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Addressing barriers to the use of value capture to fund transit-oriented developments

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1. Introduction

Ranging from an individual building to a neighborhood, transit-oriented developments (TODs) are compact, often mixed-use, developments constructed close to (usually within one-half mile) and/or oriented to transit stations with easy access to transit service through non-auto travel modes such as walking and biking (Bernick and Cervero, 1997; Calthorpe, 1993; Cervero et al., 2004; Chatman, 2013; Pojani and Stead, 2018). Hickman and Hall (2008) expand the definition of a TOD from a real estate development to a planning concept by defining it as a “careful coordination of urban structure around the public transport network, and public transport nodes (stations and interchanges) in particular” (Hickman and Hall, 2008; pg. 325).

TODs are being developed globally as a tool to provide mode choice, increase transit ridership, reduce vehicle miles travelled, promote sustainable development, and discourage car use (ARB, 2016; Arfeh and Zhang, 2014; Bedsworth et al., 2011; Cervero et al., 2004; Ewing et al., 2017; Knowles et al., 2020; Lierop et al., 2017; MTC, 2005; Padeiro et al., 2019; Renne et al., 2011; Thomas and Bertolini, 2017), and meet other policy objectives, such as, in California, the greenhouse gas (GHG) emissions reduction targets (Sustainable Jersey, 2017; ARB, 2017).

In the US, the federal government, through various transportation acts beginning from the Intermodal Surface Transportation Efficiency Act (ISTEA) that passed in 1991 to the Fixing America’s Surface Transportation Act (FAST) that passed in 2016, is promoting TODs by reinforcing the need to integrate land use and transportation planning and to promote public transit.

However, governments across the globe and at all levels—from federal to local—have limited financial capacity to provide or upgrade infrastructure around transit stations and to incentivize real estate developers to build TODs. Therefore, any new funding mechanism, such as value capture (VC), is welcome.

The VC tools capture land value increases resulting from public improvements and actions such as provision of infrastructure and up- or re-

zoning. In the context of public transit, provision of or enhancements to public transit systems lead to accessibility-related benefits to the neighboring properties. These benefits are positively capitalized into higher land values. Researchers argue that since the neighboring properties benefit from public transit systems, they should also help fund these systems (Smith and Gihring, 2009). This land value increment can be captured through various tools. These tools include increased property tax revenues, sale or joint development of land in or around the transit stations, lease or sale of air rights above the transit stations, levy of special assessments, imposition of public transportation impact fees, land value taxation, and capture of property tax increments through a tax increment financing (TIF) district (Mathur, 2014). All these tools come under the broad umbrella of VC tools.

While empirical studies find that public transit and TODs are positively associated with increases in surrounding property values (Duncan, 2011; Ibraeva et al., 2020; Mathur & Ferrell, 2013) and VC tools have been used extensively to fund transit systems (Mathur, 2014; McIntosh et al., 2017), including the metro rail systems in Japan, China, Hong Kong, and India (Mathur, 2019; Suzuki et al., 2015; Tan et al., 2014), their use to fund TODs has been sporadic. It is primarily limited to New York City and Washington DC metropolitan areas in the US, and to select countries such as Brazil, China, Hong Kong, Japan, and United Kingdom, internationally (see Suzuki et al., 2015). The limited use of VC tools likely results due to several factors. These range from a lack of inter-jurisdictional and inter-agency coordination, to the inability of transit agencies and local jurisdictions to see themselves as developers and partners in building TODs, to their difficulty to affect the 180-degree-turn-around in their role from one where they are constantly trying to address property owners’ opposition to public transit and TODs to where they ask property owners to share the transit- and TOD-generated land value increases, to a lack of enabling legislation to leverage these land value increases.

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1.1. Research questions

This study answers the following research questions:

- a) What are the major VC-related barriers to the construction of TODs; and
- b) What major strategies could be used to address these barriers?

1.2. Methodology

First, academic and professional literature was reviewed to identify the various types of VC-related barriers to TODs and the strategies employed or those that could be employed to address these barriers.

Second, two national surveys—one of transit agencies and another of local/city governments—were conducted. The Federal Transit Administration’s (FTA) National Transit Database was used to identify the top-101 transit agencies in the US, and the US Census data were used to identify the largest cities in each of these transit agencies’ service area. The surveys identified the VC-related barriers faced by the public agencies in implementing TODs and the ways in which these agencies have, or are planning to overcome these barriers.

Third, six in-depth case studies of recently-developed TODs were conducted to identify the VC-related barriers faced and overcome while constructing the TODs. Finally, information obtained from all the three sources—literature, surveys, and case studies—was synthesized to identify the major findings with respect to the types of barriers faced and the strategies that might be used to overcome them.

1.3. Paper organization

The rest of the paper is organized as follows. The next section discusses the VC-related barriers to funding TODs. Thereafter, the methodology for conducting the surveys is described and the key survey insights are highlighted. Next, the “TOD Case Studies” section describes six TODs and the VC-related barriers faced and overcome to build them. The subsequent section synthesizes the findings from the literature, surveys, and case studies to provide insights and policy recommendations to overcome the VC-related barriers to funding TODs; and the final section concludes the paper.

2. Literature review: VC-related barriers to funding TODs

Value creation is a prerequisite for the use of VC. In the TOD context, value creation could occur due to a) the value of the transit system and b) the value of the TOD. Value can be enhanced if both exist: a high-value transit system and a high-value TOD. Therefore, to understand the barriers to the use of VC to fund TODs, it is important to understand the factors that reduce the value of transit systems and TODs. Furthermore, other hurdles could exist, such as, barriers to the use of VC overall (such as state and federal restrictions), as well as those that are unique to the use of VC to fund TODs. Table 1 summarizes all these groups of barriers. An in-depth description is provided below.

2.1. Factors that impact the value of a transit system

The value of a transit system can be low if the transit system provides poor accessibility or does not enhance overall accessibility, access to the transit stops is limited, or overall demand for transportation infrastructure is low.

Both US-focused (Diaz, 1999; Litman, 2012) and international literature (for example, Ho et al., 2004) note that the factors resulting in poor accessibility include limited geographical coverage (for example, very few rail or bus lines or transit stops) and low-quality service (for example, due to infrequent service, long trip times, low-quality buses and trains, and unsafe or polluted station area, stations, buses or trains).

Based upon research of California TODs, Willson (2005) finds that

Table 1

VC-related barriers to the use of VC: Review of Literature.

VC-related Barriers to TODs		
Factors that impact the value of a transit system	Factors that impact the value of a TOD	Other VC hurdles, including those unique to TODs
Poor accessibility	Poor architecture and urban design of TODs	State-level restrictions on the use of VC tools
No enhancement to overall accessibility	Non-conducive land use and zoning	Federal-level restrictions on the use of VC tools
Poor access to transit stops	Real estate development risk	Costs and risks of implementing the VC tools are greater than the revenue generation potential
Low demand for transportation infrastructure	High cost to develop TODs	Pre-development speculation
	Risks associated with the transit system	Lack of institutional capacity to implement VC tools or to create suitable conditions to maximize value creation
	Legal or programmatic restrictions	Land acquisition barriers
	Lending practices	Lack of institutional focus Inequities created by the use of VC tools
	Lack of institutional coordination	
	Poor site location	
	Cultural attitude toward building height	

the transit system may not enhance overall accessibility if auto travel is a lower-cost and faster option because there is no traffic congestion; gas is inexpensive; the road network is extensive; and parking is convenient, ample, and free.

Other US-focused studies find that the limited access to transit stops could be due to barriers such as industrial uses around transit stations, a lack of walk/bike connectivity, and a lack of station-area parking, especially for terminal rail stations (Cervero et al., 2002); and design barriers such as only one access point to the transit station and the need to walk across expansive parking lots to access the station (Arrington et al., 2008; Levine and Inam, 2004).

Finally, based on the review of largely US-based transit systems, Page et al. (2016) note that the demand could be low for transportation infrastructure due to factors such as a small population size or slow population growth rate, high unemployment, and a weak job market.

2.2. Factors that impact the value of a TOD

Value of a TOD can be low due to several factors discussed below.

2.2.1. Real estate development risk

TODs can often be high-risk in the US, especially if they are a new real estate product type for the region, therefore, have low/uncertain market demand. Furthermore, often TODs have high design complexity (Page et al., 2016), for example, due to the need to provide various uses close to each other while maintaining visual and audio privacy and high aesthetic appeal; and need complex, multi-layered financing, such as a mix of public grants/loans/credits and private financing. Finally, TODs might be located in brownfield land parcels that require environmental remediation, or have to undergo a lengthier permitting process, for example, due to increased community participation for inner-city in-fill TODs and multiple public agencies’ approval. The above-described risk factors could increase the cost to implement TODs by increasing the cost of financing (lenders usually charge a high interest rate for risky projects). In some cases, the TOD projects might be cancelled altogether.

2.2.2. High cost to develop TODs

Apart from the risk factors discussed above, other factors that

increase the cost to develop TODs in the US include parking and prevailing wages requirements and the costs of meeting other public policy objectives and assembling land.

Several transit agencies in the US allow TODs on station parking lots if the surface parking is replaced one-to-one, often by parking garages. Since such garages are very costly to construct, they are a barrier to the construction of TODs. For example, Contra Costa Center, a joint development TOD project in Contra Costa County, CA, could only be built after the county's redevelopment agency funded the construction of the parking garage (Mathur, 2014). To remove this parking-related barrier, many transit agencies are adopting more flexible parking approaches based on the characteristics of the transit riders (for example, commuters versus neighborhood patrons), the transit system (for example, commuter rail versus light rail), and the type of transit station (for example, inner-city mixed-use versus suburban) (Reconnecting America, 2009).

