A quick introduction to Transit Oriented Development (TOD)

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TOD was introduced by the architect and urban planner Peter Calthorpe in his book The Next American Metropolis in 1993.

Definition (Transit oriented development (TOD) (Calthorpe 1993: 56)).
"Mixed-use community within average 2000-foot [$\sim$ 600 m] walking distance of a transit stop and core commercial area. TODs mix residential, retail, office, open space, and public uses in a walkable environment, making it convenient for residents and employees to travel by transit, bicycle, foot, or car."

A few suggestions from Ibraevaa et. al[1]

- Major commercial and employment areas should be located in close proximity to a station ("primary area") and nearby public space should ensure neighborhood vitality.
- A residential zone should be developed in the remaining area, with densities gradually decreasing.
- A "secondary area" related to TOD might appear at the maximum distance of 1.6 km from the core zone, where low-density housing, vast park areas, schools and other facilities for local community could be placed.
- The street network of this outer area should secure easy, fast and direct access to the core by bicycle and transit through park-and-ride lots.

[1] Ibraeva, Anna, et al. "Transit-oriented development: A review of research achievements and challenges." Transportation Research Part A: Policy and Practice 132 (2020): 110-130.

Typologies[2]

1. Regional centers
   - Primary centers of economic and cultural activity in any region
   - Regional downtowns characterized by mix of housing and employment types, retail and entertainment that cater to the regional market.
   - Served by a rich mix of transit modes including high capacity regional rail and bus.
   - Examples?

[2] Taken from report "Station Area Planning" by Reconnecting America

Typologies

2. Urban Center

- A mix of residential, employment, retail and entertainment uses, usually at slightly lower densities and intensities than in regional centers.
- Destinations draw residents from surrounding neighborhoods.
- These centers serve as commuter hubs for the larger region and are served by multiple transit options, often including rail and high-frequency regional bus or bus rapid transit (BRT).
- Densities are typically higher within a quarter-mile radius of stations than the half-mile radius.
- Examples?

Typologies

3. Suburban Center

- A mix of residential, employment, retail and entertainment uses, usually at intensities similar to that found in urban centers but lower than that in regional centers.
- Suburban centers can serve as both origins and destinations for commuters.
- They are typically connected to the regional transit network and include a mix of transit types — regional rail and bus, BRT, and local bus — with high-frequency service.
- Intensity of uses is often noticeably greater within a quarter-mile radius of stations than in the half-mile radius.
- Examples?

Typologies

4. Transit Town Center

- Function more as local-serving centers of economic and community activity than either urban or suburban centers, and they attract fewer residents from the rest of the region.
- A variety of transit modes serve transit town centers, and there is a mix of origin and destination trips – primarily commuter service to jobs in the region.
- Secondary transit lines feed primary lines, often at intervals timed to facilitate transfers at the primary transit stations.
- Residential densities are usually lower than in the previous place types.
- Examples?

Typologies

5. Urban Neighborhood

- Urban neighborhoods are primarily residential areas that are well-connected to regional centers and urban centers.
- Densities are moderate to high, and housing is usually mixed with local-serving retail.
- Commercial uses are limited to small businesses or some industry.
- Development is usually oriented along a well-connected street grid that is served by a secondary transit network.
- Examples?

Typologies

6. Transit Neighborhood

- Transit neighborhoods are primarily residential areas that are served by rail service or high frequency bus lines that connect at one location.
- Densities are low to moderate and economic activity is not concentrated around stations, which may be located at the edge of two distinct neighborhoods.
- There is often not enough residential density to support much local-serving retail, but there are often retail nodes.
- Examples?

Typologies

7. Special Use/Employment District

- Special-use or employment districts are often single-use – either they are low to moderate density employment centers, or are focused around a major institution such as a university, or an entertainment venue such as a stadium.
- Transit stations are not a focus of economic activity.
- There can be significant opportunities for mixed-use development if these stations are well-connected to other parts of the region and there is demand for housing.
- Examples?

