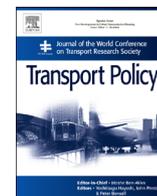




ELSEVIER

Contents lists available at ScienceDirect

## Transport Policy

journal homepage: [www.elsevier.com/locate/tranpol](http://www.elsevier.com/locate/tranpol)

## Developers' perspectives on transit-oriented development

Andrew Guthrie <sup>a,\*</sup>, Yingling Fan <sup>b</sup><sup>a</sup> Humphrey School of Public Affairs, University of Minnesota, 149 Humphrey Center, 301 19th Avenue South, Minneapolis, MN 55455, United States<sup>b</sup> Humphrey School of Public Affairs, University of Minnesota, 301 19th Avenue South, Minneapolis, MN 55455, United States

## ARTICLE INFO

## Article history:

Received 28 April 2015

Received in revised form

5 March 2016

Accepted 4 April 2016

## Keywords:

Transit oriented development

Sustainable growth

Content analysis

Transit planning

Regional planning

Affordable housing

## ABSTRACT

The success of transit corridors in promoting sustainable regional growth hinges on location decisions made by private-sector developers. This paper centers on a series of interviews with 24 residential and commercial developers in the Twin Cities region. Developers were recruited for interviews using random sampling by residential/commercial and urban/suburban specialty. The authors analyzed interview transcripts using close readings and computerized content analysis focused on word frequency analysis and topic co-occurrence statistics. Recommendations for promoting transit-oriented development include reforming zoning and development regulations, broadening the focus of TOD to include frequent bus routes, providing greater certainty of future transit improvements. Recommendations for integrating TOD with affordable housing development include pursuing affordable-by-design solutions and engaging with affordable housing specialists.

© 2016 Elsevier Ltd. All rights reserved.

## 1. Introduction

In the United States, high quality transit is no longer the exclusive domain of large, coastal cities with legacy rail systems. Across the nation, more modestly sized regions that abandoned rail entirely at the end of the streetcar era are turning back to fixed-guideway transit to provide regional mobility and catalyze sustainable regional development. A common characteristic of these "New Start" transit systems is that they serve regions with decades worth of automobile-dominated metropolitan development. This pattern presents planning opportunities and challenges. Opportunities arise as stations serving as the nuclei of transit-oriented regional growth, leading in turn to increasing ridership and further demand for transit-focused housing and commercial space, and so on (Lund, 2006; Schwanen and Mokhtarian, 2007). It is increasingly apparent that stations must so serve if the public is to reap the full rewards of the massive capital investments required for fixed-guideway transit (Tilahun and Fan, 2014). Challenge-wise, the popularity of transit-accessible locations can price low-income residents and entry-level employers out of the market in station areas, raising concerns over whether transit improvements serve those who most need improved transit. (Immergluk, 2009; Kahn, 2007) Finally, transit-friendly built forms do not inevitably follow the implementation of transit improvements: "Build it, and they will come!" seems not to be a

viable strategy on its own. (Hurst and West, 2014; Loukaitou-Sideris and Banarjee, 2000) Transit Oriented Development (TOD) may now be a watchword of comprehensive and regional growth plans, but the visions put forward by such plans are in the hands of developers to realize – or not. Despite a large body of research on the demand for and benefits of TOD, little research to date explores how developers themselves relate to the concept. Research indicating developers often attempt to build denser, more compact projects than regulations allow suggests developers' perceptions of and motivations for pursuing TOD are important to consider (Levine and Inam, 2004).

How do transportation and transit access factor into developers' decision making? How do private developers perceive their relationships to public plans, policies and processes in pursuing TOD? When developers choose to build transit-oriented projects, what motivates them? How can planners and local governments induce more developers to make such a choice? How can we integrate TOD and affordable housing development, rather than pursuing them separately? These are crucial questions for the success of transit investments and the hopes for regional growth riding on them. They also cannot be answered by common methods in TOD research, such as travel behavior modeling and analyses of residential self-selection (Cervero, 2006a, 2007). We explore these questions in the Twin Cities region of Minneapolis-Saint Paul, Minnesota. The region is in the process of developing a regional transit system of light rail and bus rapid transit lines, intended to play a transformative role in the region's future growth. The region has identified 15 major transit corridors for

\* Corresponding author.

E-mail addresses: [guth0064@umn.edu](mailto:guth0064@umn.edu) (A. Guthrie), [yingling@umn.edu](mailto:yingling@umn.edu) (Y. Fan).

further development by 2030. These corridors, called “transitways” in the region’s 2030 Transportation Policy Plan, are designed to offer fast, reliable, and frequent service all day, as well as an improved passenger experience both in vehicles and at stations.

The Twin Cities region as a case for studying TOD is relevant to many regions now building or contemplating fixed-guideway transit. In regions as diverse as Charlotte, North Carolina, Denver, Colorado, Houston, Texas, and Seattle, Washington, planners are wrestling with no less a task than fundamentally changing the foci and form of their regions’ future growth. In particular, the Twin Cities region is a major metropolitan area, but not a megacity on the order of New York or Chicago. Its suburbs primarily arose after World War II with an automobile-dominated growth pattern. This pattern is juxtaposed, however, against a revitalizing urban core. Finally, the region is going through a transition from a bus-only transit system designed to serve existing development and travel patterns to a system centered around a network of rail and bus rapid transit corridors intended to create new development and travel patterns.

Forming part of a transit-focused sustainable regional planning initiative, this research aims to explore the attitudes towards, and interest in TOD among private developers. The research proceeds from an underlying hypothesis that significant obstacles stand in the way of TOD in the region. Beyond that, however, TOD is a new enough phenomenon in the region (and many similar regions) to warrant a general scoping out of developers’ perceptions of TOD and the impediments to it. To that end, the authors conducted in-depth, open-ended interviews with 24 Twin Cities developers with diverse backgrounds. Interview transcripts were analyzed using content analysis techniques including word frequency and topic co-occurrence. Findings from the analyses were used to propose incentive, regulatory, and public-private partnership programs for attracting market-rate and affordable housing development near transitways.

## 2. Literature review

Although the past several decades have been marked by automobile-dominated suburban “sprawl” (Burchell et al., 2002; Ewing et al., 2003; Pendall, 2011), the concept of compact, walkable, mixed-use development served by high-quality transit is nothing new. Indeed, it is the hallmark of the numerous, traditional central-city and inner-suburban neighborhoods that grew up around first-generation streetcar lines a century ago (Gin and Sonstelie, 1992; Hess and Lombardi, 2004).

The basic principles of purposeful TOD have been understood for many years (Calthorpe and Mack, 1989; Cervero, 1984). Whatever planners’ goals in supporting TOD, consideration of developers’ goals and desires is crucial (Renne, 2009; Utter, 2009). In a nationwide survey of developers, Levine and Inam found that developers perceived an unmet market demand for TOD. They also found developers perceive development regulations requiring low-density, single-use development in most areas as a primary obstacle to implementing alternative development forms (Levine and Inam, 2004). Levine and Frank reach a similar conclusion regarding demand for compact, transit- and pedestrian-friendly development (Levine and Frank, 2007).

Cervero offers a detailed exploration of how TOD fits into the residential development market in the San Francisco Bay area. Residents of transit-oriented housing tend to be young, childless professionals working downtown or in transit-served areas. Cervero suggests allowing lower parking ratios in transit-oriented housing and location-efficient mortgages as strategies for promoting further TOD projects (Cervero, 1996). Renne points to “a nation of near-empty rail station precincts” in arguing that the

capacity exists for a dramatic expansion of TOD at a national scale, and further argues that business and real estate interests are poised for a shift from automobile-dominated suburbs to TOD on par with the dramatic metropolitan form changes of the 1950s (Renne, 2013). The Center for Transit Oriented Development (CTOD) estimates more than one in five households will desire housing in a TOD by 2025 (Dittmar et al., 2004). This trend appears to have intensified in recent years: as of 2015, the Urban Land Institute found 32% of Americans – and 39% of Millennials – listed convenient public transit as either a top or high priority in choosing where to live (Urban Land Institute, 2015).