Furthermore, public assistance for TODs in the US, such as city, state, and federal grants and loans, often require prevailing wages for construction workers and the fulfillment of certain policy objectives. Often, prevailing wages are higher than the local market-rate wages. Therefore, TODs that receive public assistance may cost more than the neighboring privately-funded developments. Similarly, the cost of meeting policy objectives could be higher than the subsidies or incentives received or the expected financial returns. For example, a policy requiring the inclusion of affordable housing units in a TOD could grant additional building height as an incentive. However, if the real estate market demand is low, the height relaxation might yield fewer benefits compared to the cost of providing affordable housing units.

Finally, many TODs are located in urban areas with fragmented land ownership. Therefore, land might need to be assembled and then re-parcelled into a single large parcel—a challenge for private developers, especially even if one land owner refuses to sell or asks for compensation at a rate much higher than the market rate. In such situations, transit agencies are often unable to help because many of them do not have the authority to acquire land for non-transit purposes. However, local governments, such as redevelopment agencies, or city or county governments, can use their eminent domain power to assemble land. This power also grants them leverage in influencing the TOD characteristics such as use-mix, density, and design.

2.2.3. Risks associated with the transit system

Studies across US, Canada, Netherlands, and China (see Lierop et al., 2017; Page et al., 2016; Yang et al., 2016) provide examples of such risks, which include i) the construction of the transit system is stalled or delayed; ii) the transit system is low quality to begin with and/or its quality deteriorates over time; or iii) the transit system becomes non-operational, for example, a bus rapid transit (BRT) system or a commuter train is discontinued.

2.2.4. Legal or programmatic restrictions

In the US, such restrictions include policies requiring TODs to provide ground-floor retail. Similarly, funding programs might be restricted to certain project size or type. For example, in the US, Transportation Infrastructure Finance and Innovation Act provides fixed-rate, long-term loans for “qualified transportation projects of regional and national significance” (Build America Bureau, 2020). When this program began in 1998, the minimum project size was \$50 million and the funds could be used for transportation projects only. However, the FAST Act of 2015 lowered the eligibility limit to \$10 million and increased the scope of eligible projects to include TODs and projects that enhance bike and pedestrian connectivity. The FAST Act also allowed the use of local street design guidelines rather than the state's road design standards, thereby increasing design flexibility and local control (US DOT, 2016). Finally, some restrictions originate from the transit agencies themselves: for example, in the form of parking replacement policies, where in-lieu of developing a TOD on surface parking lots, a transit agency might

require an equal number of parking spaces in a parking garage.

2.2.5. Lending practices

Often, lenders in the US are reluctant to fund vertical mix of uses (Cervero et al., 2004) or charge higher interest rates if the land for the TOD is leased, not owned (Reconnecting America, 2009). For example, the San Francisco Bay Area Rapid Transit District (BART) favors leasing land for up to 66 years only. However, it keeps the option for longer-term leases or land sales to meet specific development objectives or to obtain greater financial returns (BART, 2017).

2.2.6. Lack of institutional coordination

Research conducted across the US, Europe, and several global cities (Cervero and Dai, 2014; Pojani and Stead, 2014; Staricco and Vitale, 2018; Suzuki et al., 2015; and Tan et al., 2014) provide examples of lack of institutional coordination. Such examples include a local government not amending zoning around transit stations to make it more transit-supportive; or not widening major, competing roads, thereby reducing the value of transit; or zoning for offices/jobs in areas not served by transit.

2.2.7. Poor site location

TODs are often not constructed at locations most suited for such developments, but at locations where it is easy to assemble or acquire land. For example, in the US, redevelopment agencies typically use TIF funds to acquire land and/or to provide assembled land to developers (Cervero et al., 2004). However, many state laws restrict these agencies to blighted areas. Hence, transit stations and TODs often end up in areas that may be brownfields, lack a robust real estate market, or have insufficient infrastructure to support transit stations and TODs. On the other hand, TOD sites in sprawling suburbs (away from neighborhood-level amenities such as grocery stores, restaurants, and daycare centers) are also examples of poorly located sites.

2.2.8. Poor architecture and urban design of TODs

Studies focused on the US, Canada, and the Netherlands find that high-quality building and urban design enhances TODs' market appeal because it makes high-density urban forms attractive places to live, work, and visit (Arrington et al., 2008; Cervero, 2004; Punter, 2003; Thomas et al., 2018).

While the earlier literature on the Ds of the built environment focused only on street connectivity from a design perspective (see Cervero and Kockelman, 1997), more recent literature emphasizes that high-quality urban design is critical to successfully implementing TODs (Thomas et al., 2018). Specifically, good quality urban design imparts high aesthetic appeal to TODs while accommodating a mix of transportation types and uses (Jacobson and Forsyth, 2008).

2.2.9. Non-conductive land use and zoning

Reviews of several US-based studies (Ibraeva et al., 2020; Page et al., 2016) note that the examples of non-conductive land use and zoning include excessive parking through high minimum parking requirements; lack of zoning for affordable housing and/or for mixed-use developments; and density maximums, not minimums.

2.2.10. Cultural attitude toward building height¹

In the US, community members' opposition to tall buildings could restrict the implementation of compact TODs. Kong and Pojani (2017) note that while the residents of Asian cities favor high-rise buildings (many even see it as a sign of progress and modernity), their US and European counterparts are less likely to favor them. A study of Dutch nationals' public perceptions toward TODs provides a nuanced finding that could help TOD implementation in the US. The study finds that the Dutch resist high-rise buildings but not high density achieved through mid-rise buildings (Pojani and Stead 2015).

2.3. Other VC hurdles, including those unique to TODs

Even if transit systems and TODs are high value, other VC hurdles might exist, as discussed below.

2.3.1. State-level restrictions

While several VC tools are used across the US, the eligible uses may differ based on state laws. For example, TIF is extensively used in Illinois; however, it can be used to fund capital expenditures only, not to meet operations and maintenance expenses (RTA, 2012). Similarly, impact fees can often fund capital expenditures only (Mathur, 2014).

2.3.2. Federal-level restrictions

The US federal government does not bar the use of VC tools, in fact, it has recently advocated for their use. However, certain federal rules and procedures can indirectly hamper the use of VC tools. For example, if transit projects use federal funds, then public agencies might be barred from certain activities, such as land acquisition, before the completion of the National Environmental Policy Act process (Page et al., 2016); this in turn may reduce land banking opportunities if land values rise significantly by the time this process is complete.

2.3.3. Costs and risks of implementing the VC tools are greater than the revenue generation potential

Through a review of more than a dozen US-based public transport projects funded through VC, Mathur (2014) finds that property owners might oppose special assessment districts and public agencies might expend significant time and resources addressing this opposition. Therefore, these districts might be appropriate if the expected revenues are large enough to justify the risk and the high transaction cost. Similarly, taxing jurisdictions might oppose the use of TIF. Furthermore, revenues from joint development projects, impact fees, and TIF are often susceptible to downturns in the real estate market (Mathur, 2014).

2.3.4. Pre-development speculation

Land prices can increase significantly in the time soon after a public transportation project is announced (Page et al., 2016; BART, 2017). This increase occurs in anticipation of the enhanced transportation accessibility and mobility arising due to the new transit service. However, the increases in land prices make it expensive for the developers to buy land to build TODs. On the other hand, since the construction of the transit system may take several years (often decades), developers trying to build TODs concurrently or soon after the commencement of the transit service usually do not have the holding capacity to buy land immediately following project announcement, making it expensive for the developers to buy land for TODs (Reconnecting America, 2009). Therefore, developers often look to public agencies, such as transit agencies and local governments, for land. However, public agencies may face legislative, policy, and financial barriers. For example, many transit agencies in the US are only allowed to acquire land for the provision of transit, not for TODs. Legislative action is often needed. For example, before a state legislation (the Assembly Bill 670 of 1999) allowed three transit agencies in the San Francisco Bay Area to acquire and receive property for building TODs (ACT, 2000), these agencies were unable to do so. Many other transit agencies in California and across the US are still unable to acquire land for TODs.

Even when allowed to acquire land, funding is often limited (SF TOD Working Group, 2014). Therefore, many cities in the US are considering or have employed land acquisition/banking funds to enable early purchase of land. The funds often come from impact fees, transportation and housing funds, corporate philanthropy, family foundations, and federal/state assistance (Reconnecting America, 2009). For example, the Twin Cities Land Bank serves the seven-county Twin Cities region in Minnesota. It has spent over \$100 million acquiring land that has enabled construction of more than 1,400 real estate projects and 3,500 housing units (Land Bank Twin Cities, 2020). Similarly, in 2013, a non-profit,

Urban Land Conservancy (ULC) (Grabar, 2014), purchased 9.4-acre land along a commuter rail line, the East Rail Line, in Denver, CO. It sold 2.5 acres of this land to an affordable housing developer (Smith, 2014). However, the site was acquired only three years before the service on the rail line commenced because ULC does not function like a typical land bank (RTD, 2020a). It looks for short-term development potential when it purchases land, instead of the medium- to long-term horizon of land banks (Grabar, 2014).

2.3.5. Lack of institutional capacity to implement VC mechanism or to create suitable conditions to maximize value creation

US-focused literature finds that the lack of institutional capacity includes a lack of capacity to negotiate with developers for jointly developing a TOD (SF TOD Working Group, 2014); a lack of capacity to go through the entire joint development process, from issuing request for proposals to managing and disposing the TOD (RTA, 2012); or a lack of expertise to use TIF. The lack of institutional capacity proves even more problematic if transit agencies are restricted from outsourcing such tasks. For example, the Regional Transit Agency (RTA) that serves the Chicago region cannot outsource management of its real estate assets (RTA, 2012).

