Transit Oriented Development in the United States

December, 1st 2011
At one time,

Urban development and transit were coevolving partners in US city building.

Urban centers and streetcar suburbs defined a uniquely American form of metropolis. This form was at once focused on the city and decentralized around transit-rich suburban districts.

Since World War II this balance has been largely disrupted by sprawl and urban decay.

Now a new balance seems to emerge between suburb and city: infrastructure costs, environmental impacts, and strained lifestyles are combining with a new American demographic diversity to produce a more integrated form for the development of the regions.
Fig. 7 – Evolution of surface in daily urban system (1968-99: time-space)

Source: INSEE, Population census

Extension of aires urbaines in 1968
Extension of aires urbaines in 1999
Transit Oriented Development is regional planning, city revitalization, suburban renewal and walkable neighborhoods combined.

It is a cross cutting approach to development that can do more than help diversify the transportation systems. It can offer a new range of development patterns for households, business, towns and cities.

Transit Oriented Development is never a stand alone phenomenon: it must be conceived within the context of at least a corridor and in most cases a regional metropolis. It is seen as an alternative for a more important strategy for sustainable growth.

The original direction of TOD was limited: it focused on light rail. Now the modes have matured to include bus rapid transit, light rail, express bus, streetcars, commuter trains and heavy-rail systems. These systems are diverse and interdependent in the development of a regional cities system.
Few principles for Urban Oriented Development

**Resurgence of investments** in the city as a whole, with historic centers (downtowns) and suburbs, in a regional development pattern. Three trends:

**Urban rebirth** driven by demographic changes, including the rise in immigration, the aging of baby boomers, the increase of non family households, a growing market for smaller homes: urban centers are now seen as attractive, lively places in which to live and work, and as hubs of intellectual and creative capacity.

**Continuing growth and emerging maturity of America’s suburbs**, many of which are struggling to become cities in their own right. Suburbs need to diversify land uses in order to build more solid revenue bases. Suburbs need to respond to the desires of many suburban residents who have chosen not to move back into cities but who nevertheless want some urban amenities in their towns.

Renewed interest in **rail travel** and rail investments.
... at the convergence of these three trends is the potential for a substantial market for a new form of walkable, mixed-use urban development around new and existing rail or rapid bus stations.

Transit oriented developments have the potential to provide residents with improved quality of life and reduced household transportation expenses, while providing the region with stable mixed-income neighborhoods that reduce environmental impacts and provide real alternatives to traffic congestion.
Historical context

The early twentieth century: development – oriented transit

The streetcar suburbs that existed before the 1900s evolved in a setting that no longer exists today: often, the streetcar lines and their adjacent residential communities were developed by a single owner who built transit to add value to the residential development by providing a link between jobs in an urban center and housing at the periphery.

Private developers built transit to serve their development rather than vice versa: streetcar stops often had small retail clusters to serve commuters as well as local residents. These small commercial districts are the precursor of modern TOD and represent a good balance between place and node.
Enter suburbs—exit slums

Suppose our cities still depended upon horse cars. Workers would live huddled under the shadow of their factories. Children, who can now reach the cool beaches for a few pennies, would be condemned to the hot pavements all Summer.

The trolley car has transformed the conditions of city life. With its coming the suburb started to grow and the slum to go.

GENERAL ELECTRIC

"Enter suburbs, exit slums," 1923 General Electric advertisement showing an early New York horsecar of 1832 and its replacement, an electric streetcar. GE sold the motors for streetcars and claimed that streetcars enabled workers and their children to live in comfort. Courtesy of General Electric Company.
THE LOS ANGELES IMPROVEMENT CO.

Places before the public another offering of those

BEAUTIFUL LOTS

ON THE HILLS WEST OF THE CITY.

(See Map inside)

THESE FINE LOTS

Overlook the City and the Ocean, and from them a

most delightful view can be obtained.

A Cable Road runs Direct to the Property!

It is a fact that an investment in Real Estate on the line of or adjacent to a Cable Road in any growing City has been highly remunerative, and no doubt purchasers of this property will double or treble their investments in a short time.

GO AND LOOK AT THIS PROPERTY!

Make your selection and mark your catalogue before the day of the Sale.

