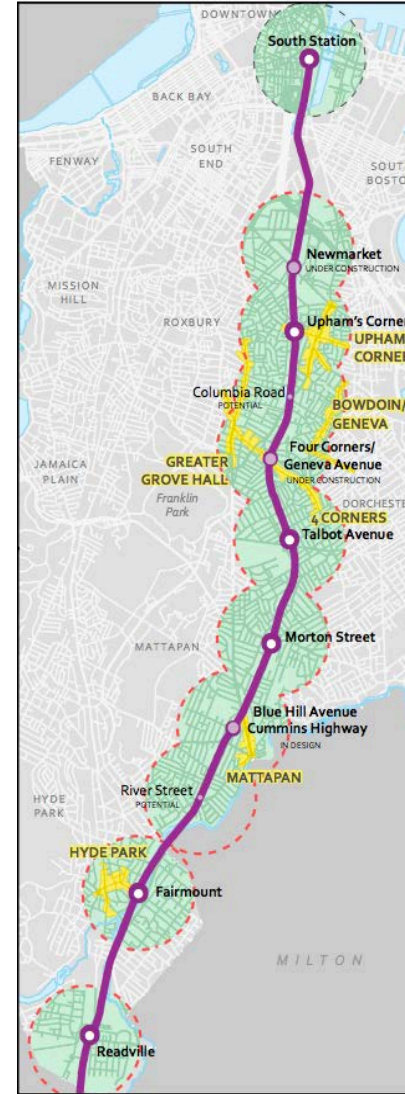
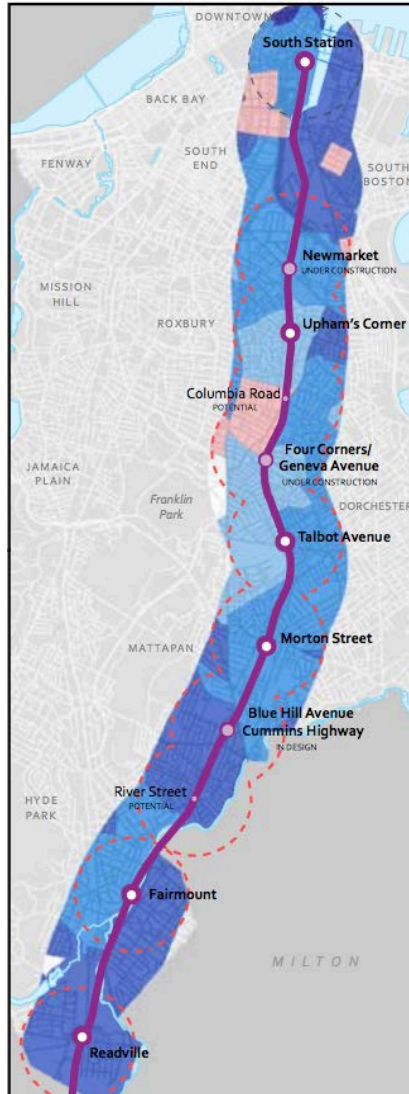
INTERNATIONAL PRACTICES

SCALES OF TOD: REGIONAL/CITY LEVEL



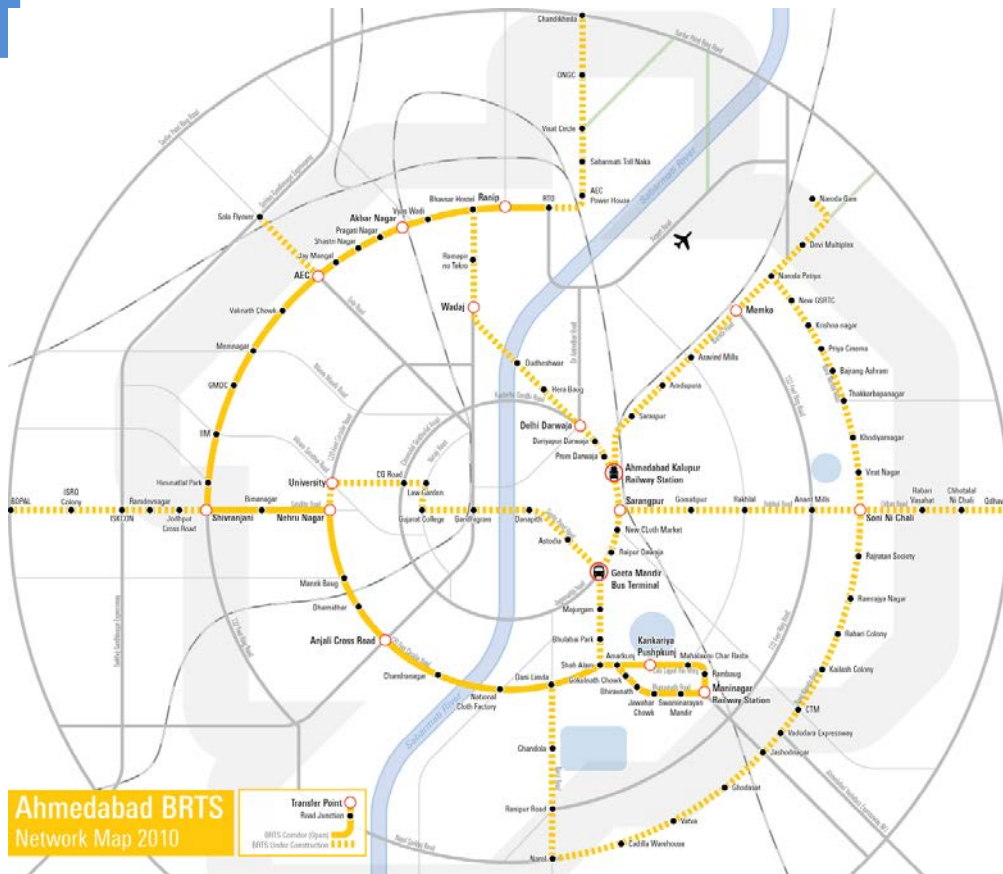
Boston, Massachusetts' Fairmount Indigo Railway Corridor