2.3.6. Lack of institutional focus

Transit agencies need to proactively engage with developers and local governments to create real estate value and to use VC tools to capture that value (Page et al., 2016). However, internal and external barriers often exist. For example, governing boards of many transit agencies in the US do not think that the use of VC tools is their agency's job (Cervero et al., 2004); or, the transit agencies do not have staff dedicated for this purpose. One other hand, some transit agencies lead the way. For example, Washington Metropolitan Area Transit Authority (WMATA) and BART work with local governments to enable transit-supportive zoning around their stations and actively seek developers to build TODs. Both these agencies have departments focused on developing TODs through a joint development process.

2.3.7. Land acquisition barriers

Often, transit agencies in the US are prohibited from acquiring land for TODs (Cervero et al., 2004). Furthermore, local governments and transit agencies may not have the funds to acquire such land. Some progress has been made, however. For example, Dallas Area Rapid Transit (DART) has a very progressive TOD policy that allows "strategic acquisition of property to capture potential TOD opportunities" (DART, 1989).

2.3.8. Inequities created by the use of VC tools

For example, TIF-led redevelopment could lead to property value increase, which in turn, could increase apartment rents. Such rent increases can make housing unaffordable for low-income renters, thereby displacing them. Such displacements could lead the community to oppose the use of TIF. Therefore, some states include policy features to mitigate displacement. In Illinois, redevelopment plans often budget funds for mitigating impacts of displacement on community members. Similarly, when localities in California undertook TIF-backed redevelopment through the redevelopment agencies, such agencies were required to allocate at least 20% of the tax increment to affordable housing. Furthermore, the use of VC to fund TODs could lead to real estate development where the increases in land values are high, not necessarily where such development is needed (often the low-income neighborhoods where a high proportion of community members is likely to use transit).

At a broader level, scholars are concerned about TOD-led gentrification. Padeiro et al. (2019) reviews 35 TOD-led gentrification studies and finds some evidence for this concern. A little over one-third of the studies reviewed find strong evidence of TOD-led gentrification, a quarter finds no evidence, and the remaining studies find variable

evidence.

3. Surveys

3.1. Overview

Two nation-wide surveys were conducted—the transit agency survey and the local government survey. Both the surveys sought to identify the barriers to the use of VC to fund TODs, and the ways these barriers have been, or could be removed in the survey respondents' service areas. The transit agency survey was sent to top-101 transit agencies that operate in the 50 states of the US. Ridership, as measured by the unlinked passenger trips (transit industry's standard measure for ridership), was used to identify the top transit agencies (FTA, 2018). Annual Data Tables for 2017 were downloaded from the FTA's National Transit Database website to identify the transit agencies (FTA, 2020).

For the local government surveys, the biggest city (by population) served by each of the above-selected 101 transit agencies was identified, assuming that big cities served by a large transit agency are more likely to support TODs than smaller cities. Overall, 82 local government surveys were sent, lower than the 101 transit agencies, because in many cases, a city was served by more than one transit agency, or the email addresses were not found.

Online searches were conducted to identify the appropriate persons to whom the survey should be sent; an ideal respondent was the person managing the planning and implementation of TODs. A combination of keywords such as "name of the transit agency," "name of the city," "property division," "real estate," "TOD," "TOD manager," "transportation planner," "planning director," "executive staff," and "executive team" was used to identify the appropriate staff member(s). Finally, searches were conducted to find their email addresses, and a link for the online survey was sent.

30 transit agencies and 25 local governments completed the surveys for response rates of 30% (30 out of 101) and 31% (25 out of 82), respectively. To ascertain whether the responses are evenly distributed, we sorted the surveys in increasing order by transit system size, then divided them into four quartiles, and ran a one-sample chi-square test. The test is statistically insignificant for both surveys. The p-values are 0.307 for the transit agency surveys and 0.93 for the local government surveys.

Both local governments and transit agencies began with answering questions aimed at estimating the prevalence of TODs nation-wide, and existence of formal programs and other ways these agencies facilitate TODs. The next set of questions inquired about the various aspects of VC-related barriers faced, and the extent to and the ways in which these barriers are being addressed. For example, the closed-ended survey questions asked respondents to identify the VC tools used by their agencies to promote TODs. The open-ended questions inquired about the federal, state, regional or local policies, plans, funding programs, and financial incentives that positively or negatively impact how their agencies approach use of VC to implement TOD. Another set of questions focused on the prevalence of cooperative agreements and collaborative arrangements for using VC to construct TODs. We provide key survey insights below. In a couple of instances, we compare our findings with those of a survey of transit agencies conducted by Cervero et al. (2004). While we surveyed both local governments and transit agencies but focused primarily on the question of using VC to fund TODs, Cervero et al. (2004) sought the opinion of transit agencies only but more broadly sought the agencies' opinion on ways to promote TODs. However, a few survey questions provide data for comparative analysis. Due to the small sample size for both the surveys [30 for our survey and 90 for Cervero et al. (2004)], we should treat the comparison with caution.

3.2. Survey insights

3.2.1. TODs are very prevalent

The surveys show a strong prevalence of TODs across the nation and among various-sized public agencies. Over 80% of survey respondents indicated existence of at least one TOD in their service areas.

3.2.2. About half of the transit agencies and three-quarters of the local governments have formal programs to promote TODs

Around three-quarters (74%) of local governments have formal programs to encourage the implementation of TODs. But only under half (48%) of the transit agencies have such programs—a little higher than 41% noted by Cervero et al. (2004). These data suggest that the proportion of transit agencies with formal TOD programs have remained largely unchanged over the last two decades.

3.2.3. The use of VC tools to implement TODs is likely not on the radar of most transit agencies and local governments

About half of the transit agencies and local governments did not respond when asked how impedimentary the barriers to the use of VC tools are; however, only a small proportion (close to a quarter of the survey respondents) think these barriers are not impedimentary.

The non-response rate (close to three-quarters of the survey respondents) was even larger when asked whether the barriers have been overcome or could be overcome. These three pieces of information combined indicate that the use of VC tools to fund TODs might not even be on the radar of a large number of transit agencies and local governments.

3.2.4. A lack of statewide vision, policy or plan for promoting TODs

Only around half of the survey respondents (57% of transit agencies and 52% of local governments) confirm existence of a statewide vision, policy, or plan which calls for compact development or TODs around transit stations. This finding highlights the need for states' leadership in promoting TODs through legislation, vision, policy, or designated funding.

3.2.5. Most frequently used VC tools to fund TODs

Transit agencies noted joint development, public-private partnerships (PPPs), and TIF as the most frequently used VC tools used to fund TODs, while local governments noted PPPs, community benefits, developer agreements, and impact fees as the most used. While PPPs are the common VC tool across the two surveys, other tools vary. This is perhaps because local governments and redevelopment agencies typically levy and benefit from tools such as community benefits and impact fees. See Figs. 1 and 2.

3.2.6. Inability to use TIF is the biggest factor inhibiting the use of VC; other factors also exist

Several survey respondents noted that their inability to use TIF restricts the use of VC to fund TODs. This inability can be due to several reasons. First, state legislation may not allow use of TIF, as in Arizona. Second, a state might not have clearly identified the eligible uses for TIF. For example, a survey respondent noted a perceived quirk in Hawaii's constitution that to some appears to prohibit use of TIF to pay off bonds. Third, TIF might be allowed on a very narrow tax base. For example, Washington State does not allow TIF on the state's portion of the property tax.

Moreover, a state might have abolished an established mechanism or not created one. For example, the 2011 dissolution of redevelopment agencies has resulted in the disuse of TIF in California. Other regulatory and institutions frameworks needed to use TIF are just emerging in this state. As one survey respondent from California noted: "what was a well-known and familiar legislative tool in the past (TIF through redevelopment agencies) has been supplanted with a sparingly used and poorly understood successor program."

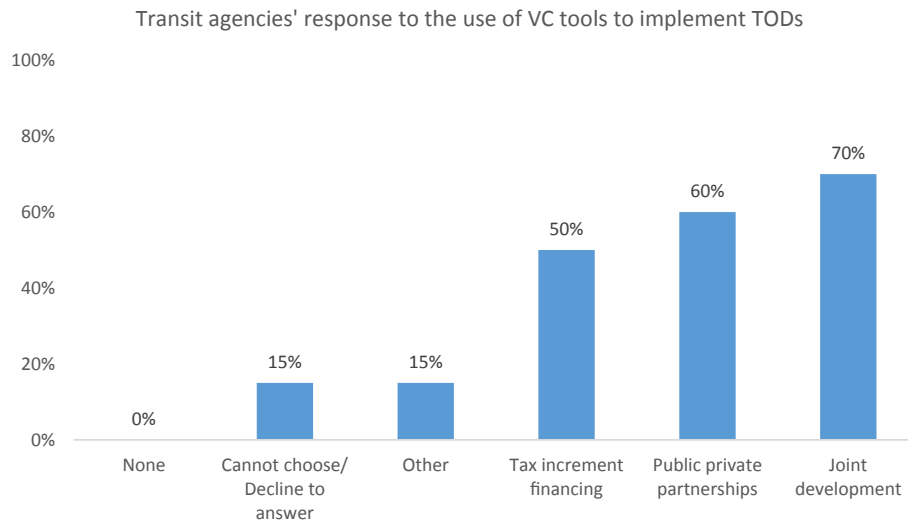


Fig. 1. Transit Agencies Typically Use Joint Development, PPPs, and TIF to Implement TODs.