Friday, May 14, 1886,

At 11 o'clock A. M.

Sale will take place on the Grounds.

The growth of the City is now surrounding this property with fine and cheerful Homes, Churches, Schools (public and private), Stores, and all conveniences abound, making this location one of the most desirable in the City.

(See Map inside)

To persons looking for either an

INVESTMENT OR A HOME,

WE COMMEND THIS PROPERTY.

Two Years' Credit!

TITLE PERFECT.

These Building Sites have advantages over other property in the city of Los Angeles.

ON THE HILLS!

AWAY FROM FLOODS!

Only Nine Minutes from the Heart of the City.

TWO CABLE RAILROADS RUNNING DIRECT.

Do not fail to examine this beautiful property before the day of sale, and remember

THE SALE IS POSITIVE.

(See Map inside)

Sale to be held on the Grounds.

FRIDAY, MAY 14TH, 1886,

At 11 o'clock A. M.
Historical context

The early twentieth century: development – oriented transit

Sam Bass Warner, “Streetcar suburbs”
  A two part city: a city of work separated from a city of homes
IT'S A CHANGE YOU NEED

MOVE TO OSTERLEY

35 MINS FROM PICCADILLY CIRCUS
40 MINS FROM MANSION HOUSE
TRAINS EVERY 7½ MINUTES

UNDERGROUND
**Historical context**

The early twentieth century: development – oriented transit

The interdependence between housing, jobs and transit inherent in the early streetcar suburbs was broken apart by the automobile and, starting in the 1930s, roads, including highways, became the preferred transportation infrastructure in America.

Development was no longer dependent on transit, the link between transit and development was broken and developers got out of the business of building transit systems.
SEPARATION OF GRADES
AT INTERSECTING STREETS
BY MEANS OF
VIADUCTS
Levitt's Homes: A look at the two types of homes Levitt built in the Levittown area.

The 1947 Cape Cod

The Levitt Cape Cod offered 4½ rooms on a 25-by-30-foot slab, with an unfinished expandable attic, and a kitchen full of appliances that included a Bendix washer. The kitchen was in the front, at the time a novel approach, and two bedrooms were in the rear. It rented for $60-65 per month, depending on the lot, and was offered for sale a year later at $7,500. Homes were landscaped with shrubs, shrubs, and shade trees. Cape Cods were built in 1947 and '48 only, all with the same interior floor plan.

The 1949 Ranch

The Levitt Ranch, also 4½ rooms, was first offered in 1949. It was 50 square feet larger than the Cape Cod and rotated the cape's floor plan, keeping the kitchen in the front, but shifting the living room to the rear and bedrooms to the side. The attic was unfinished. There was a two-way hearth between the fully-equipped kitchen and the living room. It sold for $7,990, with a monthly mortgage payment of $58. The 1950 and 1951 models had the same basic floor plan as the earlier model.

Additional information:
- Levitt offered five Cape Cod models, which all had the same floor plan but differed in window size, number and placement, house color and roofline.
- The two 1949 ranch models, while differing in exterior features, all had the same floor plan and each came with a revolving storage cabinet and a 16-foot picture window in the rear of the house.
**Historical context**

The postwar years: auto oriented transit

The postwar period saw a precipitous decline in transit use and the dismantling and abandonment of many rail systems.

Buses became the primary mode of transit in most regions. Bus service has less influence on land use patterns than fixed-rail transit.

Cars and highways development created sprawl: potentially, all the lands were available to development, in every direction, at every distance.

Sprawl began to be the only development pattern, helped and even fostered by a rigid land use zoning.
Historical context

The postwar years: auto oriented transit

As congestion worsened, a new generation of transit systems was planned and built. The San Francisco Bay Area Rapid Transit (BART) system, the Metropolitan Atlanta Rapid Transit Authority (MARTA) and the Washington (D.C.) Metropolitan Area Transit Agency (WMATA) all opened during the 1970s. These systems were built with a different rationale than their predecessors.

They were built primarily to relieve congestion, their funding was provided entirely by the public sector, and little or no additional land was purchased by the transit agencies to ensure that there would be a link between these transit investments and future development patterns.