In addition to the positive evidence of a latent market demand for TOD, empirical evidence also confirms the development impacts of premium (usually rail) transit investments (Levine and Inam, 2004). These studies often seek to quantify the impacts of transit investments on regional development patterns (Cervero, 1984, 2006a, 2006b; Cervero and Landis, 1997; Dueker and Bianco, 1999; Fan et al., 2010, 2011; Fan and Guthrie, 2012a; Fejarang, 1994; Guthrie and Fan, 2013; Landis et al., 1995; Loukaitou-Sideris and Banarjee, 2000) or the impacts of TOD projects on travel behavior (Brown and Werner, 2009; Cao and Jordan, 2009; Crowley et al., 2009; Knowles, 1996; Loukaitou-Sideris and Banarjee, 2000; Lund et al., 2004; Walters et al., 2000). In addition, TOD can play an important role in promoting location efficiency. Considering location efficiency allows for a more complete assessment of the functional accessibility of housing than traditional measured employed by the real estate sector (Jewkes and Delgadillo, 2010). More importantly, TOD allows residents to offset their housing costs (often higher than for otherwise similar housing in automobile-dominated areas) with significant transportation cost savings (Bernstein and Makarewicz, 2005). The location efficiency of TOD can be especially beneficial to low-income residents if affordable housing is included in TOD projects (Haughey and Sherriff, 2011).

Looking beyond why a regional planner might desire TOD to how that regional planner might go about promoting it, Cervero et al. identify the most common current TOD promotion strategies as overlay zones allow for higher densities, more diverse use mixes, reduced parking requirements, etc. and funding for planning, required infrastructure and ancillary improvements (Cervero et al., 2004). Considering developers’ views, Cervero, et al. found that developers generally saw TOD in a positive light, but saw obstacles to realizing it, particular with regards to financing projects; lenders see TOD as increasing complexity and risk, particularly when tied to specific transit projects or improvements. Though they were divided on the merits of reducing parking requirements in TOD’s, Cervero et al. also found developers consistently believed appropriate parking ratios in TOD projects could be better determined by market forces than regulation (Cervero et al., 2004).

Fan et al. (2012) found that the Twin Cities’ first LRT line, along with surrounding bus service changes, significantly increased employment accessibility in the region for all income groups. Tilahun and Fan (2014) conducted future oriented scenario research and found significant regional-scale accessibility benefits of the proposed 2030 Twin Cities regional transit system. Tilahun and Fan (2014) also found accessibility gains would be much greater if future housing development and/or job growth were concentrated in transit-served areas, with the greatest gains from the concentration of both. There is no guarantee, however, that TOD will follow transit investments (Goetz et al., 2010; Hurst and West, 2014; Loukaitou-Sideris and Banarjee, 2000). Indeed, regional success stories in TOD tend to be carefully nurtured by supportive public policies (Arrington, 2000; Boarnet and Compin, 1999). Our study aims to identify such supportive policies for the Twin Cities region by considering TOD and its surrounding policy environment

through the perceptions of local developers.

### 2.1. TOD vs. conventional development: the importance of allowing TOD

Automobile-dependent growth has traditionally been constructed as a free market response to the technological developments of the automobile and the freeway (Baum-Snow, 2007; Brueckner, 2000). If such automobile-oriented market forces remain prevailing, TOD promotion efforts would require coercive regulatory action – to achieve TOD we would need to require it (Levine and Inam, 2004). However, it is also possible that traditional automobile-dependent growth has shaped development regulations, resulting in current regulations that focus on limiting density, separating uses seen as incompatible, facilitating automotive transportation, and presenting a primary obstacle to TOD.

This alternative school of thought suggests there is significant latent market demand for TOD which developers would willingly serve absent automobile-focused regulatory structures. If this is so, successful TOD promotion would not require new coercive regulations so much as the repeal of existing regulations which serve goals planners no longer espouse—to achieve TOD we might need only allow it (Levine and Inam, 2004; Pendall, 2011). Downs (1999) also points out that conventional, automobile-oriented development has hardly occurred in a perfectly free market. Similarly, Pendall (2011) finds low-density zoning and annual building-permit caps are drivers of sprawling development – in spite of market forces to the contrary.

Levine and Inam argue that targeted deregulation would be sufficient to significantly increase the production of walkable, transit-friendly developments. They cite significant shares of proposed “alternative” developments being rejected or altered. Reductions in density and/or reductions in diversity of uses are the most common alterations. This pattern suggests developers would build more dense projects with greater diversities of uses *if they were allowed to* (Levine and Inam, 2004). Leach (2004) points to the Rosslyn-Ballston Metrorail corridor in Arlington County, Virginia, as a successful example of retrofitting an automobile-dominated suburb for a pedestrian- and transit-friendly built form. Arlington County allows station-area developments much higher densities than otherwise. The county also offers a standardized and predictable site-plan review process to encourage the construction of compact, urban development.

These alternative concepts of the relationship between development regulations and TOD significantly informed our interview protocol. In recognition of the need to be capable of detecting both market and regulatory obstacles to TOD, we deliberately kept interview questions open-ended, allowing participants to volunteer what they perceived as most critical before asking follow-up questions.

### 2.2. Transit joint development

In some cases, transit agencies take a direct role in TOD, partnering with developers to jointly develop transit supportive station areas, in the phenomenon of Transit Joint Development, or TJD (Cervero et al., 2004; Renne et al., 2011). Transit joint development can take the form of cost-sharing arrangements in which developers share in the costs of transit infrastructure, stations, etc., as well as revenue-sharing arrangements in which transit agencies share in the ongoing revenues of station area developments (Landis et al., 1991).

Both cost- and revenue-sharing arrangements operate on the expectation that transit – particularly fixed-guideway transit – predictably creates value for nearby development through improved accessibility (Cervero, 1994). The expectation serves as the

essential *quid pro quo* of joint development (Cervero et al., 1991; Landis et al., 1991; Transit Cooperative Research Program, 2002), and is supported by a significant body of literature on increased property values in station areas (Cervero and Duncan, 2002; Cervero, 2004; Chen et al., 1998; Fejarang, 1994; Goetz et al., 2010; Hess and Almeida, 2007; Ko and Cao, 2010). This predictable creation of value by transit can make joint development an attractive value capture strategy for fiscally constrained transit agencies (Feigon et al., 2004; Zhao et al., 2012). Given a sufficient base of transit demand, joint redevelopment of surface park-and-ride facilities can provide a valuable source of revenue for transit agencies and actually increase ridership compared with the commuter parking it replaces in some cases (Willson and Menotti, 2007), though the intensity of development required to offset ridership losses from net parking reductions varies greatly based on station area characteristics (Duncan, 2010). Successful TJD is facilitated by healthy demand from local real estate markets, an entrepreneurial spirit on the part of transit agencies, interagency coordination and recognition of the non-revenue benefits of TOD (Landis et al., 1991).

### 2.3. TOD and affordable housing

Ensuring the benefits of transit improvements are shared throughout society requires affordable housing in station areas. The construction of affordable housing is often hampered by neighborhood opposition, particularly in suburban areas (Goetz, 2008). Suburbanites often equate affordable housing with poor minorities, recipients of public assistance, and crime (Kirp, 1997). Whatever their reasons, suburban communities often oppose the provision of affordable housing on a large scale (Downs, 1993; Keating, 1994). Providing affordable housing in transit station areas may be complicated by persistent perceptions (particularly in suburban areas) that transit improvements cause increased crime rates, despite evidence to the contrary. Fan and Guthrie (2012b) find such perceptions alive and well in Twin Cities station areas.

Station area affordable housing development can be further complicated by high market demand for premium transit among affluent households driving up housing costs in station areas. Residents who actually use transit, however, tend to have significantly lower housing-plus-transportation costs than similar residents of non-transit-served neighborhoods (Belzer et al., 2006). Station-area housing attracts price premiums in varied neighborhoods and regions, even along proposed corridors (Goetz et al., 2010; Hess and Almeida, 2007; Immergluk, 2009). Negotiation of variances and approvals can present opportunities to include affordable units (Belzer et al., 2006; Leach, 2004).