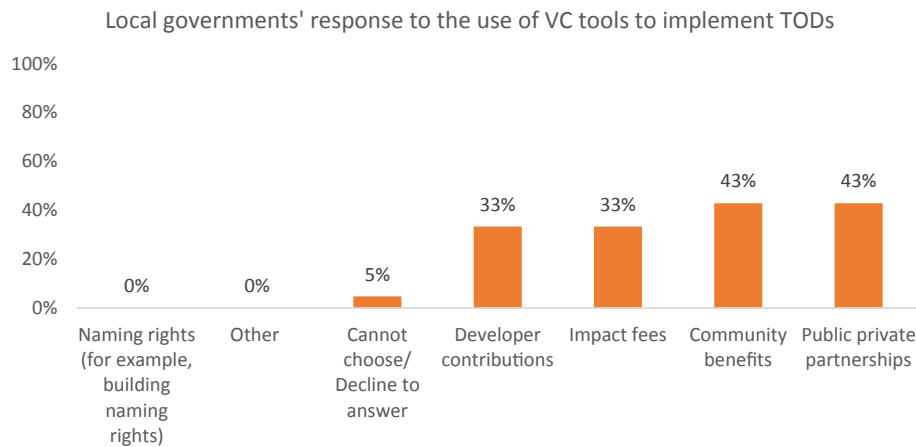


Fig. 2. Local Governments Typically Use PPPs and Community Benefits to Implement TODs.

Utah only very recently enacted the state laws that created the institutions that could use TIF—Community Reinvestment Agencies and Transportation Reinvestment Zones. Finally, although Pennsylvania has allowed the creation of transit revitalization investment districts (TRIDs) since 2004, the big bottleneck was that all taxing bodies within the TRID were required to dedicate the “entire” tax increment to the TRID. A 2017 amendment, hoping to encourage the use of TRIDs, allows taxing bodies to dedicate “a portion” of such an increment.

The other major factors inhibiting the use of VC tools include inability of the transit agencies to condemn properties for TODs; inability to levy impact fees due to weak real estate market conditions; and arduous requirements to use VC tools, such as the super-majority (two-thirds) vote requirement to form a special assessment district in California.

3.2.7. Very few survey respondents identified supporting factors

The factors identified include the ability to use TIF; supportive comprehensive plan; ability of transit agencies to lease land and air rights; statutes favorable to PPPs; and ability of transit agencies to condemn properties for transit uses and then use the excess property for non-transit use, such as TODs. It is important to note that these supportive factors are not prevalent across the US. They are often highly state- or agency-specific.

3.2.8. Lack of coordination between transit agencies and local governments

Only a minority of the survey respondents noted the existence of inter-agency partnerships to promote the use of VC, highlighting the need for encouraging such partnerships that include cooperative agreements and collaborative arrangements between agencies. See Figs. 3–5. Cervero et al. (2004) find a much larger proportion of cooperative agreements—35% of transit agencies have such agreements with cities. But only 10% of transit agencies in our survey report such agreements. This difference is likely because our study specifically inquires about such agreements for using VC to fund TODs, while Cervero et al. (2004) inquire about their use for promoting TODs in general.

4. TOD case studies

Six TODs constructed in the last 10–15 years (or TODs that are still under construction, but of which large sections have been recently completed) around the US are studied in this section to gain a finer-grained understanding of whether the developers and agencies involved in their construction encountered VC-related barriers, and if yes, how these barriers were overcome; and which VC tools were used to fund the TODs and how they were used. To choose the case study TODs, first a large sample of around 50 potential TODs were chosen from a review of the extant literature and online searches. For example, Cervero et al. (2004) note several TODs that were in planning or early

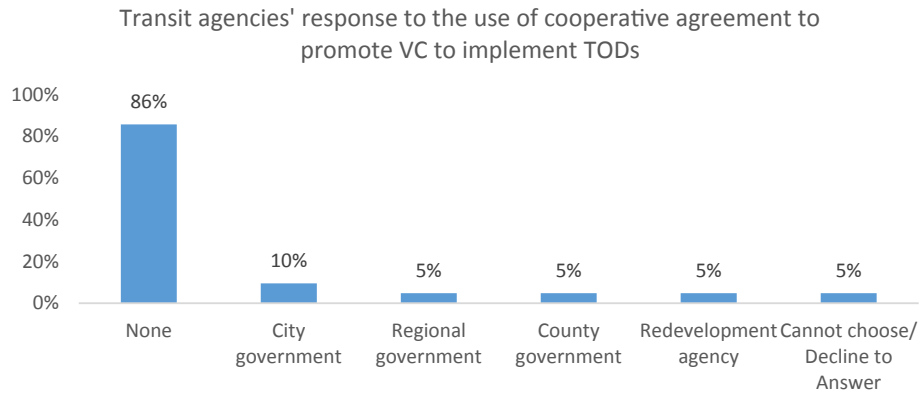


Fig. 3. Cooperative Agreements for VC are Largely Unused Among Transit Agencies.

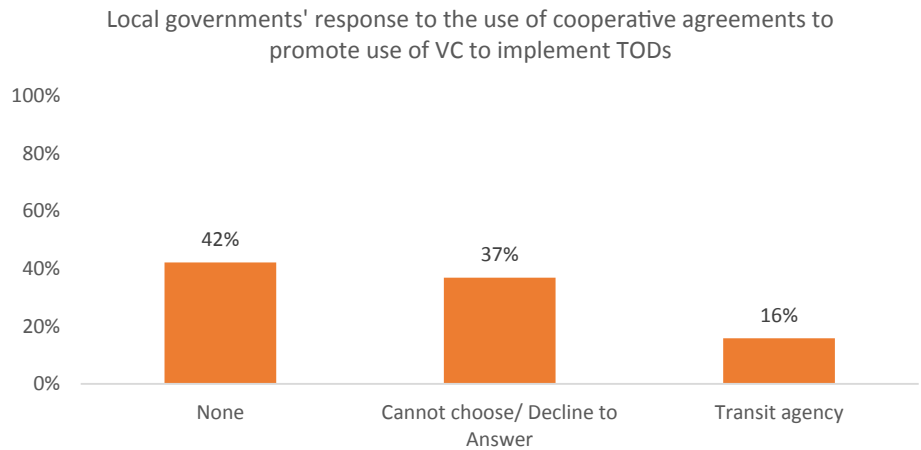


Fig. 4. Very Few Local Governments Enter into Cooperative Agreements with Transit Agencies to Promote VC.

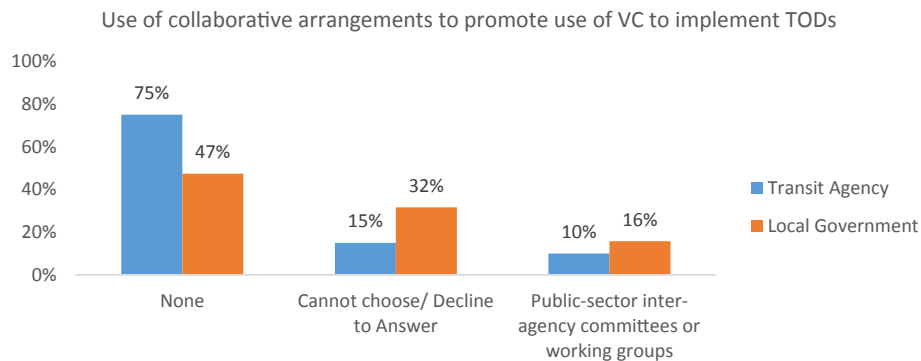


Fig. 5. Few Collaborative Arrangements Exist to Promote VC.

construction stage in early 2000s. Next, the following case study selection criteria were applied:

- a) Geographical spread: TODs spread across the four regions in the US—west, midwest, northeast and south—as classified by the US Census;
- b) Transit type: TODs served by a variety of transit systems such as commuter rail, light rail, and BRT systems;
- c) Location within the urban area: TODs located in the inner/core cities as well as in sub-urban locations; and
- d) TOD type: TODs ranging from individual buildings to a neighborhood.

Finally, the following six TODs were selected: Othello Plaza, Seattle, WA; Evans Station Lofts, Denver, CO; EcoVillage TOD, Cleveland, OH; Twinbrook Station TOD, Rockville, MD; MacArthur Station TOD, Oakland, CA; and Waterside Place TOD, Boston, MA. See Table 2 for the TODs' region, transit type, location within the urban area, the TOD type, and the VC challenges faced and overcome. The remainder of this section describes the six case study TODs.

4.1. Othello Plaza TOD

Othello Plaza TOD is a 6-story, mixed-use affordable housing TOD that includes 108 affordable housing units and 6500 square feet of

Table 2
Summary of Case Study TODs.

TOD Name	City, State	Region	Location within urban area	Transit Type	Transit Agency	TOD type: single Building; Group of Buildings; or Area	VC tool used	VC Challenges	How VC challenge was overcome
Othello Plaza	Seattle, WA	West	Sub-urban	Light rail	Sound Transit	Single Building	Land sale	Early sale of land, in violation of Sound Transit's policy	Sound Transit modified the policy on sale of land; safeguarded its interests through agreement of cooperation
EcoVillage	Cleveland, OH	Mid-West	Sub-urban	Light rail	Greater Cleveland Regional Transit Authority (RTA)	Neighborhood	Community land trust	Scalability	-
MacArthur	Oakland, CA	West	City Core	Heavy rail rapid transit	San Francisco Bay Area Rapid Transit District (BART)	Group of Buildings	Joint development (long-term lease); Parking garage and other infrastructure improvements in lieu of land; building height relaxation in-lieu of 44 affordable housing units and \$1.3 million community benefits; transit benefit fee; share in sale price	Changes in project parameters	Series of amendments due to change in developer and in project parameters
Evans Station Lofts	Denver, CO	Mid-West	Sub-urban	Light rail	Regional Transportation District (RTD)	Single Building	Land banking: TOD fund enabled reduced risk and holding costs for the developer		
Twinbrook Station	Rockville, MD	North-East	Sub-urban	Heavy rail rapid transit	Washington Metropolitan Area Transit Authority (WMATA)	Group of Buildings	Joint development (long-term lease, sale of a part of land)	Changes in project parameters	Series of amendments due to changes in real estate market conditions, developer's ability to secure higher density in the entitlement process, and uses
Waterside Place	Boston, MA	North-East	Sub-urban	Bus Rapid Transit (BRT)	Massachusetts Bay Transportation Authority (MBTA)	Group of Buildings	Joint development (long-term lease)	Changes in project parameters	Series of amendments due to changes in real estate market conditions and uses

ground floor commercial space. It is located in southeast Seattle (Mercy Housing, 2012), in the state of Washington. Constructed in 2016–2017 (Mercy Housing, 2016; Shaner, 2017), the TOD is served by Othello Station, which falls on Sound Transit's light rail line. Additionally, it is served by buses operated by King County Metro (Sound Transit, 2019). Sound Transit is the regional transit provider of high capacity transit service through a network of commuter rail, light rail, and buses. Since 2010, Sound Transit has been planning and developing TODs on surplus land parcels as part of its TOD Program Strategic Plan (Sound Transit, 2014a, 2014b). Othello Plaza TOD is developed on one such land parcel. See Fig. 6 for an image of the TOD. Othello Plaza is on the left and the light rail line is on the right.