These systems were also designed to work with the automobile, under the assumption that most people would drive to suburban stations rather than walk, bike or ride the bus.
Historical context

The postwar years: auto oriented transit

What’s more, these systems were viewed as primarily serving a regional purpose, and the individual stations were considered nodes within this larger system, but with little concern about making them sensitive to the places in which they were located.

Because of these, many stations were surrounded by large amounts of parking lots rather than being integrated into the neighborhoods they served. These large surface parking lots or structures created barriers between the station and the communities.
Historical context

Today: transit related development

Rail systems usually enhance the value of adjacent land and transit agencies and the federal government see large scale real estate development on property owned by transit agencies as a way to capture some of that value.

Transit agencies and the federal government have an interest in promoting intense development around transit stations. This “joint development” approach has been used with notable success in locations around the US, including Washington D.C. and Portland.

The emphasis of most joint development, which until 1990s was virtually the only form of TOD pursued, has been on dense, profitable real estate development aimed at generating revenue for the transit agency and the federal government. Projects were predicated on a purely financial rationale rather that a broad vision of how transit could work in tandem with surrounding development.
Historical context

Today: transit oriented development TOD

The last decade saw subtle but promising shifts in the landscape of transit and development, with the convergence of a number of trends: growing transit ridership, increased investment in transit, frustration with congestion and sprawl, smart growth movements, New Urbanism, and in general a greater recognition of the advantages of linking development and transit.

New Urbanism brought together the notion of the pedestrian pocket with the idea of planning development around transit stations.

Mixed uses development + density around stations
Historical context

Today: transit oriented development TOD

Peter Calthorpe, “The next American metropolis”

Urban design principles associated with TOD
Historical context

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Urban design principles associated with TOD

Organize growth on a regional level to be compact and transit supportive
Historical context

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Organize growth on a regional level to be compact and transit supportive
Place commercial, housing, jobs, parks and civic uses within walking distance of transit stops
Historical context

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Preserve sensitive habitat, riparian zones, and high-quality open spaces
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Preserve sensitive habitat, riparian zones, and high-quality open spaces
Make public spaces the focus of building orientation and neighborhood activity
Encourage infill and redevelopment along transit corridors within existing neighborhoods
Historical context

Today: transit oriented development TOD

Rober Cervero, University of California at Berkeley
“Transit villages in the twenty-first century”
“Transit metropolis”

Cervero’s research has centered on the relationship between transit and metropolitan development and has stressed the relationship between urban form and the type of transit best suited to serving particular urban form.
Historical context

Tomorrow: Transit-oriented Development (TOD)

Transit oriented development can realize its full potential only if it is seen as a new paradigm of development rather than a series of marginal improvements. TOD cannot be and should not be an utopian vision: it must operate within the constraints of the market and realistic expectations of behavior and lifestyle patterns. Even if the market and lifestyle patterns can and do change as a result of both policy choices and socio cultural trends.

Federal transportation legislation in the 1990s has helped shift government investment priorities away from the automobile and toward alternatives such as transit, walking and biking. Transit oriented development can respond to these changes by offering an alternative that is viable in the market place while still yielding social benefits.
Historical context

Tomorrow: Transit-oriented Development (TOD)

Some conclusions after few years of TOD:

- There is no clear definition of TOD or agreement on desired outcomes, and hence no way of ensuring that a project delivers these outcomes;
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- TOD requires the participation of many actors and occurs in a fragmented regulatory environment, adding complexity, time, uncertainty, risk and costs to projects;
- Although transit adds accessibility and value to a place, transit alone is insufficient to drive real estate markets.
Defining TOD: the new regional building block

The typical definition of TOD is purely descriptive: a mix of uses, at various densities, within a half mile radius (800 m) around each transit stop.

Beside that, a set of performance benchmarks has been created:

Location efficiency
Rich mix of choices
Value capture
Place making
Resolution of the tension between node and place
For instance, in this diagram, the core commercial area is located near the transit stop, with residential areas surrounding it. The secondary employment/residential areas are further away from the core commercial area, and the arterial roads provide access to these areas. This layout could benefit from having more market stalls in the core commercial area to attract more foot traffic.
Highway: a long-distance, speed-movement thoroughfare traversing open countryside. A highway should be relatively free of intersections, driveways, and adjacent buildings, otherwise it becomes strip development which interferes with traffic flow and human comfort. Syn.: townless highway

Variants include Expressway and Parkway. An expressway is a highway with grade-separated intersections. A parkway is a highway designed in conjunction with naturalistic landscaping, including a variable-width median.