The provision of adequate affordable housing in transit accessible areas appears both crucial for the maximum social benefits of transit investments and often difficult to accomplish. Any region includes people with widely varied means, as well as neighborhoods in varied physical locations. We contend that transit-oriented jobs-housing balance cannot genuinely be regional in scope unless access to transit-oriented housing cuts across social strata as well as geographic areas. On account of this importance and difficulty, we specifically asked residential developers about their experiences with and perceptions of affordable housing development in transit accessible areas.

## 3. Interview protocol

Developers were randomly sampled for the interview series. Out of 163 developers identified in the region, we interviewed a total of 24, including 16 working in Minneapolis and/or St. Paul, 21

working in suburbs, 15 developing residential projects, and 17 developing commercial projects. These categories are not mutually exclusive: some developers specialize in only suburban commercial development, for example, while others undertake residential and commercial projects in both central cities and suburbs. We sampled developers to ensure adequate representation of each category, but encouraged participants to discuss any projects they considered applicable, regardless of type or location.

Prior experience with TOD was not a requirement. Transit-oriented development is still a relatively new phenomenon in the study region, and achieving a significantly more transit-oriented regional built form will likely require participation from developers that have yet to build transit-oriented projects. As such, it is crucial for this study to include developers both with and without TOD experience. Ten participants had TOD experience, eleven did not; two had built projects with built forms reminiscent of TOD on sites with transit access, but for which transit access was not a deciding factor in site selection.

Interviews took place from February through May, 2012. At the time, two major transit projects, the Metro Red Line BRT (opened 2013) and Metro Green Line LRT (opened 2014) were under construction in the region. The Metro Blue Line LRT (opened 2004) and Northstar commuter rail (opened 2009) were already in operation. Two further LRT lines (the Metro Green Line Extension and Metro Blue Line extension) were at the Alternatives Analysis stage of the Federal Transit Administration New Starts grant program; both are currently in Preliminary Engineering.

With the exception of one firm in which two partners participated, all participants were interviewed individually to prevent larger developers from dominating the conversation as well as to avoid biasing the responses of developers without TOD experience by directly exposing them to the views of more experienced developers. Interviews took place at participants' offices, except in one case where the participant requested to meet at a local coffee shop. All participants were assured of privacy and confidentiality in the interest of obtaining honest answers, particularly concerning working relationships with local governments and community organizations.

Interviews were conducted by a team of two researchers. One introduced the research and its general goals to the participant and asked the primary interview questions. The other focused on engaging with the participant and following up interesting statements. Questions for all interviews revolved around four themes:

- What the participant sees as crucial factors involved in selecting locations for their development projects,
- Where transportation and transit access fit into that set of factors,
- What makes transportation and transit access important (to whatever degree they are) and,
- What actions the public sector could take to make transit-accessible sites more attractive for private-sector development.

Residential developers were also asked about affordable housing: about what their past experience (if any) had been and what the public sector might do to make developing affordable housing more attractive. Discussion of public-sector actions was deliberately focused primarily on actions other than financial incentives and direct public spending on or in support of TOD. This focus stemmed partly from limited potential to increase regional funding to support TOD at the time the interviews were conducted. In addition, the aim of this research is to expand TOD on a regional level far beyond the scope of current TOD promotion programs; as a result, the research looks for policies to make TOD a natural outcome of regional growth.

The rewritten questions mentioned above served as

conversation starters. To let participants provide the insights they saw as most important, interviewers stayed "out of the way" as much as possible. Interviewers only stepped in to redirect the conversation to make certain all key topics were addressed, or to expand on interesting but not fully explored themes. Interviews were recorded and transcribed in full.

#### 4. Analysis techniques

We employed two computerized content analysis techniques: word frequency and topic co-occurrence, in connection with repeated close readings of the interview transcripts. Word frequency analysis offers a simple but comprehensive first look at recurring themes in the interviews. The NVivo 10 software package processes word frequency counts with the aid of a thesaurus and aggregates words with their synonyms. As a result, each word appearing in the final count represents a meaning, not merely a string of letters.

Commonly recurring meanings suggest important topics and concepts to the researcher. The software employed also allows the user to assign passages of text to "nodes," tagging them as pertaining to a particular topic. This process allows the use of a computer to analyze the frequencies of and correlations between a large number of topics throughout all the documents in the completed set of interviews. Since topics are manually assigned, this analysis analyses can be performed even on complex themes requiring human intelligence to parse (QSR, 2012). Co-occurrences of important topics can shed light on the important issues to address in efforts to promote TOD, since interviewees likely mention conceptually related topics together.

This analysis approach is not common in transportation scholarship, but is well established in the social sciences: coding of interview and ethnographic data is a cornerstone of qualitative social research (Glaser and Strauss, 1967; Miles and Huberman, 1994), and electronic coding allows for the efficient organization and cross-referencing of the large amount of information produced by interviews (Basit, 2003). Co-occurrences or intersections of important topics can be valuable telltales for sections of texts to read closely in relation to each other, but it is important to note that they are not conclusive findings by themselves – those come from analyzing the intersubjective, shared understandings of participants.

As beneficial as computerized content analysis can be, there is no substitute for reading and rereading interview transcripts by a researcher intimately familiar with the subject. This process identifies recurring overall themes which may not appear in more formal analysis techniques – for example, a systemic perspective present throughout an interview may be plain to a reader, yet difficult to assign to specific topics. In addition, the human touch, so to speak, identifies novel perspectives from participants which are interesting more for offering a different point of view than for prevalence. Computerized analysis can help direct close readings of interview transcripts by allowing the reader to search transcripts by topic and identifying intersections between important topics. The reverse can be true as well. For example, a passage in which two or more topics appear together in an unexpected way could suggest a new coding query, leading to an iterative process blending human and computerized analysis.

#### 5. Results

##### 5.1. Word frequency analysis

Fig. 1 shows the 100 words used most frequently in interviews;



most current transit in the region is local bus transit; participants saw existing transit as more relevant to their business than future proposals, as with this small, urban redevelopment specialist:

*If it's housing, obviously, transit, and desirability of location and what affects that. If it's housing, what are the supporting services that surround there, or could surround there? And transportation. And transportation. And we are urban infill developers. So, when I look at transportation, I don't look at as much the possibility of future transit, it's what's existing. Now that's all changed over the last you know, eight years, because of our newly constructed and evolving light-rail system.*

Developers show interest in proposed transitways but will not make location decisions based on them unless construction is certain. One participant put it so:

*[T]he proposals for the transportation changes and stuff are so many years out, and very speculative, [...] it's still so far into the future, and the funds aren't even there to do it.*

The second most common topic mentioned together with TOD is also instructive: regulatory issues. Examination of the interview transcripts shows reports of increased costs, complexity, and/or time caused by regulatory regimes ill-suited to TOD are mentioned in one in four mentions of TOD. Participants saw TOD as requiring significantly more effort to shepherd through the regulatory process than more conventional development. Four participants specifically saw current development regulations as restricting developments that might have negative impacts rather than encouraging developments with positive impacts. The following example comes from a suburban developer with residential and commercial experience:

*They're not pro-development. They're actually anti-development, and they look at their jobs as to try to control it. [...] So anyway, what we see is cities, even with this downturn, they see themselves still as regulators. They aren't – there are very, very few cities that take a proactive response that say, "Okay, what is it we can do to make something happen? What is it that we can come alongside with and help to make this project move forward?"*

Participating developers did not, for the most part, advocate for a complete *laissez faire* approach to development regulation. Rather, they showed much more interest in moving towards a more collaborative model of proactively promoting desirable development, as opposed to the current model of reacting to undesirable development. Frequent mentions of market niches with TOD suggest developers see it as a niche market. Close examination of transcripts, however, shows that TOD is not alone in this—interview participants discuss development more as a myriad of niche markets than as one mass market. One small, urban developer put it this way:

*So, my buyers are people that decidedly want urban – I mean, I'm an urban developer. I'm in the niche. And people just, statistically, go, well, don't people still want to buy a single-family house in the suburbs? Yeah! The majority of them still do. But instead of 98%, we're down to 80%. And that 20% is my market.*

In other words, conventional development is still in high demand, but developers still perceive strong growth potential for TOD. The key is that they understand TOD as an underserved market for which there is pent-up demand.