SCALES OF TOD: CORRIDOR LEVEL



Boston, Massachusetts' planned Fairmount Indigo Railway Corridor

SCALES OF TOD: CORRIDOR LEVEL



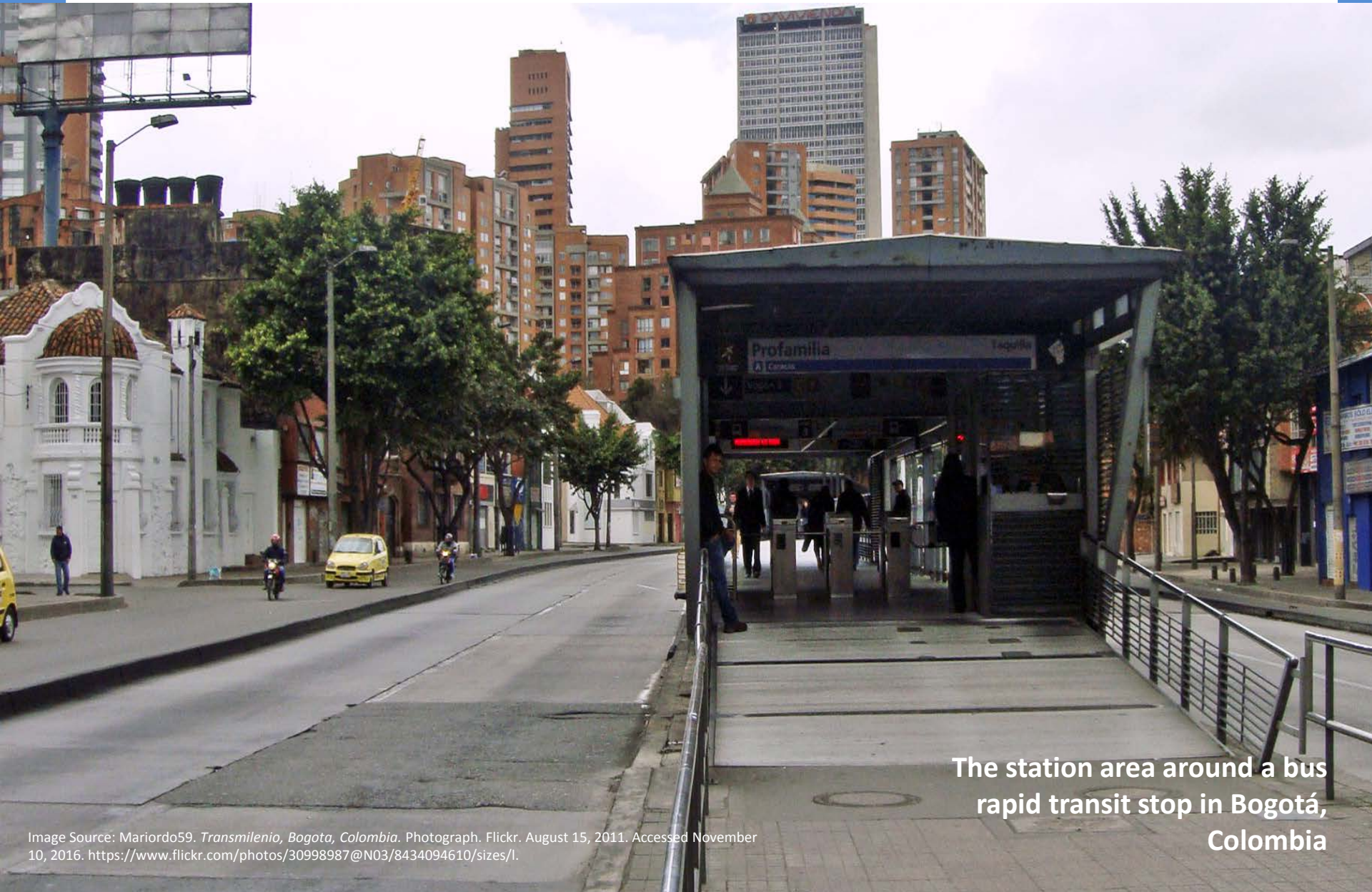
- TOD corridors serve as the backbone of the city, shaping its network and spatial structure
- Promote communities' long-term goals
- Offer a variety of land uses
- Provide community destinations
- Incorporate community input

The city of Ahmedabad, India's BRT system

Image Source: *Ahmedabad BRTS*. Illustration. Wikimedia Commons. February 12, 2010. Accessed September 6, 2016. https://commons.wikimedia.org/wiki/File:Ahmedabad_BRTS_Network_Map.png.

Source: Michaelson, Juliette, Gary Toth, and Renee Espiau. Project for Public Spaces, Inc. "Great Corridors, Great Communities." Project for Public Spaces, Inc. 2008. Accessed September 6, 2016. http://www.pps.org/pdf/bookstore/Great_Corridors_Great_Communities.pdf.