Drive: a thoroughfare along the boundary between an urbanized and a natural condition, usually along a waterfront, a park, or a promontory. One side of a drive has the urban character of a street or boulevard, with sidewalks and buildings, while the other has the qualities of a road or parkway, with naturalistic planting and rural detailing.

Road: a local, slow-movement thoroughfare suitable for Edge and Rural Zones. Roads provide frontage for low-density buildings such as houses. A road tends to be rural in character without curbs or striped on-street parking; it may have clustered plantings and paths instead of sidewalks. The degree of rural or rustic character of a road may be adjusted by the manipulation of such elements.

Boulevard: a long-distance, free movement thoroughfare traversing an urbanized area. A boulevard is flanked by parking, sidewalks, and planters buffering the buildings along the sides.

Avenue: a limited distance, free-movement thoroughfare connecting civic locations within an urbanized area. Unlike a boulevard, its length is finite and its axis is terminated. An avenue may be conceived as an elongated square. Syn.: connector (from TOD usage)

Variant: allée. A rural thoroughfare, free of fronting buildings, except at the terminus, where only trees in alignment define the space. Over time, an allée may become urbanized, evolving into an avenue.

Street: a local, slow-movement thoroughfare suitable for General, Center, and Core Zones. Streets provide frontage for higher-density buildings such as offices, shops, apartment buildings, and rowhouses. A street is urban in character, with raised curbs, closed drainage, wide sidewalks, parallel parking, and trees in individual planting areas. Character may vary somewhat, however, responding to the enfronting commercial or residential uses.
### Streetscape Elements

- **Streetscape**: the publicly held layer between the lot line and the edge of the vehicular lanes. The principal variables of streetscape are the type and dimension of curbs, walks, planters, street trees, and streetlights.

- **Curb**: the detailing of the edge of the vehicular pavement, usually incorporating drainage.

<table>
<thead>
<tr>
<th>Curb Radius</th>
<th>Curb Type</th>
<th>Parking Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 ft/min</td>
<td>open swale</td>
<td>none</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Sidewalk**: the layer of the streetscape dedicated exclusively to pedestrian activity. There is a choice of sidewalk width, and surface which are important components of the urban to rural character of the Transect.

<table>
<thead>
<tr>
<th>Walkway Type</th>
<th>Plantar</th>
</tr>
</thead>
<tbody>
<tr>
<td>path optional</td>
<td>continuous swale</td>
</tr>
<tr>
<td>path</td>
<td>continuous swale</td>
</tr>
<tr>
<td></td>
<td>continuous planter</td>
</tr>
</tbody>
</table>

- **Planters**: the layer of the streetscape which accommodates street trees. Planters may be narrow or wide, continuous or individual, holding allées or clusters of trees, all depending on the intended urban to rural character of the location within the Transect.

<table>
<thead>
<tr>
<th>Arrangement</th>
<th>Tree Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>clustered</td>
<td>multiple species</td>
</tr>
<tr>
<td>clustered</td>
<td>multiple species</td>
</tr>
<tr>
<td></td>
<td>multiple species</td>
</tr>
</tbody>
</table>

### Typical Streetscape Diagrams

<table>
<thead>
<tr>
<th>Highway</th>
<th>Rural Road</th>
<th>Road</th>
<th>Residential Street</th>
<th>Commercial Street</th>
<th>Avenue</th>
<th>Boulevard</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="#" alt="Diagram" /></td>
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</table>
Defining TOD: the new regional building block

Location efficiency
Rich mix of choices
Value capture
Place making
Resolution of the tension between node and place

Density: sufficient customers within walking or bicycling distance of the transit stop to allow the system to run efficiently;

Transit accessibility: transit stations and stops are centrally and conveniently located within the TOD and service that allows riders to reach their destination easily;

Pedestrian friendliness: a network of streets within the transit district that is interconnected and scaled to the convenience of pedestrians