Typologies

8. Mixed-Use Corridor

- Mixed-use corridors are a focus of economic and community activity but have no distinct center
- These corridors are typically characterized by a mix of moderate-density buildings that house services, retail, employment, and civic or cultural uses.
- Mixed-use corridors are especially suitable for streetcars, bus rapid transit or other high-quality bus service with closely-spaced stops.
- Mixed-use corridors offer a good opportunity for infill and mixed-use development, and development is usually more intense within a quarter-mile of transit stops.
- Examples?

Different typologies require different strategies for TOD to be successful.

TOD Impact on Travel[3]

Literature reported the following:

- Owning fewer cars: TOD households are twice as likely to not own a car and own roughly half as many cars as comparable households not living in TODs.
- Ridership increased: Between 1970-2000, transit ridership for work trips increased in TOD zones, although ridership declined markedly in the metro areas surrounding TODs. TOD residents used transit 2$\sim$5 times more than those in other communities.
- Residential choice: Among the factors that attract households to TOD, households consistently place high value on neighborhood design, home prices and perceived value, and transit proximity (top 3).
- Firm location choice: Access to high quality transit is becoming increasingly important to firms trying to attract creative class workers in the knowledge economy.
- Others
  - Effect on VMT, fuel use, and emissions
  - Improving employment accessibility
  - Less congestion and parking requirement

[3] Taken from CEGE 5213 taught by Prof. Jason Cao

Factors influencing transit ridership[4]

Literature reported the following:

- Quality of transit services (availability, comfort, convenience)
- Traffic congestion
- Parking supply and costs
- Job accessibility by transit and density at stations (job vs. pop.)
- Mixed uses and design elements (primary for place making to attract residents and customers and secondary for travel)

[4] Taken from CEGE 5213 taught by Prof. Jason Cao

Barriers to TOD[5]

- Node vs place
- Congestion paradox
- Fiscal
- Political will
- Difficult to change the existing settlement
- Others?

[5] Taken from CEGE 5213 taught by Prof. Jason Cao

Suggested readings

- Dittmar, Hank, and Gloria Ohland, eds. The new transit town: Best practices in transit-oriented development. Island Press, 2012.
- Station Area Planning Reconnecting America and the Center for Transit-Oriented Development: How To Make Great Transit-Oriented Places.
- TCRP Report 128
- City of Edmonton video

TOD is not a new concept!

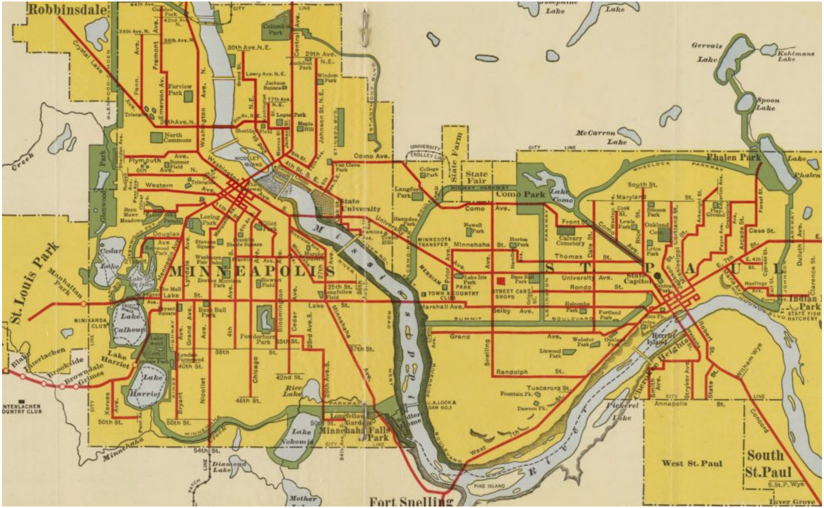

Figure: Twin Cities streetcar network 1930[6]

[6]Source:https://streets.mn/2022/12/01/living-in-a-streetcar-city/

Thank you!