SCALES OF TOD: STATION AREA LEVEL



The station area around a bus rapid transit stop in Bogotá, Colombia



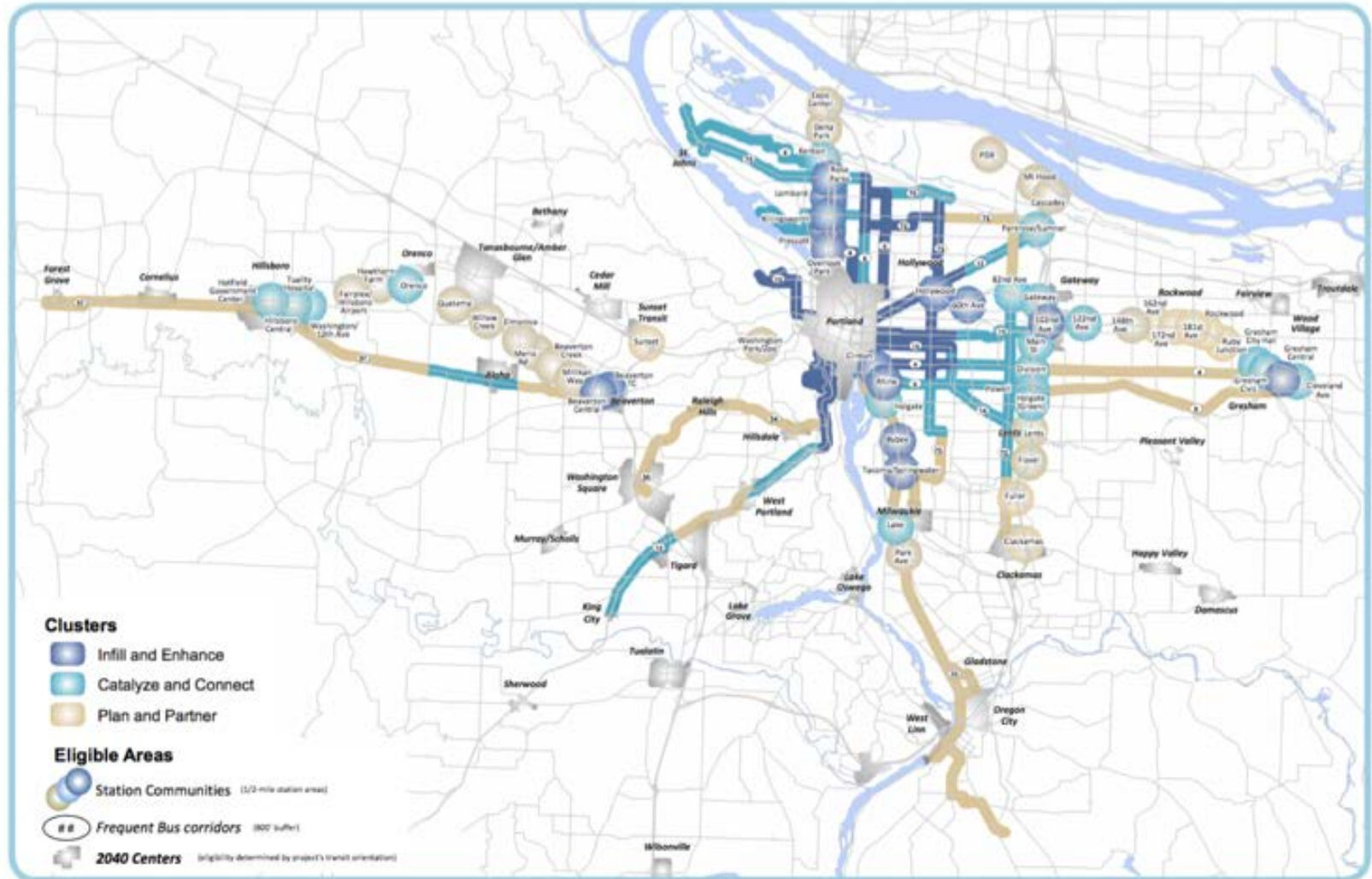
TOD CASE EXAMPLES

INTERNATIONAL PRACTICES

PORTLAND, U.S.A.

TOD typology clusters

(transit orientation + market readiness)



A PLAN FOR SURABAYA, INDONESIA



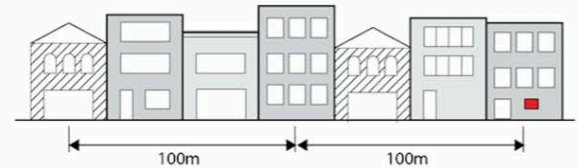
City Form Lab



5 Promoting hawkers along the heritage trail



1 Establishing continuous heritage trail between different historic districts along the corridor



3 Maintain the continuity of the trail by implementing heritage trail wayfinding signage or plates at most 100m apart

4 Communication of historic places, sites and precincts through collateral that 'tells the story'.



2 Setback regulations to ensure new form does not overwhelm or dominate the heritage asset



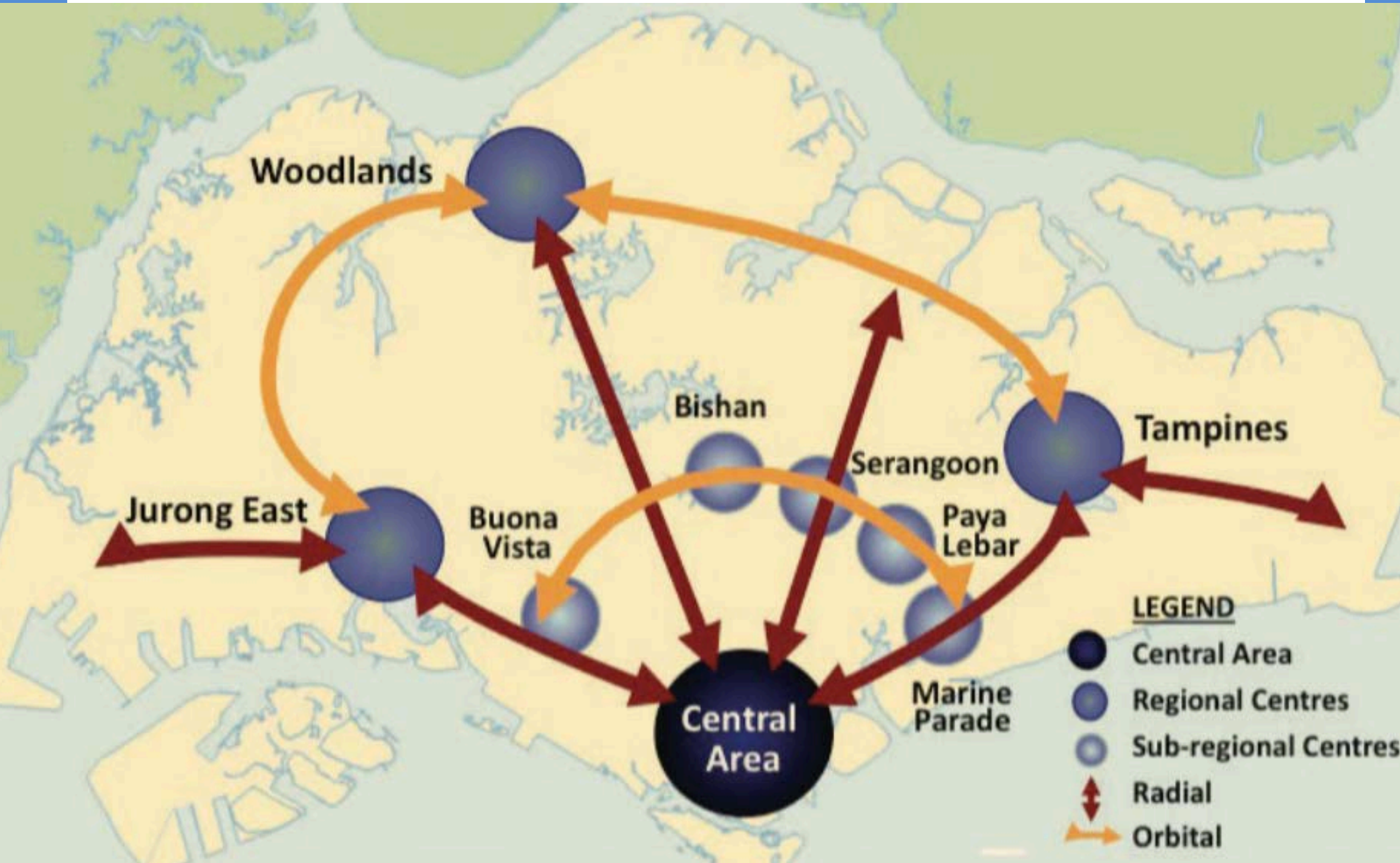
7 Establishing Kampung passages as part of the heritage trail