Source: Google Maps

4.1.1. VC tool: land sale

In November 2014, Sound Transit sold the surplus land near Othello Station for \$1.9 million to the developer. The land was sold at fair market value. The covenants on the property required it to be used for TOD for 60 years (City of Seattle, 2013).

Typically, Sound Transit only closes the sale of its property after a

building permit is secured for the project. Such stipulations ensure that Sound Transit can pursue other development opportunities if the buyer does not move forward with the project as envisaged in the purchase and sale agreement (Sound Transit, 2014a, 2014b).

In the case of Othello Plaza TOD, Sound Transit agreed to a quick (30-day) close, however. The short close was necessary because the developer were acquiring the land using funds that needed to be spent by the end of 2014. These funds came in the form of a loan from the City of Seattle Office of Housing's Equitable TOD program (ETOD). The City of Seattle received these funds from a \$3 million Community Challenge Grant. The U.S. Department of Housing and Urban Development (HUD) awarded the grant to the City of Seattle to meet the grant's objectives, which included, among others, growth of housing and commercial uses near light rail stations; and the provision of housing affordable to a range of incomes and household sizes (City of Seattle, 2013). Othello Station TOD met both these objectives.

The shared goal of all the parties—to develop an affordable housing TOD—also contributed to Sound Transit's waiving their stipulations regarding close of sale. To further safeguard its interests, the agency entered into an agreement of cooperation with the City of Seattle and the

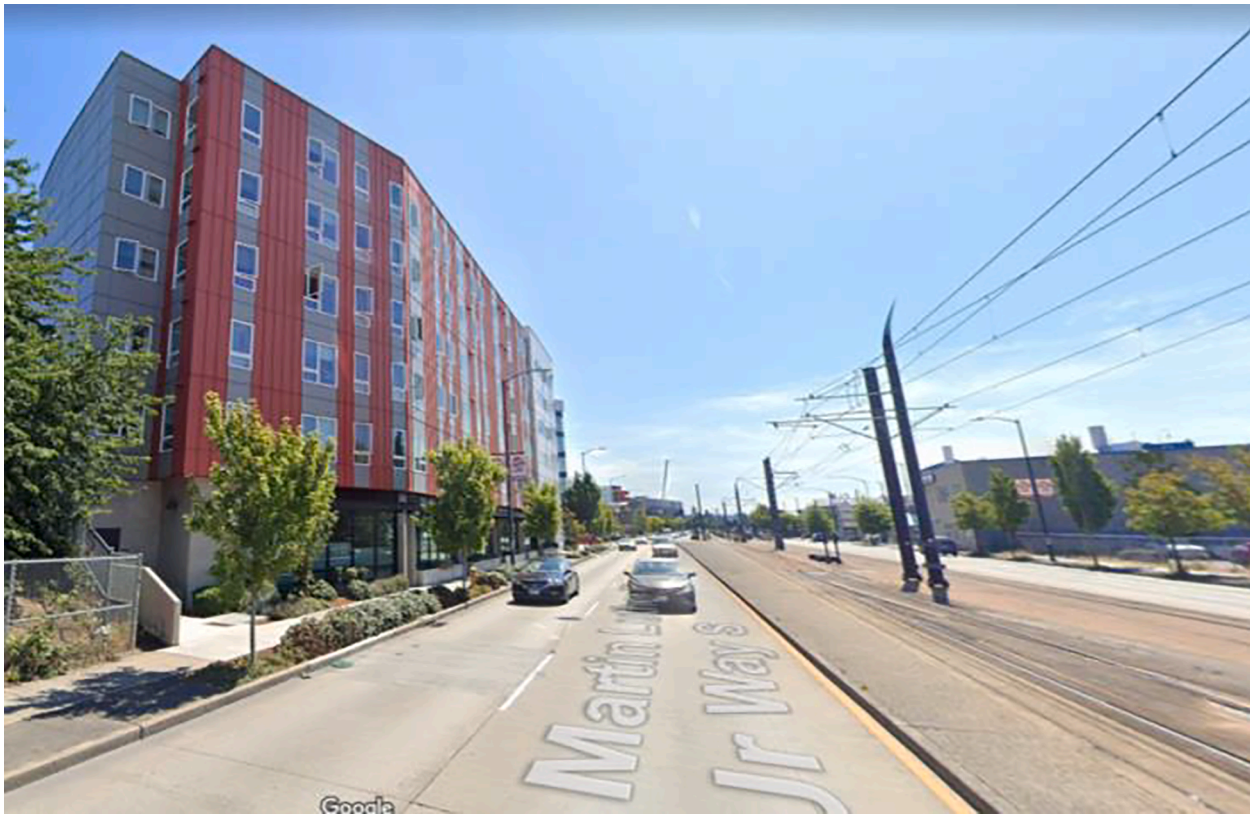


Fig. 6. Othello Plaza TOD.

developer. The agreement obliged each party to share information about the TOD in an open and transparent manner and to use good faith to communicate any permitting, construction, or design delays. Furthermore, all parties agreed to create a process for corrective action and to resolve disagreements internally if the developer defaulted on the ETOD loan or if the project fell behind schedule (Sound Transit, 2014a, 2014b).

In summary, this case study provides an example of novel and nimble ways to further development of TODs when all the parties share the same goals and are vested in ensuring project success.

4.2. EcoVillage TOD

The EcoVillage TOD is located in the Detroit Shoreway neighborhood situated two miles southwest of downtown Cleveland, Ohio. The TOD is served by a bus line and a rapid transit line operated by the Greater Cleveland Regional Transit Authority, RTA (RTA, 2019). In 1998, the Detroit Shoreway Community Development Organization (DSCDO) helped establish the EcoVillage concept for the Detroit Shoreway area, partnering with the City of Cleveland, the RTA, and EcoCity Cleveland (a local environmental group), among others (DSCDO, 2019; CNT, 2013). The EcoVillage TOD hosts a variety of housing types, such as apartments, townhomes, detached single-family homes, cottages (called the Green Cottages), and tiny homes. See Fig. 7 for a location map of the TOD.

Source: DSCDO (2020)

4.2.1. VC tool: community land trust

The Green Cottages development in the EcoVillage TOD includes five single-family, affordable, income-restricted houses built during the period 2008–2010 (The Project Group, 2010). Around 1300 square feet in size, the cottages were developed by the Cuyahoga Community Land Trust, a local land trust which preserves affordable housing stock through a shared equity model. Under this model, a homeowner leases a

house for 99 years at a reduced price from a community land trust. The ownership of the land remains with the land trust. Furthermore, to maintain permanent affordability, the homeowner agrees to allow a portion of the increase in property value to remain with the house when they sell (Green City Blue Lake, 2013; Perkins, 2019; Hansen, 2008). Therefore, the property value increase is shared among the property owner and the land trust.

4.3. Evans Station Lofts TOD

The Regional Transportation District (RTD) is the regional transportation agency that provides the Denver metro region of Colorado with bus, rail, paratransit, and other transportation services. (RTD, 2019). Evans Station is located in south Denver, serviced by several RTD light rail lines as well as by a bus route (RTD, 2020). Sited directly next to Evans Station, Evans Station Lofts opened in 2013 and features fifty affordable housing units and 10,000 square feet of ground-floor commercial space (Smith, 2014). See Fig. 8 for an image of the TOD. The station is on the left, the RTD park-and-ride lot is in the center, and the TOD is on the right.

Source: Google Maps

4.3.1. VC tool: land banking using a TOD fund

The Urban Land Conservancy (ULC) was a major partner in the development of the Evans Station Lofts. In 2011, ULC purchased one-acre land adjacent to Evans Station for \$1.1 million with funding from the Denver Transit Oriented Development Fund (TOD Fund). This \$30 million fund was created in 2010 with the help of the City of Denver, ULC, and Enterprise Community Partners, among others, to create and preserve affordable housing around transit (HUD, 2012). The fund guidelines allow ULC to purchase and hold properties as developers secure financing for affordable housing and TOD projects, ultimately reducing risk for developers. After its acquisition in 2011, ULC banked on the one-acre parcel for one year before selling to a community and