Issues of long-range planning occur frequently, either in terms of identifying a need to support future TOD or recommending how to plan more effectively for TOD. Roughly one in five mentions of TOD also include mention of high market demand. Looking at these concepts together reveals an expectation that the

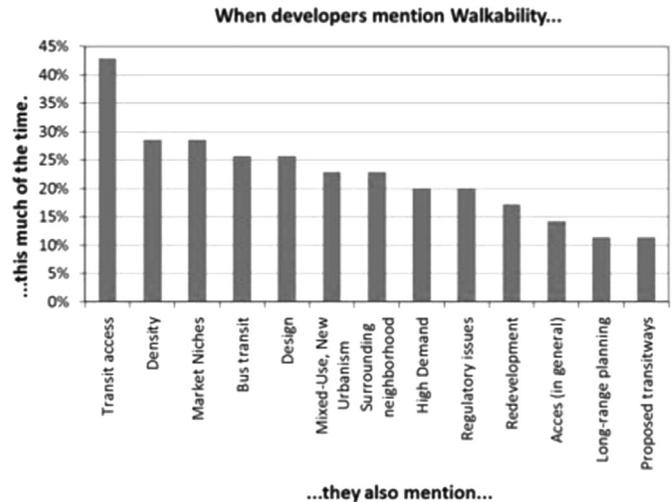


Fig. 3. Walkability topic intersections.

importance of transit access to successful development will grow markedly in the future – especially among younger demographics. One primarily suburban residential developer described his perception of demand for TOD thus:

*That's where the customer is [going to] be. And the younger customer that we're [going to] do, is just [going to] be, you know, transit motivation and orientation is generational. [...] And so they try to do senior housing around transit orient is stupid. And so, but you get someone your guys' age, you go, why wouldn't I live there? Leave the damn car, and/or if I team up with someone, have one car and use the transit.*

### 5.2.2. Walkability

Walkable neighborhood design is widely considered a crucial component of TOD (Calthorpe and Mack, 1989). Developers shape the pedestrian environments of new and redeveloped communities. Fig. 3 shows topics that frequently appear in connection with walkability. Several of these topics are especially important to consider for TOD promotion, as they demonstrate how desire for TOD intersects with desire for generally walkable locations, as well as how functionally transit-oriented developments may, in some cases, be byproducts of walkable development in transit-served areas.

Transit access stands out – mentioned by developers with nearly 45% of mentions of walkability. Developers marketing to growing desires for urban living cite walkability as an important neighborhood amenity. Walkability is seen both as complementary to transit access and desirable in its own right:

*The first way I want to move is walking. Then I want good bike connections. Then I want to take my transit to work. So, multi-modal. And then just, sort of, urban amenities. Shops and restaurants and activities and clubs. And then nature. Access to nature.*

In this instance, the walkable location comes first. Transit access is desirable, but may be attained largely due to the fact that most walkable locations in the region are in central city neighborhoods with relatively high levels of bus service – underscored by the fact that bus transit appears with roughly 25% of passages regarding walkability. Urban-oriented developers' perceptions of walking as their future residents' desired primary mode with transit used for a small number of trips too long to be made on foot has important implications for TOD promotion: it shows the importance of (at least mostly) full-service communities at a

pedestrian scale. Density appears in generally similar context. Density often comes up in conversation in terms of a neighborhood having destinations within walking distance of a site.

The market niches node appears in more than 25% of passages dealing with walkability. This pattern fits with developers seeing walkable environments as high-demand segments of the housing market – especially with young members of the “creative class” – with strong desires for vibrant, urban neighborhoods. Walkability in surrounding neighborhoods also appears as a point in favor of urban or older suburban sites.

Discussion of high demand in interviews appears in 20% of discussions of walkability. All but one developer who mentioned walkability acknowledged a walkable neighborhood would increase the desirability of a site, at least for residential development.

Regulatory issues appear largely regarding parking standards, setback requirements, and similar. Off-street parking requirements that increase walking distances between pedestrian destinations and create an unwelcoming pedestrian environment are prominent. One participant spoke at length about preferring to build as few as 0.83 stalls/residential unit with good transit access, even with two-bedroom units. In the words of a smaller, urban residential and commercial developer:

*You know, parking is always the conundrum in any development because the clients, the users, want what they call line-of-sight parking. Park here, walk 30 feet, and get in the front door, that way I'll have more customers. [G]o to any metropolitan area, and that is no longer possible, just because of density. So, [Minneapolis] requires certain parking minimums. Portland has parking maximums. If one develops in the traditional way, you end up with a checkerboard: building, parking lot, building, parking lot, building, parking lot. And you lose the opportunity for increased density, and architectural presence along the entire boulevard face.*

This example illustrates a perceived vicious cycling centered around excessive minimum parking standards: excessive required parking (which would not be needed in a truly walkable development) reduces the walkability of the development and leads to more residents and visitors driving, thus creating its own need. The crucial point here is that the developers who see parking requirements in this light are confident in the adequacy of much lower parking ratios than are common in contemporary development, as long as that development is walkable.

### 5.2.3. Affordable housing

Transit-oriented affordable housing, while part of the broader housing market, faces specific obstacles stemming from high demand for sites with high quality transit access and from constrained supply of such sites. Interviews considered affordable housing primarily from a perspective of how best to build it into transit-oriented development. Interviewers broached the subject with a general conversation starter question on the participants prior experience with affordable housing, then quickly steered the conversation towards the specific challenges and opportunities involved in transit-oriented affordable housing.

Fig. 4 shows topics participants frequently mentioned with affordable housing. In stark contrast with TOD, the two most commonly co-occurring nodes with affordable housing—financing and regulatory issues – both largely describe impediments to its development. Financing is a negative in the context of renting or selling housing significantly below market price. Regulatory issues arise as negatives in terms of zoning, height/bulk limits, and/or parking standards that make it difficult to design profitable projects including affordable housing. Four developers with affordable

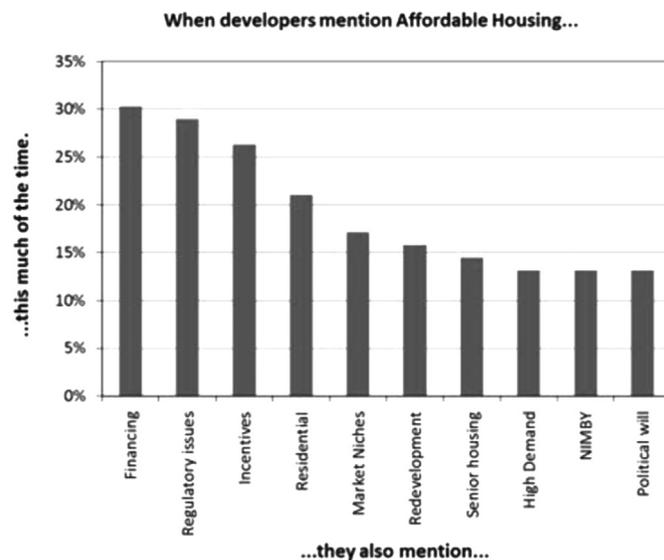


Fig. 4. Affordable housing topic intersections.

housing experience specifically cited relaxed parking requirements and higher permitted densities as important for making affordable developments financially viable. Allowing an affordable development in a transit corridor to have, for example, four stories instead of three and parking at 0.85 stalls per unit instead of 1 or 1.5 could potentially make the difference between needing grant funding and simply fitting costs to a lower-income market. This statement, and others like it underscore a perception that available funds for means-tested affordable housing are simply not sufficient to meet the need for affordable housing near transit. Stringent regulatory compliance requirements accompanying affordable housing can reduce competition, especially for developers with in-house compliance capabilities. As one urban, affordable housing specialist put it:

*We've done a lot of that and it's one of those things that you don't want to do one, you need to kind of set up everybody for it. You're talking about fair housing, you're talking about a lot of people looking over your shoulder for various reasons that you wouldn't have in a normal real estate.*

In this case, building the capacity to handle Federal, state and local compliance for affordable housing in house gives the developer a competitive advantage. As with the more innovative participating developers interested in TOD, this unusual focus helps the firm in question carve out a market niche for themselves.