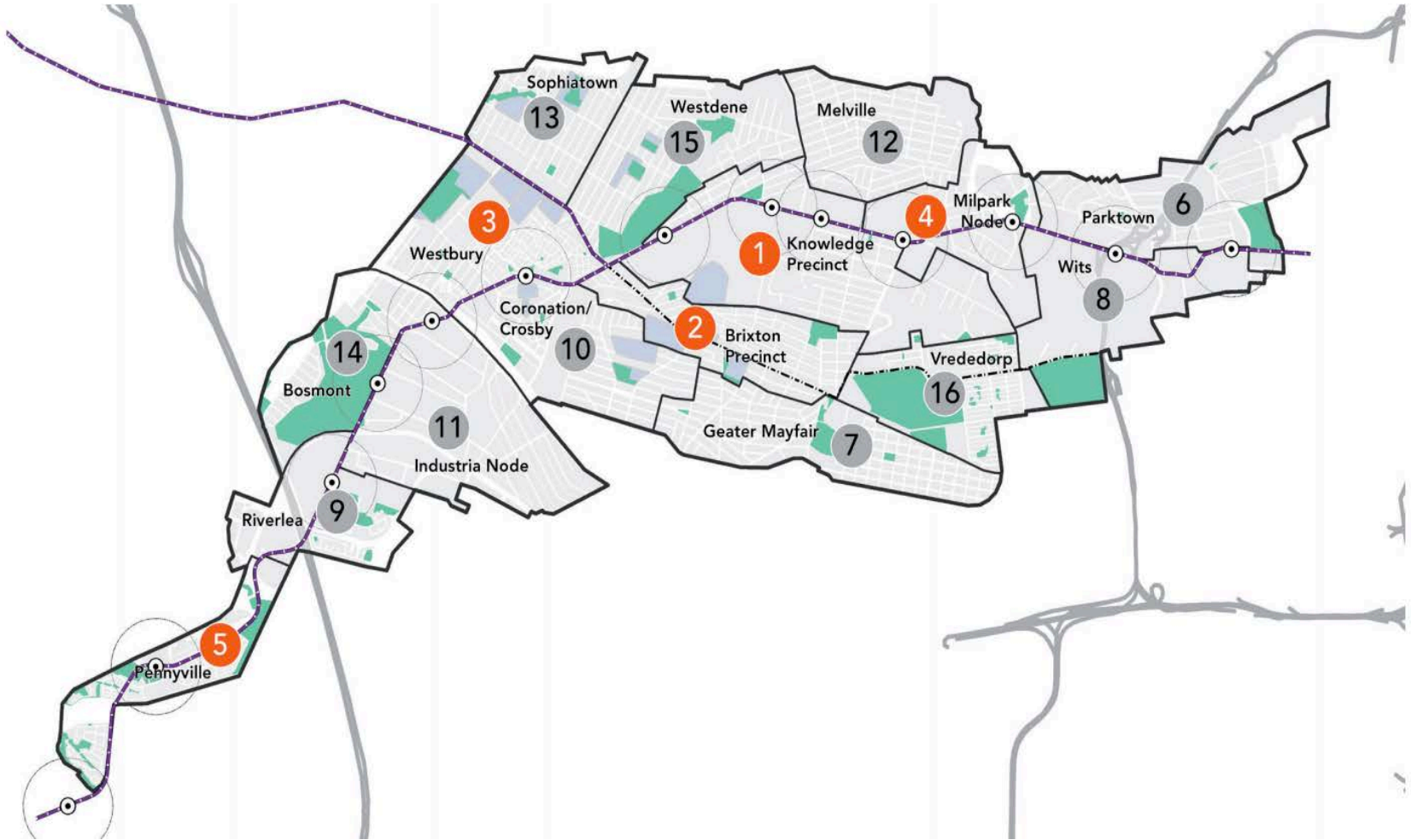
6 Boulevard trees providing natural shading for walks along the trail



SINGAPORE



JOHANNESBURG, SOUTH AFRICA





ADDRESSING LAND

INTERNATIONAL PRACTICES

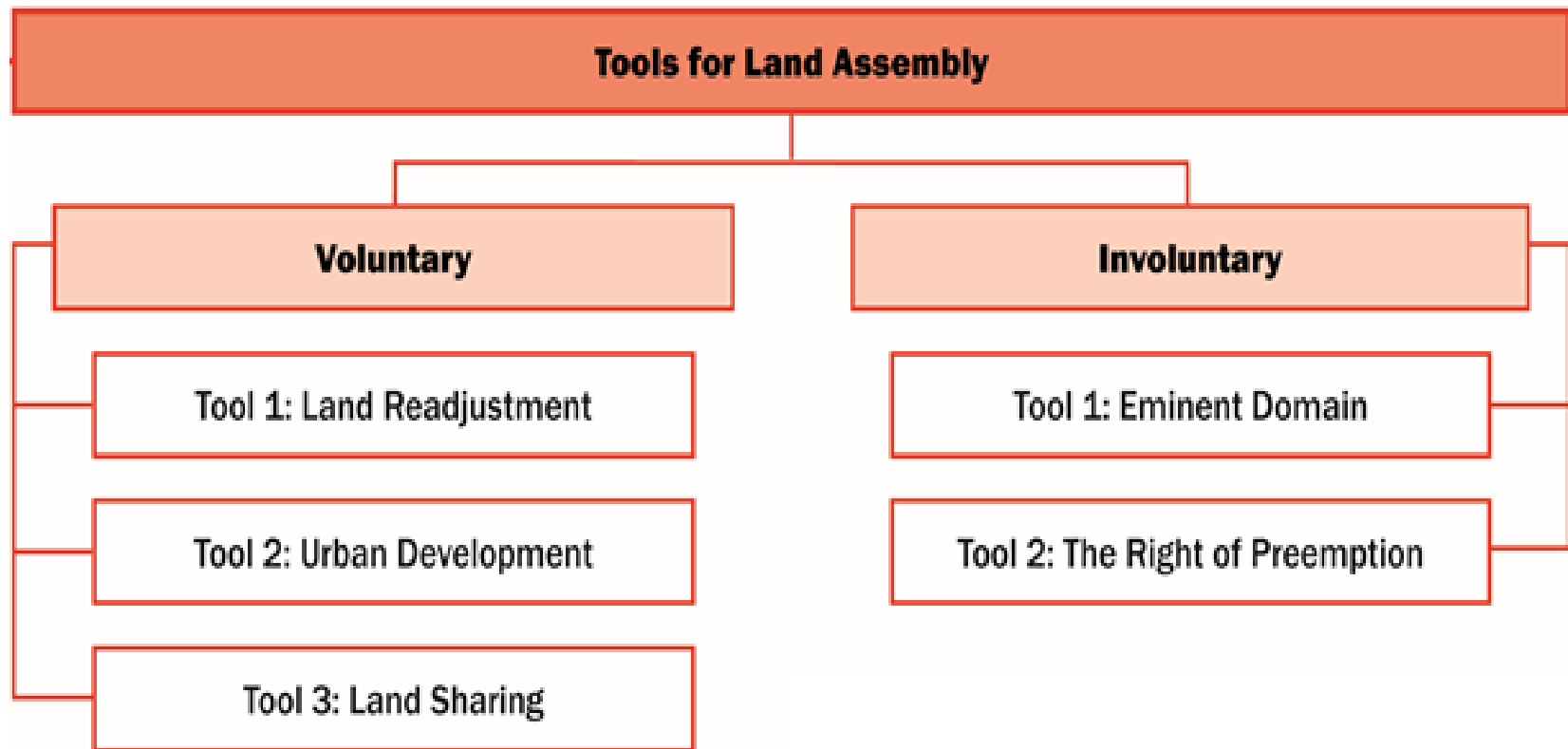
Land: the foundational building block for TOD