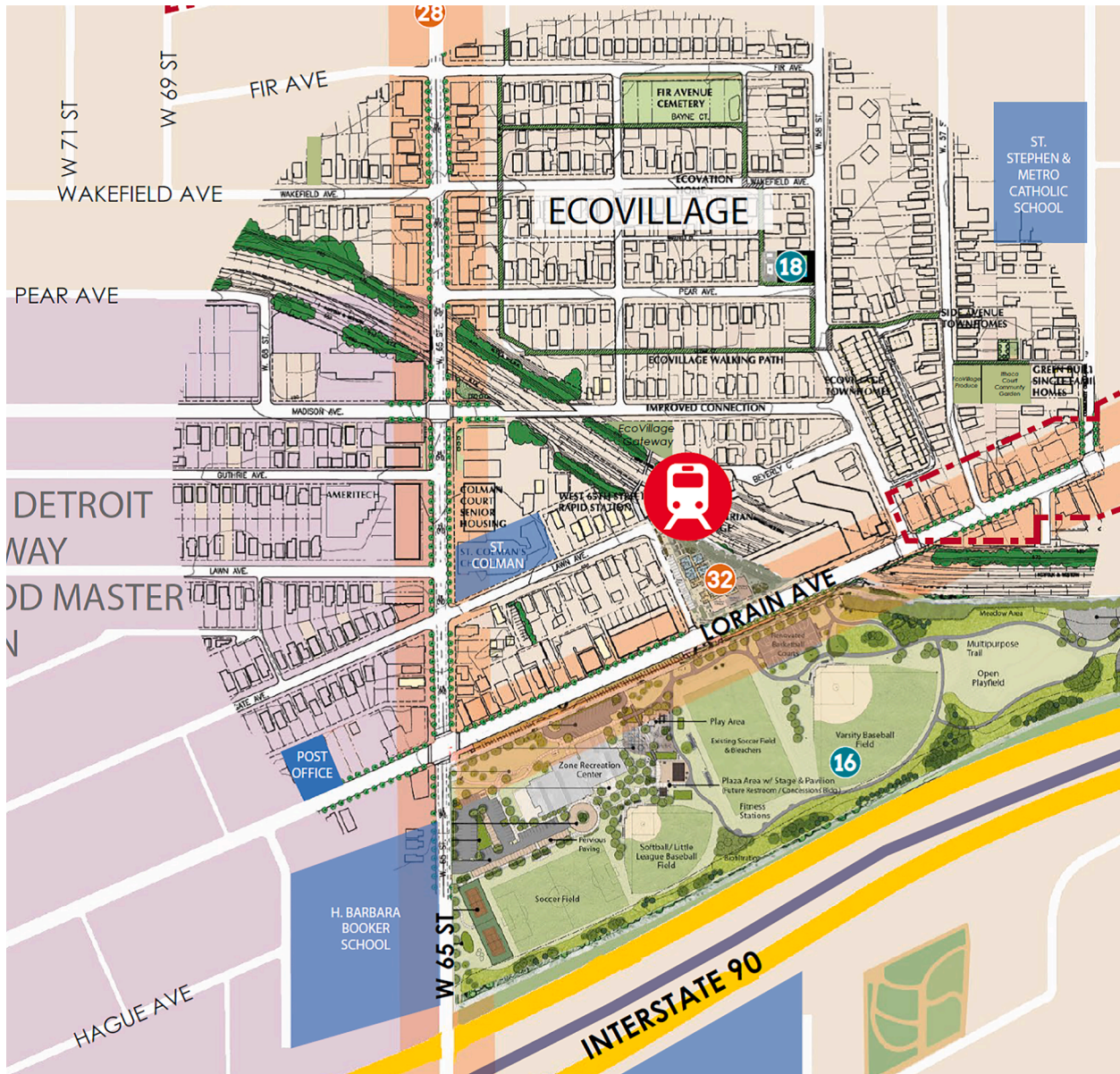


Fig. 7. EcoVillage TOD.

affordable housing developer, Medici Consulting Group, for \$1.2 million. ULC recovered their original land cost and some of the holding costs. Even after paying the full cost of land, the developer gained for two reasons: a) ULC sold the land for only little more than the price they paid for it, thereby, transferring any present or future land value gain to the developer, and b) ULC held the land for one year for the developer without charging a holding fee (personal communication on January 31, 2020 with Troy Gladwell, CEO, Medici Consulting Group). The developer arranged funding during this, risk-free, holding period (Bross, 2014).

4.4. Twinbrook TOD

Opened in 1984, Twinbrook Station located in Rockville, MD is a subway station on WMATA’s Red Line. Two transit-oriented residential developments—The Alaire and The Terano—are part of the Twinbrook Station TOD. Both these projects were jointly developed by WMATA and a real estate firm, JBG Smith. A joint development agreement (JDA) was formed in 2002 and the first ground lease was signed in 2008 to begin construction on 26 acres of WMATA-owned land for residential

development. The Alaire building was completed in 2010 and includes 279 residential units and 16,500 square feet of ground-floor retail. The Terano features 214 residential units with 33,000 square feet of retail and was completed in 2015 (WMATA, 2020). See Fig. 9 for an image of the two projects. The Terano is on the right and the Alaire is on the left.

Source: Google Maps

4.4.1. VC tool: joint development

The initial 2002 JDA outlined a mixed-used development plan for 26.3 acres of the Twinbrook Station area, with the entire land leased for 99 years by WMATA to JBG Smith. The JDA called for the development of 1000 housing units, 20,000 square feet of retail, 280,000 square feet of office space, and two parking garages (among others, to replace the surface parking removed to make way for the joint development). These projects were to be constructed over multiple phases (Phases 1 to 3, each with two sub-phases: for example Phase 1a included the Alaire and Phase 1B, The Terano) (WMATA, 2005, 2011).

The JDA was restructured multiple times. In 2007, it was restructured to sell one-third of the station area land to the developer for the purposes of constructing 595 condominium units in addition to the

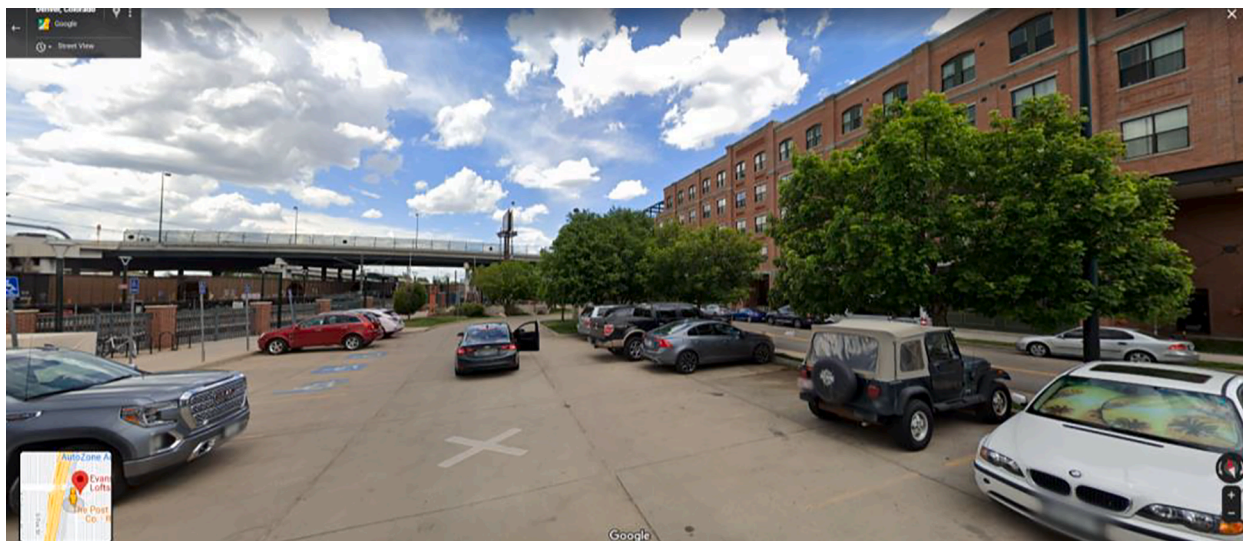


Fig. 8. Evans Station Lofts TOD.

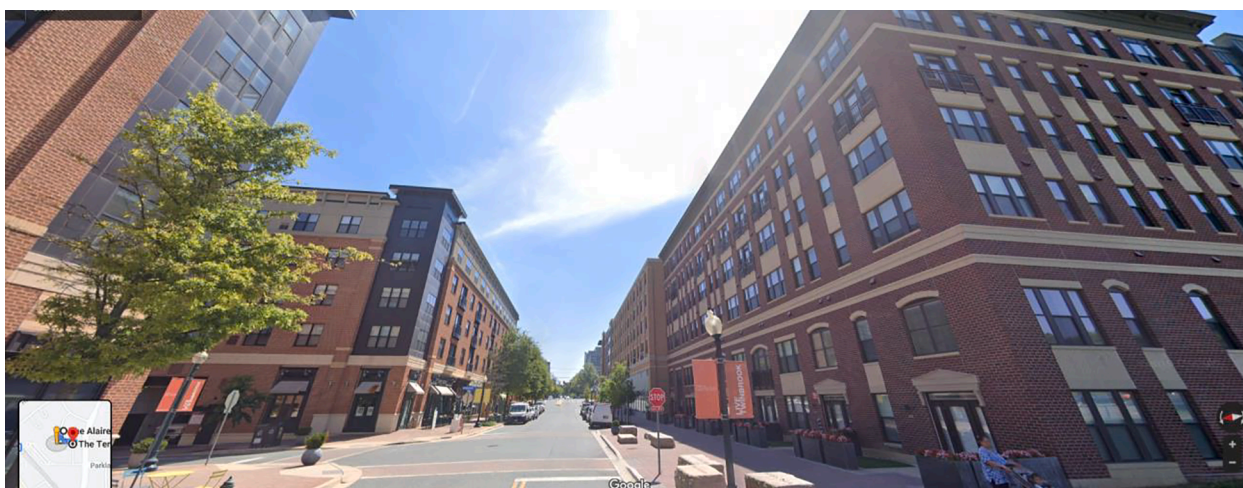


Fig. 9. Twinbrook TOD.

rental apartments outlined in the original agreement. Furthermore, since the developer was also able to secure higher densities during the entitlement process, the restructured agreement included an increase in housing units from 1000 to 1595 (1000 apartments and 595 condominiums), retail from 20,000 to 200,000 square feet, and office space from 280,000 to 325,000 square feet (WMATA, 2011). More apartments, much of the retail, and all the office space and condominiums were to be built in Phases 2 and 3.