Public-sector incentives appear in over 25% of passages mentioning affordable housing, underscoring the importance of governmental actions and funding. The incentives topic node refers to financial incentives, density bonuses and other affordable-housing specific variances from underlying zoning and development regulations.

“Affordable by design,” – maximizing affordable housing in a constrained public funding environment by controlling construction costs (hence reducing break-even rents) and/or reducing residents’ other expenditures through services such as on-site childcare (financed through other programs) or good transit access – is a compelling concept raised in the interviews. It also softens the boundary between affordable housing and other housing, by acknowledging that transit access has implications for the effective affordability of all housing. Here is one of the most striking statements heard on affordable housing in the series of developer interviews:

*[I]n my group we say, what's the best way to build affordable housing? Put it on transit. You don't even have to touch the unit.*

*You don't have to subsidize the unit or do anything – just put it on transit. Change the equation about the money going into personal transportation, which is 20% now. Housing is 30%. So, transportation is taking up two-thirds of the budget that your house is. Your car is costing you two-thirds as much as your house! That's crazy – if you're on the lower end, especially. So, that's – you can change the two-by-fours or get government programs all day long, but none of them have the impact of transportation connections.*

Making a critical link between affordable housing and TOD, the developer quoted above argues that transit-oriented housing is affordable housing – at least significantly more affordable than it would otherwise be due to transportation savings. Of course, this only works up to a point. Still, transportation costs play right into a strategy of making housing “affordable by design,” in the words of one participant.

The market niches node occurs with affordable housing roughly 17% of the time. Developers experienced in affordable housing have nuanced perceptions of different affordable housing needs and how well they are met. For example, one urban, mixed-use developer identified affordable family housing as a major, underserved need in transit corridors:

*How much money have we got for affordable housing? [...] Okay, what's the best way to spend this money [...]? Buy up as much existing inventory along the line, a block or two away, as you can. First of all, it's going to be more family-oriented inventory, which is where the problem is. It's not going to be the one-bedroom studio apartment I build over the store on the line. That's not where the affordable disconnect is. That unit will cost more than that house that I could buy today.*

The frequent occurrence of the redevelopment node with affordable housing also underscores perceived demand for affordable housing in urban areas. Six developers also mention a growing need for affordable housing in historically affluent suburbs, especially along proposed transitways. In these cases, the problem is perceived much more as one of affordable housing production and the need to overcome exclusionary policies and tendencies.

Roughly one in eight passages mentioning affordable housing also mentions high demand for affordable housing. In an illustration of the complexity of affordable housing development, however, NIMBY-ism and problems of local political will to allow needed projects occur together with affordable housing as often as high demand. Developers with significant experience in affordable housing identify NIMBY-based neighborhood opposition as a frequent problem. In the words of one:

*When people talk about affordable housing, they think you're building a 10-story high-rise project building, and if you can breathe, you can move in. It's had a negative connotation that requires a lot of education and unfortunately it seems like the people that are involved in the municipal process, [...] I think you've got just a generational gap in attitude between people that sit on these boards and people that are trying to get work done and that are in need of the housing. You kind of have the people making the decisions that don't understand and don't care.*

This example shows a serious disconnect between what “affordable housing” means to developers and to community groups – at least in affluent communities.

### 5.3. Recurring themes on overall location factors

#### 5.3.1. Convenient transportation and transit access desirable

Participants were asked: “What are the crucial factors you often consider in determining the location of your development projects?”

In response, participants frequently identified convenient access to transportation as key to their site-selection decisions. In fact, all but three interview participants volunteered convenient transportation access as important before they were asked any transportation-specific questions. Transit access appeared repeatedly as a desirable amenity, as in this example:

*I look for the amenity package. I want a restaurant near me, a coffee shop near me, a bus stop near me, so multimodal transit options. Can I move around to this site?*

Transit access is not the only or even the primary location factor here, but it may determine between otherwise similar sites. These developers demonstrate real demand for transit-oriented sites.

#### 5.3.2. Importance of redevelopment

Redevelopment in built-out communities is a prominent focus of participants. Reasons include a perceived oversupply of conventional, greenfield development, and transportation access problems at remote sites. Developers of affordable housings also often focus on redevelopment and/or reuse of existing sites/buildings. This focus results in part from high demand in the central cities and inner suburbs. It can also protect affordable housing developments from “NIMBY” opposition by promising reuse of a vacant site or rehabilitation of a dilapidated property.

#### 5.3.3. Tenants drive commercial development

Current market conditions have led prospective tenants to determine many aspects of commercial development projects before developers even become involved. Participants cite financing and leasing difficulties as reasons for avoiding speculative commercial development. A retail chain, for instance, might select general areas in which to locate. In such cases, developers can play an important role in selecting a specific site within a key tenant's desired market.

### 5.4. Recurring themes on TOD-related experience and attitudes

#### 5.4.1. Transit access desired but often overridden

The following statement came early in an interview with a project manager at a major Twin Cities-based development company:

*[I]t's always on the list. We want to be close to buses, we want to be close to light rail. [...] [I]t ends up being not quite as important as you'd think. At least in the Twin Cities, here. But everything that we've responded to in the last two years, that's been on the list – for a corporate user or a government user.*

Transit access is broadly perceived as desirable, all else equal. Participants, however, cited increased land costs, limited buildable land around existing transitways, and difficult permitting processes in the central cities as factors keeping all else from being equal. A common theme is that transit can easily “break the tie” between otherwise similar sites, but that few developers will compromise other site-selection factors for a transit-oriented site.

#### 5.4.2. Already interested

Developing near transit in such a way as to be truly transit-oriented, rather than merely transit adjacent, can be difficult. Still, several groups of developers in the Twin Cities place a premium on transit access in selecting sites:

- Multifamily developers: Developers of market-rate multifamily housing depend on a young demographic. Participants identify young people as demanding rather than desiring transit access.

- Redevelopers: Developers specializing in redevelopment tend to work in the central cities and inner suburbs. Basic transit access is widespread, and demand for new construction is predominantly in multifamily housing. As a result, redevelopers frequently build projects with the effect of retrofitting a more transit-friendly built form onto neighborhoods.
- Large office developers: The more employees commuting to an employer's place of business, the more important commutes become to that employer's business. Large office firms generally drive the development of the buildings they will occupy. Consequently, they have power to shape commercial development patterns.

## 6. Conclusions and policy recommendations

These findings point to strategies for encouraging TOD, both through public policy changes and partnerships with the private sector. In particular, instances where current development policies are perceived to inhibit TOD and where the interests of TOD-promoting planners and profit-seeking developers align offer fruitful ways forward. Word frequency analysis, topic co-occurrence analysis and close readings all show strong interest in transit-served locations among developers, high perceived demand for transit-friendly development types, and a difficult, expensive process for permitting TOD. The latter point is troubling given that developers perceive genuinely transit-oriented built forms (with high densities and low parking ratios, for example) as crucial to making a profit on transit-served sites. Developers are motivated to build complex TOD projects on expensive, transit-served land by hopes of profit; the result of difficult permitting processes for genuinely transit-oriented development may not be the pejorative "transit-adjacent development" (Belzer and Autler, 2002; Dittmar and Ohland, 2004), but no development at all in some cases. Interest in TOD is by no means unanimous, but together with difficult regulatory perceptions suggests an artificially constrained supply of TOD projects, much as found by Levine and Inam (2004).