Land is often the most valuable asset a city possesses to leverage TOD

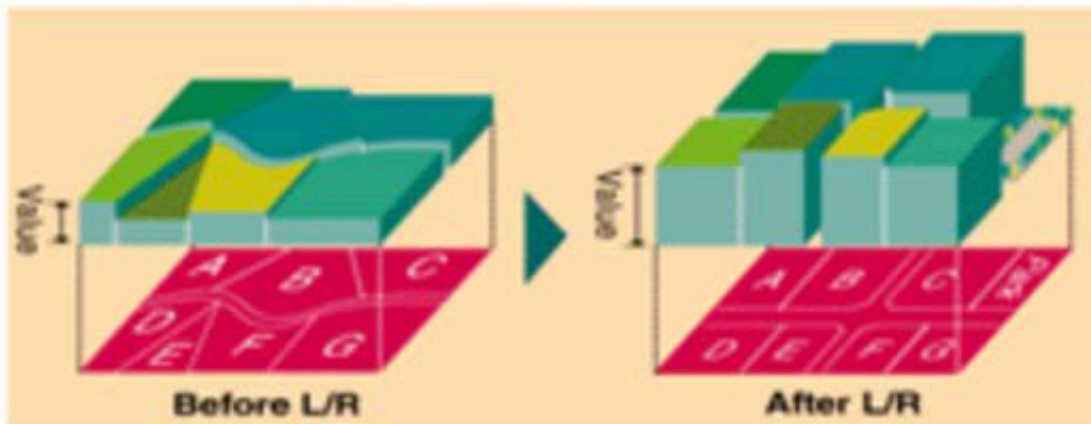
Many funding and financing tools can be used to harness land assets

Given the variety of land-ownership regimes, diverse tools and cooperation between entities is key to assemble land for TOD Corridor projects

Land related tools



Land readjustment scheme



**Ahmedabad-
Town
Planning
Scheme +
Land Pooling**



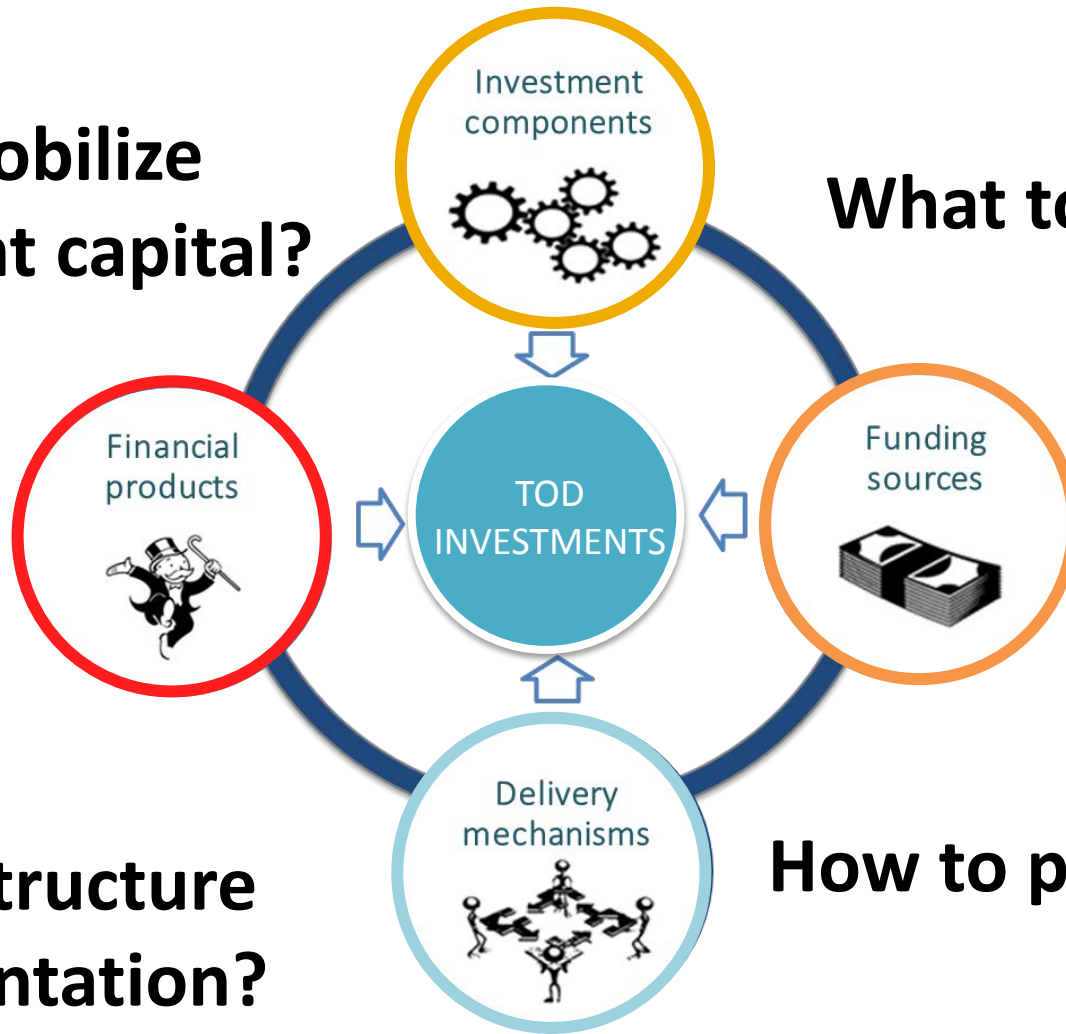
FINANCING TOD

INTERNATIONAL PRACTICES

The Business Model Framework

How to mobilize investment capital?