The JDA was restructured in 2011 after property values declined following the 2008 financial crisis, which led JBG Smith to express unwillingness to continue with the project as per the existing terms. The renegotiated JDA allowed the developer to refinance Phase 1A project (The Alaire). In 2013, the JDA was amended again, among others, to extend the Phase 1B (The Terano) and Phase 3 closing dates (WMATA, 2013). Since then the developer has parted ways with WMATA after completing the first two phases, specifically the Alaire and the Terano and the public streets on which these two developments are located, the parking garage, and a surface parking lot (personal communication with Ricky W. Barker, Director of Community Planning and Development Services, City of Rockville, MD and Mr. Jim Wasilak, Chief of Planning, City of Rockville, MD).

4.5. MacArthur Transit Village TOD

BART is a regional heavy rail system that serves the San Francisco Bay Area region of California. One of the busiest BART stations in the entire system, north Oakland's MacArthur Station is the site of the MacArthur Transit Village TOD (King, 2019).

Phase 1 of the 7.76-acre MacArthur Transit Village TOD began in 2011 and was completed in 2014 with the completion of the 481-space parking garage and other infrastructure improvements. The garage is meant to replace the surface parking lost to stage development. Phase II saw the construction of Mural, a 90-unit, 100% affordable housing complex developed by BRIDGE, Inc., completed in 2016 (MacArthur Station, 2019). Phases III to V include the construction of two market-rate, mixed-use apartment complexes—a 6-story 385-unit Hines' MacArthur Commons broke ground in 2017 and will include 24,689 square feet of ground-floor retail; and a 24-story, 402-unit, mixed-income development broke ground in 2018. It will include 10,000 square feet of retail and is being developed by Boston Properties (personal communication on February 12, 2020 with Paul Voix, Principal Property Development Officer, Real Estate and Property Development, BART).

MacArthur Transit Community Partners, a partnership between BRIDGE, Inc. and McGrath Properties, were appointed master

developers of the TOD. The partnership ended a few years ago. McGrath Properties took ownership of the parcel where the 24-story Boston Properties' tower is located (Boston Properties have the ground lease for this parcel). As the master developer, BRIDGE, Inc. developed the parking garage, made improvements to the entrance plaza and adjacent city streets, and constructed the frontage road and other private streets. The parking garage sits on land initially occupied by two motels which were bought by Oakland Redevelopment Agency for \$5 million (personal communication on February 12, 2020 with Paul Voix, Principal Property Development Officer, Real Estate and Property Development, BART). See Fig. 10 for an image of the TOD.

Source: Google Maps

4.5.1. VC tool: joint development

Value capture in this joint development project happened in two important ways. First, BART contributed land worth 13 million dollars. Additional funds came from the state of California, the Oakland Redevelopment Agency, and BART. In return, BART received projects worth approximately \$35 million, including a parking structure worth \$27 million.

Second, BART will receive long-term revenue from developers in the form of transit benefit fees. Specifically, for the market-rate apartments, BART will start receiving transit benefit fees seven years after project stabilization. Project stabilization is deemed to occur when a project reaches 90% occupancy or 18 months after certificate of occupancy is issued. BART will receive 1% of gross revenue for 10 years post-project stabilization, and 2% of gross revenue after that. The agency is likely to receive the fee revenue from the Hines' MacArthur Commons starting 2029 and from the Boston Properties 24-story tower starting 2030. This fee revenue is estimated to be \$383,000 per year for the first 10 years, increasing to over \$1 million per year by 2040. Finally, BART will receive 1.5% of the sale price if the apartments were to convert to

condominiums (personal communication on February 12, 2020 with Paul Voix).

4.6. Waterside Place TOD

The Massachusetts Bay Transportation Authority (MBTA, or 'the T') provides heavy and commuter rail, bus, ferry, and paratransit services in the Boston, MA metropolitan area (MBTA, 2019). Included in the T's rapid transit system is the Silver line, a BRT route which runs several branches and serves, among others, Boston's Seaport District where the Waterside Place TOD is located (NYCSubway.org, 2012).

4.6.1. VC tool: joint development

In 2005, the Massachusetts Port Authority, Massport, and the developer, Core Development Group, entered into an agreement under which the developer was granted an option to enter into separate, 95-year ground leases for five land parcels totaling 8.3 acres and located in the Seaport section of south Boston. These five parcels are known as Core Block. The entire Core Block development, to be called the Waterside Place Project, was envisaged to include a variety of uses such as 640,000-square-foot retail space, a 300-room hotel, 209 condominiums, a 20,000-square-foot visitor center, and a 2350-space parking garage for the entire Waterside Place Project (Gants, 2008; The Drew Company, 2011). It was part of Massport's 30-acre Commonwealth Flats Development Area, the port's planning area set for mixed-use development on South Boston's waterfront and historic Seaport District (MPA, 2016).

The Waterside Place Project—a large integrated enclosed urban mall with residential units and hotel above—did not materialize as envisaged due to a variety of reasons, mainly the 2008 economic recession. Furthermore, the enclosed mall was not unfeasible because of the changed landscape of retail wherein attracting anchor stores proved

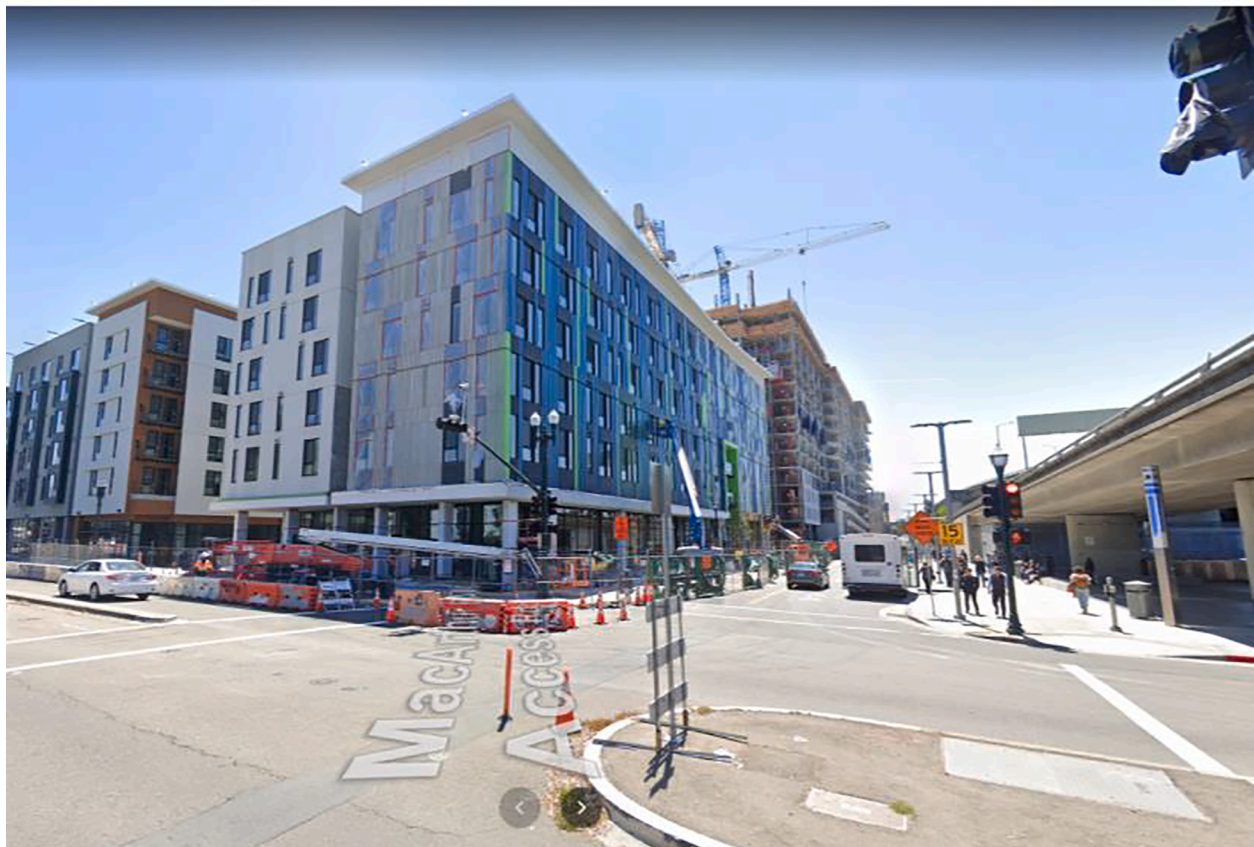


Fig. 10. MacArthur Transit Village.

challenging (personal communication on February 27, 2020 with Andrew Hargens, Chief Development Officer, Massachusetts Port Authority).

Therefore, a number of Notices of Project Change (NPCs) were submitted to the Boston Planning and Development Agency. Under the first NPC requested in 2010, Core Development Group proposed to develop the project in phases, starting with Phase 1 that was to include 234 rental apartments (the original project called for 209 condominiums); 72,000 square feet of retail space, including a grocery store and a pharmacy; 185 parking spaces; and 14,000 square feet of innovation space (The Drew Company, 2011). The requirement to provide innovation space emanated from the location of the project in Boston's Innovation District, an approximately 1000-acre area comprising five sub-districts, including Seaport (The Intersector Project, 2017).

The second NPC was requested in 2011. Under it, the Phase 1 was divided into two sub-phases: 1a and 1b. The Phase 1a was to include 236 rental apartments (Waterside by Windsor), 140 parking spaces, and 17,000 square feet of ground-floor commercial space that would include 7000 square feet of innovation space. The Phase 1b was to include 55,000 square feet of retail space including a grocery store and 7000 square feet of innovation space and 115 parking spaces (The Drew Company, 2016).

The third NPC, in 2015, sought permission to lease 2600 square feet of the approximately 7000-square-foot innovation space to a non-profit health center (it was leased to the Boston Veterinary Clinic). The fourth NPC was requested in 2016 to change the grocery component of the retail portion of Phase 1b to rental housing (including affordable housing). This enabled the construction for Waterside Place Phase 1B (known as Gables Seaport), which will open in 2020 (NEREJ.com, 2019; The Drew Company, 2016). See Fig. 11 for an image of Waterside by Windsor. Gables Seaport can be seen under construction at the far end.