Participating developers who built transit oriented projects also did so to serve perceived demand for walkable developments in vibrant, urban communities. In such instances, transit access is not a primary goal, but a characteristic which makes other goals easier to achieve. Participants cite factors such as the ability to bargain for lower parking ratios (despite the uncertainty and difficulty of success) and access to a larger pool of residents (due to reduced competition between housing and transportation expenditures) as potentially making TOD more profitable than broadly similar development could be without transit access.

Regarding affordable housing, a common thread is the inadequacy of available public funding to meet perceived demand. Developers with affordable housing experience cite a need to either combine other funding sources, minimize building costs and/or build housing which minimizes residents' other expenses, allowing them to afford more expensive housing. The latter two strategies suggest a possible symbiotic relationship between affordable housing and TOD: higher densities and lower parking ratios can help reduce per-unit costs, while transit access can dramatically reduce household transportation expenditures. They also call for a broadening of the very concept of affordable housing, both in terms of what household costs are included and in terms of considering transit's implications for the affordability of both means-tested and market-rate housing.

These conclusions show important motivations developers have for pursuing TOD, as well as perceived issues that can override those motivations. Below, we make specific policy recommendations to address these issues and perceptions.

### 6.1. Policy recommendations for promoting TOD among developers

#### 6.1.1. Reduce costs, emphasize benefits

High costs of transit-accessible sites can stop interested developers from selecting them. Subsidy programs, including TOD promotion grants or station-area tax abatement, could offset this obstacle to TOD and station-area economic development. In addition, most developments incur costs related to transportation, particularly automotive transportation, such as parking construction or impact fees related to traffic impacts. While transit-accessible sites may have higher land costs, they may also allow developers significant savings on automobile-related costs if station area policies such as lower minimum parking standards are in place. Land costs are immediately apparent, and an important factor in site selection, while the near ubiquity of high minimum parking standards may make the savings possible from TOD less apparent. One way to illustrate this would be a site-plus-transportation cost index (like housing-plus-transportation indices) which could quickly show the combined costs of land and required parking, etc. for sites with and without transit access.

Twin Cities developers see current development regulations (such as single-use zoning, low density limits, and high parking minimums) as limiting them from building profitably near transit. A TOD zone, in which a developer can build a true TOD project (desired development) *by right* (a strong encouragement to regulation-averse developers), would help level the playing field between transit-oriented and automobile-dominated areas. Such a zone would permit higher densities, increasing potential returns on investments. Reducing minimum parking ratios where transit options exist would reduce the costs of TOD projects and increase densities of residents and destinations in station areas.

#### 6.1.2. Take advantage of natural alliances

Developers that build transit-friendly projects in the Twin Cities metropolitan area tend to be small, innovative firms focusing on multifamily residential development and/or redevelopment of sites in the central cities and inner suburbs. In addition, large development corporations interviewed indicated that corporate clients are increasingly including transit access in their "wish lists" of desired site characteristics. It is important for TOD promotion efforts to actively reach out to these developers. Developers who have built projects with TOD characteristics near transitway corridors should be included in TOD promotion efforts surrounding these corridors. TOD-friendly zoning reforms should consider the needs of small projects as well as large ones.

Developers also specialize in specific areas of the region, and most developers with experience in transit-friendly development work primarily in the central cities. Connecting developers with expertise in suburban transit corridor areas and developers with TOD experience could speed the broader adoption of sustainable development patterns.

#### 6.1.3. Accelerate and diversify transit improvements throughout the region

The prominence of planned transit improvements in developers' consideration of TOD is noteworthy: this primacy demonstrates the importance of continuing, and if possible, accelerating the build-out of the regional transit system to take advantage of the interest developers show in TOD around yet-to-be-built transitways. A strengthened, dedicated funding source for transit improvements could offer developers the feeling of certainty they need to make transit-oriented location decisions.

Bus transit was the third most common topic node to co-occur with TOD—more common even than the Metro Blue Line (the region's one operating light rail line at the time of data collection) (See Fig. 2). Interviews suggest significant amounts of urban TOD

activity oriented to Twin Cities bus routes. High-frequency bus routes, especially with transitway connections, offer significant TOD opportunities and should be considered for TOD-specific zoning and parking standards.

In addition, this relevance to development of central city locations and bus service indicates transit could be enhanced if premium local services, such as streetcars and/or arterial bus rapid transit (BRT), were implemented in popular urban neighborhoods. Such services could offer attractive links with the regional transitway system, extending its reach and development impacts. This finding also underscores the importance of taking a transit system level approach to TOD-friendly regulatory reform, and including bus-served neighborhoods beyond immediate station areas.

## 6.2. Policy recommendations for attracting affordable housing near transit

### 6.2.1. Pursue affordable-by-design solutions

The high demand for affordable housing, coupled with limited available public funds, points to affordable-by-design housing as a potentially important part of a system-wide, transit-oriented affordable-housing strategy. Affordable-by-design housing will require reform of the same automobile-oriented density and use restrictions as well as off-street parking standards that hinder TOD. For example – the developer who stated a clear preference for parking ratios low enough to create conflict with staff and neighborhoods in the permitting process has no personal aversion to parking; he merely recognizes that parking is expensive to build. Implementing affordable-housing policies that recognize transit's housing-plus-transportation cost benefits in determining what constitutes "affordable" for funding eligibility could ease the development of transit-oriented affordable housing.

### 6.2.2. Engage with affordable housing specialists

Participants with extensive experience in developing affordable housing relate regulatory compliance and management capacities well beyond those required for market-rate residential development, as well as economies of scale realized by building those capacities in-house for all-affordable projects. Affordable-housing promotion efforts might have more success if focused on providing affordable-housing units at the level of station-area neighborhoods rather than percentages of individual new developments. Several participants also contend that transit-oriented housing – affordable or otherwise – often means high-density multifamily development that does not always consider the needs of poor families with children. Considering amenities needed by families, such as parks, playgrounds, good schools, etc. in planning for transit-oriented affordable housing will allow families with children to more easily share in its benefits. In addition, given low values and high vacancy rates for single-family homes along several key Twin Cities transit corridors, broadly including preservation and reuse in affordable-housing strategies could offer significant cost savings along urban transitways and avoid NIMBY opposition.

### 6.2.3. Final comments

The most positive finding of this research is that pent-up demand for transit access exists among Twin Cities developers – even among some of those with little prior experience pursuing it. The prevalence found of desire for transit access shows a capacity for a regional expansion of transit-oriented development if constraints are removed. As restricted as developers currently perceive opportunities for TOD to be, interest from a majority of developers is not needed to achieve a regionally significant realignment of development patterns towards the growing transit system. Though significant obstacles also remain to TOD, this study

shows real potential for the success of commonly-suggested tactics for encouraging TOD. Precedents exist. For example: consideration of transportation costs as a component of housing affordability is an increasingly common practice in planning, though not in determining threshold rents for means-tested affordable housing. While not as radical as the TOD-by-right zone proposed here, TOD overlay zones that relax some density, use, height and bulk and/or parking regulations of underlying zoning are common in cities with fixed-guideway transit. The key is implementing such policies on a broad enough, regional scale to achieve the desired broad, regional impacts. Implementation will require a great deal of regional cooperation and political will – things this study does not make any easier to realize. It does, however, argue strongly for the need to try.

## Acknowledgements

This research was made possible by funding from the Twin Cities Metropolitan Council's Corridors of Opportunity Initiative, as a sub-award of a Sustainable Communities Regional Planning Grant from the United States Department of Housing and Urban Development (Grant number HUD Cooperative Agreement MNRIP0023-10). The authors also wish to extend their special thanks to graduate research assistants Chris Berrens and Brent Oltz for their hard work in recruiting participants and helping conduct interviews, as well as the members of the Transitway Impacts Research Program's Technical Advisory Group (including Metropolitan Council staff) for their thoughtful guidance of and suggestions for the research. The assistance of the Technical advisory group was the full extent of funders' involvement in the conduct of the research.