What to invest in?



How to structure implementation?

How to pay for it?

Portland: Delivery Mechanisms + TIF

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 TOD area known as the Pearl District in Portland, U.S.A.

Colombia: Service Charges



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

Image Source: Martha Irujo. Picture 613. Photograph. Flickr. February 12, 2010. Accessed November 18, 2016. https://www.flickr.com/photos/soy_de_cali_ve/4368840057/sizes/l

- **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

Hong Kong: Rail + Property



Kowloon Station, Hong Kong: a TOD project where stakeholders utilized post-rail land value capture

Image Source: *Buildings on Kowloon Station*. Photograph. Wikimedia Commons. May 22, 2016. Accessed November 17, 2016.
https://commons.wikimedia.org/wiki/File:Buildings_on_Kowloon_Station.jpg.

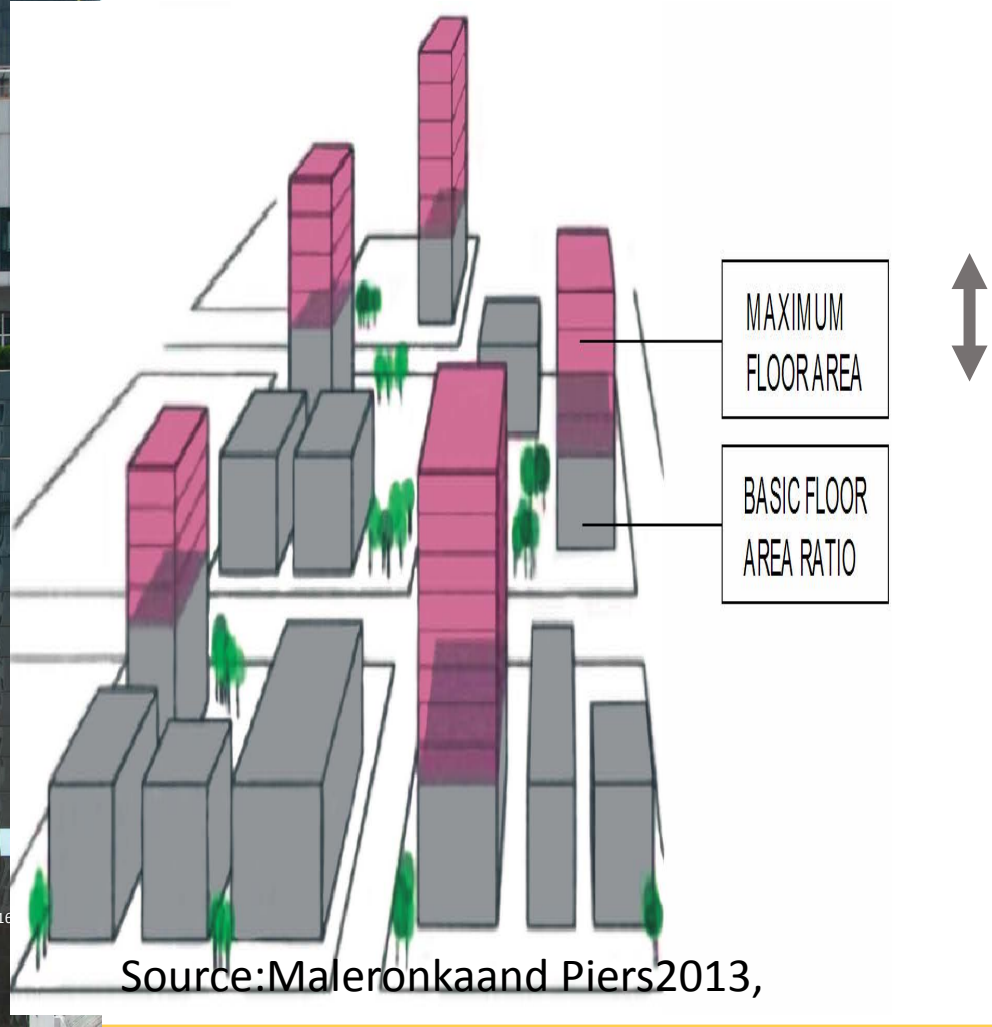
Land value increments: revenues gained through land value capture, a technique in which a public authority harnesses increased land value derived from public action or investment

- Land value capture can be carried out through such public delivery mechanisms as: Upzoning, Land readjustment, Special assessment tax, Land sale at post-rail prices

Sao Paulo: Air rights

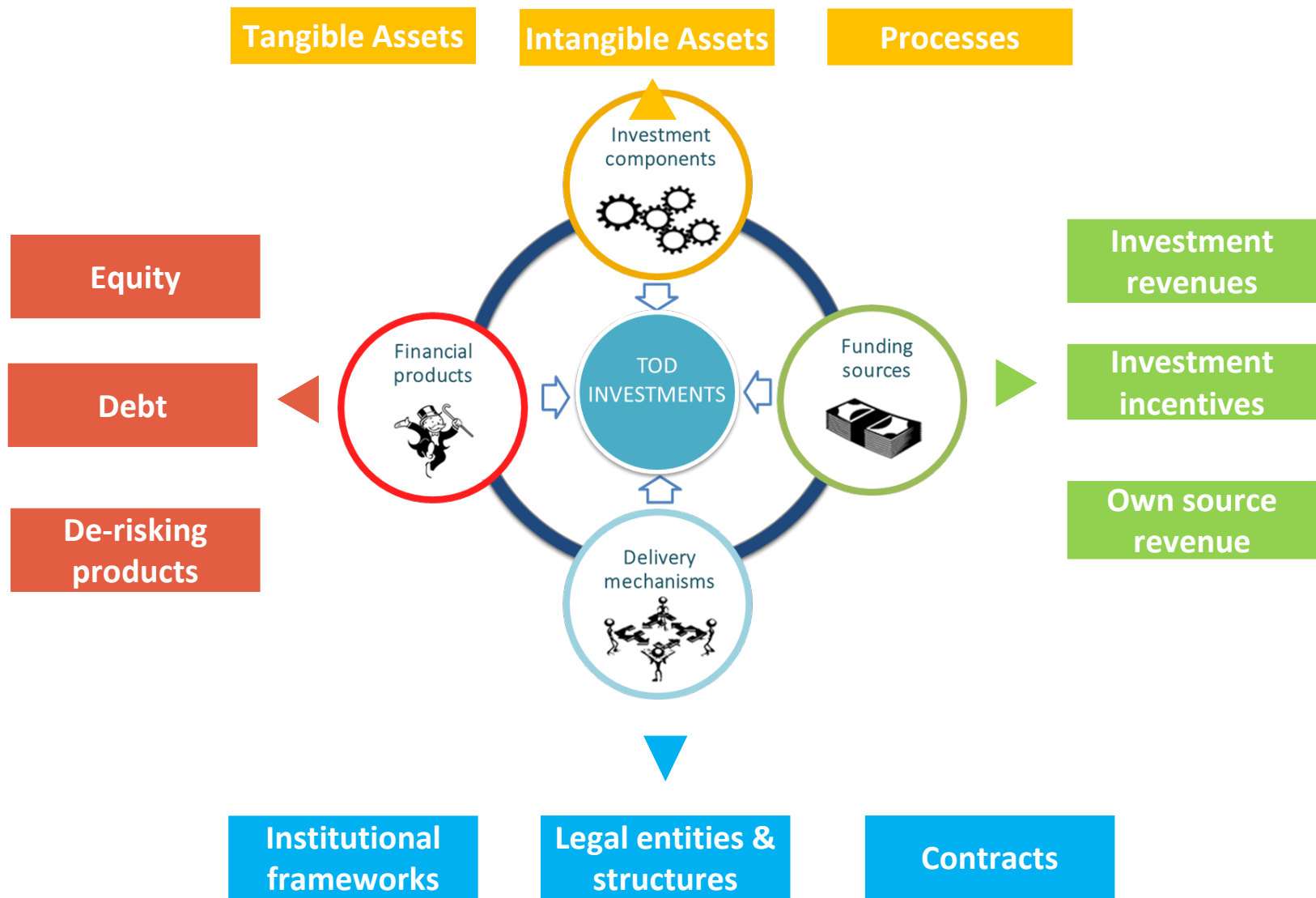
Faria Lima District, São Paulo, Brazil:
a TOD project in which urban
authorities mobilized funding
through the auction of development
rights