Source: Google Maps

This case study provides three takeaways. First, the number of NPC's issued underlines the need for flexibility. Second, concerted planning efforts can create the enabling environment for VC. Massport proactively plans for the land parcels it owns and has the long-term vision of generating value from them. Third, Massport typically receives three types of revenues from its joint development projects: fixed rent in the form of annual lease revenue; participation rent that varies depending upon a project's success; and transaction rent which accrues when the property is sold or refinanced (personal communication on February 27, 2020 with Andrew Hargens, Chief Development Officer, Massachusetts Port Authority). These three revenue types ensure that Massport receives a guaranteed revenue stream (fixed rent), is able to capture any upswing due to the project's success (participation rent), and receives its due share as a joint development partner at the asset disposition stage (transaction rent).

5. Synthesis of findings from the literature, survey, and case studies: insights and recommendations

The synthesis of the literature review, surveys, and case studies leads to several insights and recommendations that are described below.

5.1. Consider land use, zoning, and VC in an integrated manner

Many of the barriers to the use of VC are closely tied to land use and zoning. For example, requiring a certain amount of parking and ground-floor retail, or requiring very specific uses in the TODs (such as innovation uses in the case of Waterside Place TOD) could diminish the value of the TOD, thereby reducing the potential for VC. Integration is also needed to enhance transit ridership, provide adequate infrastructure,



Fig. 11. Waterside Place TOD.

and enable good urban design. Furthermore, since the station-area property values can increase from the transit-anticipation period to the time the transit system matures, an integrated framework can help capture property value increases along all these time periods through tools such as long-term land banking and neighborhood-level planning ahead of TOD implementation. Transit agencies and the local governments can partner in such land banking and planning efforts. Such integrated thinking gains importance because the survey data suggest that the use of VC to implement TODs is likely not on the radar of most of the transit agencies and local governments.

5.2. Need for inter-agency coordination

Survey responses highlighted the need for inter-agency coordination. In the absence of strong, enforceable, cooperative agreements, transit agencies and local governments are relying on weak, collaborative arrangements such as TOD working groups. However, an integrated approach to the TODs requires much closer coordination between these two public agencies. Such close coordination was not found for the case study TODs. For example, in one instance, the city government staff did not even have access to the JDA between the transit agency and the developer. Therefore, strong state and regional leadership is required to provide incentives and to foster the right environment for such coordination. Although some federal, state, and regional TOD planning and infrastructure grants promote such coordination, they are piece-meal approaches at best.

5.3. More power to the transit agencies over station-area land, in close consultation with these agencies

The respondents to the transit agency survey noted the lack of power over station-area land use and zoning as a big barrier. However, overly prescriptive legislation such as AB 2923 of California that provides zoning authority to BART over the station-area land parcels it owns, may not be very effective either. On the one hand, AB 2923 requires TODs to meet minimum floor area ratio requirements that are almost impossible to achieve in most cases; on the other hand, it restricts BART's zoning authority to the land parcels it owns, instead of including all station-area parcels.

Actions are needed on many fronts. More flexible, outcome-focused requirements can be devised, such as a requirement to ensure that station-area land use and zoning lead to specific transit ridership and station access mode share outcomes. For example, in California, a city's planning commission is required to certify consistency between a city's general plan and capital improvement plan. In the case of station-area land use and zoning, a state- or a regional-level agency or a joint local committee between the government and transit agency could be formed for such certification purposes. Alternatively, an existing agency could be assigned this role.

Furthermore, federal, state, and regional governments could make formation of such committees, or assignment of this role, a pre-requisite for receiving grants. Going a step further, enabling legislation may be enacted to provide transit agencies the ability to acquire land for constructing TODs. Currently, most of the transit agencies can purchase land for transit-related purposes, but not for TODs. However, some exceptions exist. For example, land bought using FTA funds can be sold for constructing TODs. Similarly, California's state legislation allows some San Francisco Bay Area transit agencies to acquire properties for constructing TODs. A survey respondent from Denver, CO area noted the ability of transit agencies to use the excess land acquired for transit-related purposes for TODs. Therefore, states should consider designating TODs a transit-serving infrastructure/facility and allow transit agencies to acquire land for TODs at the time they acquire land to build or expand transit systems.

5.4. Need for state and regional-level leadership and enabling framework

The existing literature and a large number of survey respondents note a lack of state- and regional-level leadership as well as a lack of state and regional growth management (GM) tools as barriers to implementing TODs. On the other hand, survey respondents from states with state-level GM programs—for example, Washington and Oregon—frequently noted the existence of state and regional laws, programs or plans to encourage TODs, especially their emphasis on closer land use-transportation coordination. In these states, TODs are viewed as key to achieving the GM objectives.

5.5. Reduce developer risk

Reducing developer risk is key to promoting TODs. The risk reduction can be achieved through various means identified in the literature, surveys, and case studies, including streamlining zoning and permitting processes; reducing uncertainty in the environmental approval process; land banking by public sector agencies that allows developers to conduct site-level due diligence and obtain approvals before purchasing land, as was the case for Evans Statin Lofts TOD; and flexibility in changing the joint development agreements due to changes in the real estate market conditions, as was the case for Twinbrook Station and Waterside Place TODs.

5.6. Use land assembly and eminent domain

Existing literature notes that for TODs to be located in areas with fragmented land ownership, land has to be assembled and then re-parceled into a single parcel—a process that could require use of eminent domain and land assembly. However, the survey findings show that the use of eminent domain and land assembly for facilitating TODs are among the least used tools. Furthermore, ad-hoc use of these tools can be controversial. Therefore, they should be employed to meet well-defined objectives derived from sound planning processes: for example, to facilitate development of affordable housing in TODs, if provision of affordable housing has been identified as a planning objective.

5.7. Encourage transit agencies and local governments to use VC to implement TODs

Survey responses indicate that the use of VC tools to implement TODs is likely not on the radar of most of the transit agencies and local governments. Other evidence support this finding, too. For example, the preliminary budget of the Santa Clara Valley Transit Authority's BART Silicon Valley Phase 2 Extension Project does not include VC. One project document merely calls for "supporting value creation through increased development, and identification of strategies for value capture to fund station area improvements" (VTA, 2019)—a very weak statement considering that a much smaller project in that region, the Warm Springs BART Extension Project, led to an approximately \$4 billion increase in the value of single-family houses alone—five times the amount needed to fund the entire project (Mathur, 2020). These missed opportunities highlight the need for well-coordinated use of tools such as eminent domain, site assembly, land banking, TIF, and SADs.

5.8. Enhance public agencies' ability to use TIF and other VC tools

Extant literature as well as surveys indicate that not being able to use TIF is a major factor inhibiting the use of VC to implement TODs. Many of these restrictions are due to state-level policies and legislation. Therefore, strong state-level leadership is required to remove the barriers to the use of TIF as well as to other VC tools such as SADs. For example, California's Proposition 218 could be amended to lower the current two-thirds super-majority vote requirement to institute a SAD to perhaps 55%, as is the case for approving a school bond measure in the

state.

5.9. Need for transparent, systematic, and comprehensive assessment of value increase

While the MacArthur Station TOD and Waterside Place TOD case studies indicate that public agencies are using sophisticated ways to capture value (for example, they receive various kinds of lease revenues and a portion of sale proceeds), the use of VC is disjointed. For example, VC occurred at various times and in various ways during the construction of the MacArthur Station TOD project's multiple components and was mediated through muddled and non-transparent negotiation processes. Notably, for almost all the case study TODs, the JDAs, especially the financial analysis that constitute the basis for these JDAs, such as the revenue sharing agreements and the lease/sale of land agreements are not easily publicly available. Indeed, in one case, a public agency even refused to provide information about the amount of lease revenues received unless a request for information was filed under their state's public records law. In the absence of such freely available information, the community is likely to be concerned that the public agencies are not capturing value adequately. For example, in the case of MacArthur Station TOD, some community members felt that the City of Oakland did not negotiate enough community benefits when relaxing the height of a residential project from six to 24 stories. Therefore, we recommend a transparent, systematic, and comprehensive analysis of total VC potential of a TOD, and then divvying up of this potential into major buckets, such as requirements to build affordable housing, undertake infrastructure improvements, and share lease revenues.

5.10. Need for flexibility in the use of VC tools

Flexibility in policy and program design is needed to use VC tools. For example, Sound Transit requires that the sale of its land parcels (where TODs are to be developed) can only close after building permits are secured for the TOD projects. However, they waived this requirement for the Othello Plaza TOD. Similarly, in the case of Twinbrook Station TOD, the joint development agreement was amended multiple times, and the project parameters changed several times in the case of Waterside Place TOD due to the changing economic conditions and real estate market trends.

6. Conclusion

Through a review of literature, national surveys of transit agencies and local governments, and in-depth case studies, this paper contributes to the transport and land use policy research by identifying the barriers to using VC to fund TODs and the steps that are being taken to remove these barriers. Finally, the paper synthesizes the findings from the literature, survey, and case studies to recommend strategies to remove these barriers. The major recommendations include the need for flexibility in using VC tools, providing more power to transit agencies over station-area land, reducing developer risk, using land assembly and eminent domain, systematic and comprehensive assessment of value increase, encouraging transit agencies and local governments to use VC to fund TODs, enhancing public agencies' ability to use TIF and other VC tools, and strong state and regional-level leadership and enabling framework.

Finally, we hope that by identifying the set of challenges to the use of VC and ways to address them, this paper would enhance local, state and federal governments', transit agencies', and transportation policy makers' understanding of the policies and tools needed to successfully use VC tools to fund TODs.

7. Endnotes

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