## References

- Arrington, G., 2000. Reinventing the American dream of a livable community: light rail and smart growth in Portland. In: Proceedings of Investment for the Future: 8th Joint Conference on Light Rail Transit. Transportation Research Board, Baltimore, Nov. 11–15.
- Basit, T., 2003. Manual or electronic? the role of coding in qualitative data analysis. *Educ. Res.* 45 (2), 143–154.
- Baum-Snow, N., 2007. Did highways cause suburbanization? *Q. J. Econ.* 122 (2), 775–805.
- Belzer, D., Autler, G., 2002. Transit Oriented Development: Moving from Rhetoric to Reality (Research report). Brookings Institution, Washington, DC.
- Belzer, D., Berstein, S., Goerwitz, C., Makarewicz, C., McGraw, J., Poticha, S., Zimmerman, M., 2006. Preserving and Promoting Diverse Transit-oriented Neighborhoods (Research Report). Center for Transit-Oriented Development, Chicago.
- Bernstein, S., Makarewicz, C., 2005. Rethinking Affordability: The Inherent Value of TOD (White paper). Center for Neighborhood Technology, Chicago.
- Boarnet, M., Compin, N., 1999. Transit-oriented development in San Diego county: the incremental implementation of a planning idea. *J. Am. Plan. Assoc.* 65 (1), 80.
- Brown, B., Werner, C., 2009. Before and after a new light rail stop: resident attitudes, travel behavior, and obesity. *J. Am. Plan. Assoc.* 75 (1), 5–12.
- Brueckner, J.K., 2000. International regional science. *Int. Reg. Sci. Rev.* 23 (2), 160–171.
- Burchell, R.W., Lowenstein, G., Dolphin, W.R., Galley, C.C., Downs, A., Seskin, S., Moore, T., 2002. Costs of Sprawl – 2000. Transit Cooperative Research Program, Washington, D.C (Research report no. 74).
- Calthorpe, P., Mack, M., 1989. The Pedestrian Pocket Book – A New Suburban Design Strategy. Princeton Architectural Press, New York.
- Cao, X., Jordan, R., 2009. Understanding Transportation Impacts of Transitways: Demographic and Behavioral Differences Between Transitway Riders and Other Transit Riders (Research report). Center for Transportation Studies, Minneapolis.
- Cervero, R., 1984. Light rail transit and urban development. *J. Am. Plan. Assoc.* 50 (2), 133–147.
- Cervero, R., 1994. Rail transit and joint development: land market impacts in Washington, DC and Atlanta. *J. Am. Plan. Assoc.* 60 (1), 83–94.
- Cervero, R., 1996. Transit-based housing in the San Francisco bay area: market profiles and rent premiums. *Transp. Q.* 50 (3), 33–49.
- Cervero, R., 2004. Effects of light and commuter rail transit on land prices:

- experiences in San Diego county. *J. Transp. Res. Forum* 42 (1), 121–138.
- Cervero, R., 2006a. Alternative approaches to modeling the travel-demand impacts of smart growth. *J. Am. Plan. Assoc.* 72 (3), 285–295.
- Cervero, R., 2006b. Office development, rail transit, and commuting choices. *J. Public Transp.* 9 (5), 41–55.
- Cervero, R., 2007. Transit-oriented development's ridership bonus: a product of self-selection and public policies. *Environ. Plan. A* 39, 2068–2085.
- Cervero, R., Duncan, M., 2002. Transit's value-added effects: light and commuter rail services and commercial land values. *Transp. Res. Rec.* 1805, 8–15.
- Cervero, R., Hall, P., Landis, J., 1991. Transit Joint Development in the United States: A Review and Evaluation of Recent Experiences and an Assessment of Future Potential (Research report). Urban Mass Transit Administration, Washington, D. C.
- Cervero, R., Landis, J., 1997. Twenty years of the bay area rapid transit system: land use and development impacts. *Transp. Res. Part A – Policy Pract.* 31 (4), 309–333.
- Cervero, R., Murphy, S., Ferrell, C., Goguts, N., Tsai, Y., Arrington, G., Witenstein, N., 2004. Transit-oriented Development in the United States: Experiences, Challenges and Prospects. Transit Cooperative Research Program, Washington, D.C.
- Chen, H., Rufolo, A., Dueker, K., 1998. Measuring the impact of light rail systems on single-family home prices: a hedonic approach with GIS applications. In: Proceedings of the 77th Annual Meeting of the Transportation Research Board. Transportation Research Board, Washington, D.C. January 11–15.
- Crowley, D.F., Shalaby, A.S., Zarei, H., 2009. Access walking distance, transit use, and transit-oriented development in North York City Center, Toronto, Canada. *Transp. Res. Rec.* 2110, 96–105.
- Dittmar, H., Ohland, G., 2004. The New Transit Town: Best practices in Transit-oriented Development. Island Press, Washington, D.C.
- Dittmar, H., Poticha, S., Ohland, G., Belzer, D., Autler, G., Lawson, W., Benedict, A., 2004. Hidden in Plain Sight: Capturing the Demand for Housing Near Transit (Research report). Center for Transit-Oriented Development, Oakland.
- Downs, A., 1993. Reducing regulatory barriers to affordable housing erected by local governments. In: Kingsley, G., Turner, M. (Eds.), *Housing Markets and Residential Mobility*. Urban Institute Press, Washington, D.C., pp. 215–281.
- Downs, A., 1999. Some realities about sprawl and urban decline. *Hous. Policy Debate* 10 (4), 955–974.
- Dueker, K.J., Bianco, M.J., 1999. Light-rail-transit impacts in Portland: the first ten years. *Transp. Res. Rec.* 1685 (1), 171–180.
- Duncan, M., 2010. To park or to develop: trade-off in rail transit passenger demand. *J. Plan. Educ. Res.* 30 (2), 162–181.
- Ewing, R., Pendall, R., Chen, D., 2003. Measuring sprawl and its transportation impacts. *Transp. Res. Rec.* 1831, 175–183.
- Fan, Y., Guthrie, A., 2012a. Winners or losers: individual perceptions of transit-induced neighborhood change. *Transp. Res. Rec.* 2276, 89–100.
- Fan, Y., Guthrie, A., 2012b. Assessing Neighborhood and Social Influences of Transit Corridors (Research report). Center for Transportation Studies, Minneapolis.
- Fan, Y., Guthrie, A., Levinson, D., 2012. Impact of light rail implementation on regional labor market accessibility: a transportation equity perspective. *J. Transp. Land Use* 5 (3), 28–39.
- Fan, Y., Guthrie, A., Teng, R., 2010. Impact of Twin Cities Transitways on Regional Labor Market Accessibility: A Transportation Equity Perspective. Center for Transportation Studies, University of Minnesota, Minneapolis (Research report no. 10-06).
- Fan, Y., Khattak, A., Rodriguez, D., 2011. Household excess travel and neighbourhood characteristics: associations and trade-offs. *Urban Stud.* 48 (6), 1235–1253.
- Feigon, S., Hoyt, D., Ohland, G., 2004. The Atlanta case study: Lindbergh city center. In: Dittmar, H., Ohland, G. (Eds.), *The New Transit Town: Best Practices in Transit Oriented Development*. Island Press, Washington, D.C., pp. 175–192.
- Fejarang, R., 1994. Impact on property values: A study of the Los Angeles metro rail. In: Proceedings of the 73rd Annual Meeting of the Transportation Research Board.
- Gin, A., Sonstelie, J., 1992. The streetcar and residential location in nineteenth century Philadelphia. *J. Urban Econ.* 32, 92–107.
- Glaser, B., Strauss, A., 1967. *The Discovery of Grounded Theory: Strategies for Qualitative Research*. Aldine, Chicago.
- Goetz, E., 2008. Words matter: the importance of issue framing and the case of affordable housing. *J. Am. Plan. Assoc.* 74 (2), 222–229.
- Goetz, E., Hagar, A., Ton, H., Ko, K., Matson, J., 2010. The Hiawatha Line: Impacts on Land Use and Residential Housing Value. Minneapolis: Center for Transportation Studies, Minneapolis.
- Guthrie, A., Fan, Y., 2013. Streetcars and recovery: an analysis of post-hurricane Katrina building permits around New Orleans streetcar lines. *J. Plan. Educ. Res.* 33 (4), 381–394.
- Haughey, R., Sheriff, R., 2011. *Challenges and Policy Options for Creating and Preserving Affordable Housing near Transit and in Other Location-efficient Areas*. Diane Publishing, Darby, PA.
- Hess, D., Almeida, T., 2007. Impact of proximity to light rail rapid transit on station-area property values in Buffalo, New York. *Urban Stud.* 44 (5/6), 1041–1068.
- Hess, D., Lombardi, P., 2004. Policy support for and barriers to transit-oriented development in the inner city. *Transp. Res. Rec.* 1887, 26–33.
- Hurst, N.B., West, S.E., 2014. Public transit and urban redevelopment: the effect of light rail transit on land use in Minneapolis, Minnesota. *Reg. Sci. Urban Econ.* 46, 57–72.
- Immergluk, D., 2009. Large redevelopment initiatives, housing values and gentrification: the case of the Atlanta beltline. *Urban Stud.* 46 (8), 1723–1745.
- Jewkes, M.D., Delgado, L.M., 2010. Weaknesses of housing affordability indices used by practitioners. *J. Financ. Couns. Plan.* 21 (1), 43–52.
- Kahn, M., 2007. Gentrification trends in new transit-oriented communities: evidence from 14 cities that expanded and built rail transit systems. *Real. Estate Econ.* 35 (2), 155–182.
- Keating, W., 1994. *The Suburban Racial Dilemma: Housing and Neighborhoods*. Temple University Press, Philadelphia.
- Kirp, D.L., 1997. *Our Town: Race, Housing, and the Soul of Suburbia*. Rutgers University Press, New Brunswick, NJ.
- Knowles, R., 1996. Transport impacts of greater Manchester's Metrolink light rail system. *J. Transp. Geogr.* 4 (1), 1–14.
- Ko, K., Cao, X., 2010. Impacts of the Hiawatha Light Rail Line on Commercial and Industrial Property Values in Minneapolis. Center for Transportation Studies, University of Minnesota, Minneapolis (No. 10-05).
- Landis, J., Cervero, R., Guhathukurta, S., Huang, W., 1995. *Rail Transit Investments, Real Estate Values, and Land Use Change: A Comparative Analysis of Five California Rail Transit Systems*. Institute of Urban and Regional Studies, University of California, Berkeley.
- Landis, J., Cervero, R., Hall, P., 1991. Transit joint development in the USA: an inventory and policy assessment. *Environ. Plan. C: Gov. Policy* 9 (4), 431–452.
- Leach, D., 2004. The Arlington county case study: Rosslyn-Ballston corridor. In: Dittmar, H., Ohland, G. (Eds.), *The New Transit Town: Best Practices in Transit Oriented Development*. Island Press, Washington, pp. 131–154.
- Levine, J., Frank, L.D., 2007. Transportation and land-use preferences and residents' neighborhood choices: the sufficiency of compact development in the Atlanta region. *Transportation* 34 (2), 255–274.
- Levine, J., Inam, A., 2004. The market for transportation-land use integration: do developers want smarter growth than regulations allow? *Transportation* 31 (4), 409–427.
- Loukaitou-Sideris, A., Banarjee, T., 2000. The blue line blues: why the vision of transit village may not materialize despite impressive growth in transit ridership. *J. Urban Des.* 5 (2), 101–125.
- Lund, H., 2006. Reasons for living in a transit-oriented development, and associated transit use. *J. Am. Plan. Assoc.* 72 (3), 357–366.
- Lund, H., Cervero, R., Willson, R., 2004. *Travel Characteristics of Transit-oriented Development in California* (Research report). San Francisco Bay Area Rapid Transit District, Oakland.
- Miles, M., Huberman, A., 1994. *Qualitative data analysis: an expanded sourcebook*. Second ed. Sage, Thousand Oaks, CA.
- Pendall, R., 2011. Do land-use controls cause sprawl? *Environ. Plan. B: Plan. Des.* 26 (4), 555–571.
- QSR. (2012). NVivo 10 help. Retrieved from ([http://help-nv10-en.qsrinternational.com/nv10\\_help.htm](http://help-nv10-en.qsrinternational.com/nv10_help.htm)).
- Renne, J., 2009. Measuring the success of transit oriented development. In: Curtis, C., Renne, J., Bertolini, L. (Eds.), *Transit Oriented Development: Making it Happen*. Ashgate, Burlington, VT.
- Renne, J., 2013. The pent-up demand for transit-oriented development and its role in reducing oil dependence. In: Renne, J., Fields, B. (Eds.), *Transport Beyond Oil: Policy Choices for a Multimodal Future*. Island Press, Washington, D.C., pp. 226–243.
- Renne, J., Bartholomew, J., Wontor, P., 2011. Transit-oriented and joint development: case studies and legal issues. *Transit Cooperative Research Program, Washington, D.C (Legal Research Digest no. 36)*.
- Schwane, T., Mokhtarian, P.L., 2007. Attitudes toward travel and land use and choice of residential neighborhood type: evidence from the San Francisco bay area. *Hous. Policy Debate* 18 (1), 171–207.
- Tilahun, N., Fan, Y., 2014. Transit and job accessibility: an empirical study of access to competitive clusters and regional growth strategies for enhancing transit accessibility. *Transp. Policy* 33, 17–25.
- Transit Cooperative Research Program, 2002. *Transit-oriented Development and Joint Development in the United States: A Literature Review*. Federal Transit Administration, Washington, D.C (Research results digest no. 52).
- Urban Land Institute, 2015. *America in 2015: A ULI Survey on Housing, Transportation, and Community* (Research report). The Urban Land Institute, Washington, D.C.
- Utter, M., 2009. Developing TOD in America: the private sector view. In: Curtis, C., Renne, J., Bertolini, L. (Eds.), *Transit Oriented Development: Making it Happen*. Ashgate, Burlington, VT.
- Walters, G., Ewing, R., Schroeder, W., 2000. Adjusting computer modeling tools to capture effects of smart growth: or “poking at the project like a lab rat”. *Transp. Res. Rec.* 1722, 17–26.
- Willson, R., Menotti, V., 2007. Commuter parking versus transit-oriented development. *Transp. Res. Rec.* 2021, 118–125.
- Zhao, Z., Das, K., Larson, K., 2012. Joint development as a value capture strategy in transportation finance. *J. Transp. Land Use* 5 (1), 5–17.

## Glossary

- Affordable housing:** – Housing within the financial means of low-income households. Commonly defined as renting for no more than 15% of metro-area median income (i.e. 30% of the income of a household earning 50% of median);
- Bus Rapid Transit (BRT):** – A collection of transit technologies aimed at providing a high-quality transit service using buses. Features vary, but can include dedicated busways, exclusive lanes, signal priority, high-amenity stations,

lengthened stop spacings, off-board fare collection and distinctive marketing.;

**Form-based code:** A form of development regulation that replaces traditional use-based zoning with direct regulation of building design and external impacts. Often implemented to allow market-based diversity of uses while limiting negative externalities.;

**Light Rail Transit (LRT):** – An electric rail transit technology employing moderately sized vehicles, overhead contact, station spacings in the 0.5–1 mile range and a

mix of in-street (generally with exclusive lanes) and private right-of-way alignments. Lines are primarily built at grade.;

**Transit-Oriented Development (TOD):** The practice of promoting dense, walkable development in transit station areas, often with the aim of increasing ridership.;

**Transitway:** A catch-all term for premium transit service corridors including both rail and BRT.