Image Source: Alexandre Nascimento, 06.11.09, Nov 002, Photograph, Flickr, November 6, 2009, Accessed November 16, 2009



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 The auctioning. Authorities can also provide density bonuses (FAR increase beyond the zoning code

The business model framework





TOD GOVERNANCE

INTERNATIONAL PRACTICES

TOD IMPLEMENTATION PROJECT CYCLE

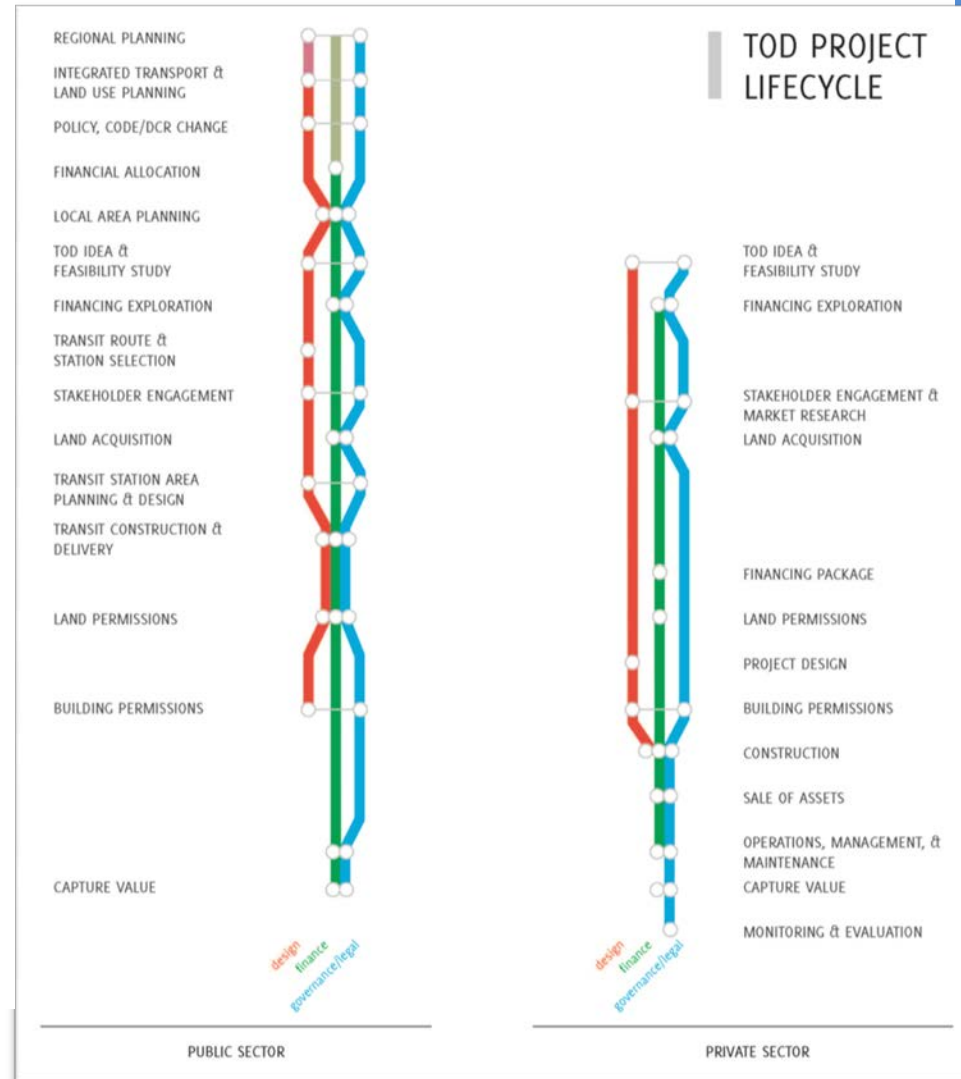
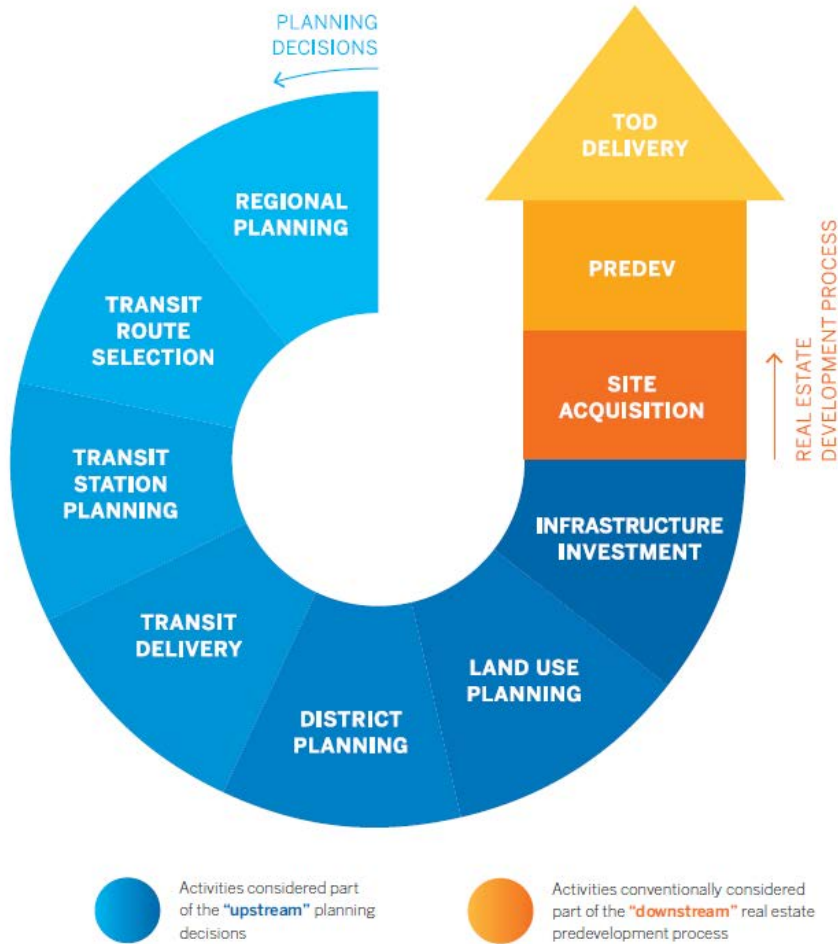
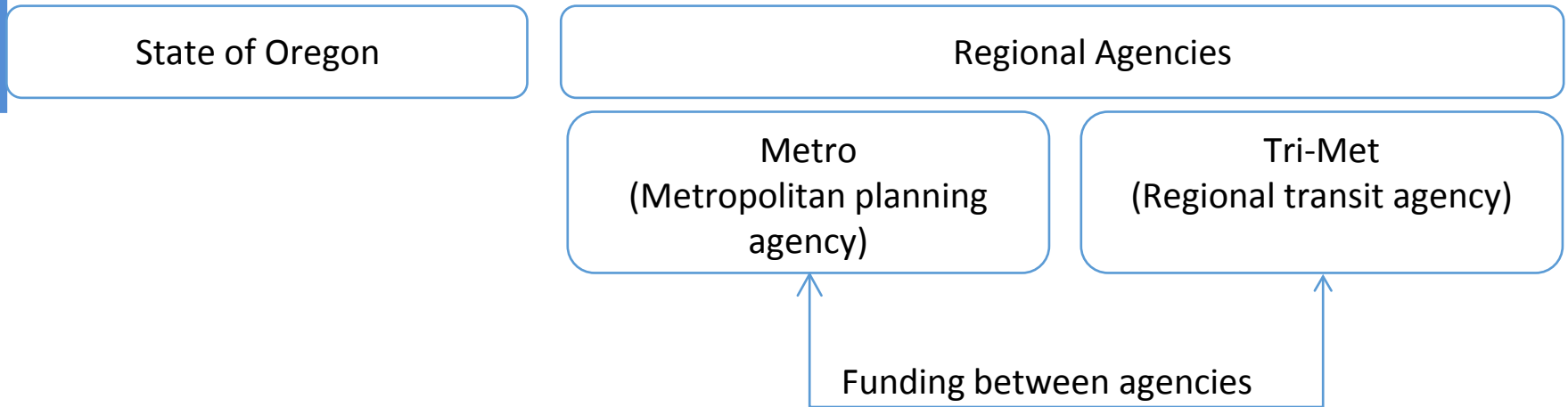