The key variables for measuring location efficiency for a particular site are:

- Households per residential acre;
- Zonal transit density, which combines transit service frequency and proximity to the stop or station;
- Pedestrian / bicycle friendliness, which measures street grid and age of housing, with bonuses for traffic calming measures
Defining TOD: the new regional building block

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Choice is the defining feature of the best neighborhoods. A well designed neighborhood offers many activities within walking distance for those who do not drive (the young and the elderly), people who cannot afford cars and people who choose not to rely on cars to get around. Providing a mix of uses within neighborhoods helps make communities more convenient, and more affordable.

Housing and life style options
Defining TOD: the new regional building block

Location efficiency
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Since the transportation is the second highest consumer expenditure after housing, success in creating effective transit oriented could mean substantial economic value capture.

For local governments, value capture can mean higher tax revenues from increased sales and property values;
For the transit agency, value capture means both lease revenue from joint development and increased revenue from fare boxes
For riders, value capture means the reduction of access costs, both in reaching the stations and in riding the service

TOD offers value capture in terms of reduced household expenditures on transportation and increased opportunity for wealth capture through home ownership.

Households in denser, transit rich neighborhoods have significantly lower transportation expenditures
Defining TOD: the new regional building block

Location efficiency
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For residents of TOD, capturing value involves two things: acknowledge that the value of accessibility is already reflected in the cost of housing, all other things being equal, and finding ways to give households in these neighborhoods credit for the transportation savings they experience from owning fewer cars and driving them less.

A number of studies have demonstrated that proximity to transit tends to increase the value of a home, while proximity to a highway tends to decrease its value.

The Location Efficient Mortgage (LEM)
Defining TOD: the new regional building block

Location efficiency
Rich mix of choices
Value capture

Place making
Resolution of the tension between node and place

The Urban Design Compendium (UK)
It makes a case for the importance of high quality urban design in development and revitalization efforts.

- places for people;
- enrich the existing;
- make connections;
- work with the landscape;
- mix uses and forms;
- manage the investment;
- design for change.
Defining TOD: the new regional building block

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Resolution of the tension between node and place

A tension exists between the role of a transit station or stop as a “node” in a regional transportation network and the station’s role as a “place” in a neighborhood. As a generator of travels, a transit stop attracts activity and is a desirable place in which to live, open a shop or locate a workplace. At the same time, it is an interchange point serving a specific function in a regional network, which is in turn part of a metropolitan economic composed of employment centers and residential areas.

Luca Bertolini, Tejo Split “Cities on Rail”

The unique challenge of the development of node – places is the need to deal, at the same time, with both transport and urban development issues.
Defining TOD: A new typology for TOD

The standard definition of TOD tends to force a one-size-fits-all set of solutions onto the different types of sites served by transit and the different types of transit that serve communities.

Urban downtown

Urban neighborhood

Suburban town center

Suburban neighborhood

Neighborhood transit zone

Commuter town
Defining TOD: Actors

Transit Agencies
- maximize monetary return on land
- maximize ridership
- capture value in long term

Riders
- create/maintain high level of parking
- improve transit service and station access
- increase mobility choices
- develop convenient mix of uses near stations
- maximize pedestrian access

Neighbors
- maintain/increase property values
- minimize traffic impacts
- increase mobility choices
- improve access to transit, services and jobs
- enhance neighborhood livability
- foster redevelopment

Local Governments
- maximize tax revenues
- foster economic vitality
- redevelop under utilized lands

Federal Government
- protect public interest and set limits on the use of how federal helps shall be used

Developer / lender
- maximize return on investments
- minimize risks
Studying TOD: Case studies
Studying TOD: Case studies

DENVER, CO
The master plan for Orenco Station’s 190 acres (77 hectares) includes
Studying TOD: Case studies

LOS ANGELES, CA
Studying TOD: Case studies

WASHINGTON, DC and ARLINGTON, VA
Studying TOD: Case studies

SAN FRANCISCO, CA
Studying TOD: Case studies

DALLAS, TX
Studying TOD: Case studies

TYSONS CORNER, VA
Studying TOD: Case studies

DENVER, CO
Stapletown