Image Source: Carlton, I. and Fleissig, W. "Steps to Avoid Stalled Equitable TOD Projects" Living Cities. April 2014.

Image Source: WRI.

Portland – TOD Governance



Urban Growth Boundary (UGB), 1979

Transportation Planning Rule, 1991 followed by “2040 Growth Concept”

Transportation & Growth Management Program, 1993

TOD Tax Exemption, 1995

Regional Growth Management, 1994

TOD Implementation Program, 1998

Metropolitan Transportation Improvement Program

Westside Station-Area Planning, 1993–1997

Joint Development, 1997

TOD Tax and Fee Exemptions



INCLUSIVE TOD

INTERNATIONAL PRACTICES

Housing Production: Land Acquisition, Diverse Zoning for Affordable Housing

- Public land dedication and write-downs
- Joint public-private developments
- Land banking
- Land readjustment
- Overlay zones- diverse zoning, including rentals



Public housing in Singapore

Connecting housing to opportunities: Medellin, Colombia



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.



ADAPTING
TRANSIT ORIENTED DEVELOPMENT

LESSONS FROM THE FIELD

TOD: Lessons From the Field

Political economy

- Political leadership and vision for the city
- Appropriate institutional structures
- Community participation
- Intergovernmental and metropolitan collaboration

TOD: Lessons From the Field

Planning and Regulation

- Holistic and integrated approach (LU+T)
- Supportive regulatory environment

Finance

- Leverage capital
- Use a combination of financing options
- Use public sector investment to encourage private sector investment
- Stakeholders must have shared vision

TOD: Lessons from the Field

Implementation

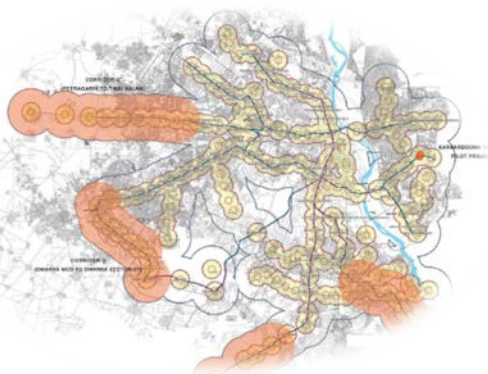
- Create democratic, transparent, and fair processes
- Create new spatial identities through placemaking strategies
- Allow for adjustments over long-term market cycles
- Limited transit network diminishes TOD appeal
- Limit gentrification through increased access to low-income housing

The opportunity

Game-changing solutions are out there

Managing Urban Expansion

Transit-oriented development



Improve Energy Efficiency

Smart, efficient buildings



Addressing congestion

Mass Transit, Bike sharing systems and other low impact modes



- But solutions need *improving*, *scaling* and *adapting* for maximum impact:
 - **Extending** the coverage of mobility, energy, and other services to underserved areas
 - **Diversifying** options for greater choice and accountability, and adapting to local context.

- Source: UTTIPEC, DDA, WRI India)
- Photo credit: Anne Maassen

Thank You

Jaya Dhindaw
Director- Urban Development
World Resources Institute, India

www.wri.org

