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Residential and transit decisions: Insights from focus groups of neighborhoods around transit stations

Jianling Li

College of Architecture, Planning and Public Affairs, University of Texas at Arlington, Box 19108, 601 W. Nedderman Drive, Arlington, TX 76019, USA

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ABSTRACT

Despite the momentum of transit oriented development (TOD) and significant progress, research on relationships among built environment, residential location, and travel decisions remains debatable. This study investigates reasons behind residential and transit decisions – the building blocks for studies of TOD travel impacts. In-depth focus group interviews in three TODs in Dallas/Fort Worth metroplex reveal that social belonging and access to diverse amenities are key features for residential decision regardless of travel preference. Transit decision depends on factors beyond built environment and access to transit service. The findings suggest further investigation of social capital effects and broader benefits of TODs.

1. Introduction

Cities and regions around the world have promoted transit-oriented development (TOD)[1] as a smart growth strategy for sustainable development (Reconnecting America, 2011; Singh et al., 2014; Vale, 2015; Renne et al., 2017). As such there has been great interest in the potential and empirical impacts of TODs. Numerous studies have focused on travel impacts of TOD, particularly the effect of land use and built environment (BE) on driving, transit usage, walking, and vehicle miles of travel, as travel impact is a top goal of TOD and one of the most important indicators for measuring the success of TOD (Ewing et al., 2015).

Quite a few empirical studies have shown higher transit usage in TOD neighborhoods than in low-density residential neighborhoods (Cervero et al., 2004; Reconnecting America, 2011; Muley et al., 2012; Renne and Ewing, 2013; and Kamruzzaman et al., 2015). Progress has also been made on demonstrating the causal effect of built environment on travel behavior using either cross-sectional or longitudinal research design with data in various geographic locations and control of self-selection and sociodemographic factors (Aditjandra et al., 2012, 2016; Giles-Corti et al., 2013; Ewing et al., 2015; Cao, 2015; Kamruzzaman et al., 2016; Renne et al., 2017). However, the effects of TOD on travel behavior, especially transit use, have not been fully explored (Cao et al., 2009; Olaru et al., 2011; Badland et al., 2012; and Cao and Chatman, 2016). There exists evidence of mismatch between preferred and actual residential location, as well as heterogeneity among individual households' response to a given built environment (Bagley and Mokhtarian, 2002; Frank et al., 2007; Bohte et al., 2009; Forsyth et al., 2009; Olaru et al., 2011; De Vos et al., 2012; Chatman, 2014; Liao et al., 2015). Questions remain about the potential effects of TOD on housing affordability, demographic composition, and consequence in travel patterns (Chapple, 2009; Pollack et al., 2010; Pendall et al., 2012; Rayle, 2015). Recent research has developed theories about market shift for housing in walkable and accessible communities, real estate values of TODs, residential sorting, and travel behavior, and has also called for in-depth understanding of the complex relationship among land use, built environment, residential and travel self-selection on travel mode choice (Bartholomew and Ewing, 2011; Cao and Chatman, 2016). A more in-depth understanding of rationales behind residential and travel decisions will shed light on these theories and future empirical studies.

This research intends to investigate the influence of land use, built environment, self-selection factors on residential and travel decisions through focus group interviews of residents and workers in three TOD neighborhoods in the Dallas area. Specifically, this study focuses on the following questions:

- How do individuals in these TOD neighborhoods travel?
- Why do they choose to live in their respective neighborhoods?
- What influences their decision on transit usage?

The focus group interview approach used in this study can provide

E-mail address: jjli@uta.edu.

[1] The term of TOD usually refers to transit-based developments that share a number of characteristics including pedestrian-friendly environment, dense and mixed land use developments around a transit station, usually a rail station and in some cases a bus stop (Evans et al., 2007). This study adopts such definition of TOD.

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insights about the aforesaid relationship through the lens of "customers," as it is a powerful tool for researchers to gather more in-depth, rich data from a small number of individuals in TOD communities to explore rationales for their travel and residential decisions (Stewart and Shamdasani, 2013). In a focus group setting, participants interact and exchange opinions and experience, stimulate dynamic discussions, and reveal nuances behind their residential and travel decisions that may or may not be captured in the preconceived theories or empirical findings resulted from survey data and models. The nuances generated from focus groups can enrich the existing knowledge about residential and travel decisions. The uniqueness of TODs in the Dallas area will also help fill a gap in the existing literature on travel impacts of TODs, as the Dallas Area Rapid Transit (DART) light rail station developments have often been touted as successful examples of TOD (Ohland, 2002; Boelens and Schaafsma, 2006; Dunphy and Porter, 2006) and yet their impact on travel decisions is largely unknown.

The section below highlights some main findings of the research on transit impacts of TODs. Section three describes the research design. The results of focus group interviews are reported in subsequent sections. The article concludes with a summary of the findings and discussion of implications for planning research and practices.

2. The state-of-inquiry about the impact of TOD on residential and transit decisions

The idea that TOD can affect travel behavior is based on the assumption of a strong connection between land use and transportation. It is expected that by offering dense, mixed-use developments, multiple housing options, close proximity to transit services, and convenient amenities for daily life, TOD will create an inviting built environment for walking, using transit, and engaging in activities and social interaction, thereby resulting in less automobile and energy usage, more transportation and housing choices, higher efficiency of transit services and land use, better air quality, more social homogeneity and equality, lower demand for overstressed road systems, and more healthy and livable communities. It is also expected that TODs will stimulate economic development and increase safety by drawing diverse businesses and attracting visitors, which will in turn result in an increase in retail sales, higher tax revenues, and crime reduction (Cervero et al., 2004).

The theories of TOD impacts on travel behavior have been tested extensively since the concept was introduced in the 1990s. The majority of empirical studies comparing transit share between TODs and non-TODs find that transit usage, walking, and cycling trips are higher in TODs than in other neighborhoods, while automobile trips or ownership are lower in TODs than in other neighborhoods in the U.S. and else in the world (see, e.g. Cervero et al., 2004; Muley et al., 2012; Renne and Ewing, 2013; and Kamruzzaman et al., 2016). Quite a few studies also indicate that several built environment factors and transit service factors are predictors of transit demand in addition to sociodemographic factors (Ewing and Cervero, 2010; Guerra and Cervero, 2011). Common built environment factors are known as density, diversity, and design – the 3Ds as coined by Cervero and Kockelman (1997) and recently extended into distance, destination, and demand by others (Renne et al., 2017). The effects of several transit service factors, such as service type, cost, connectivity, extensity, speed, and frequency have also been examined (Cervero et al., 2004; Evans, 2004; Evans et al., 2007; Taylor et al., 2009; Guerra and Cervero, 2011; Sung and Oh, 2011; Thompson and Brown, 2012; Chandra and Quadrifoglio, 2013). Renne et al. (2017) argue that previous studies are limited in scale and geography. They address the limitations using data of more than 4000 rail stations in the U.S. and the multi-level analysis technique. Their analysis show that several regional and neighborhood built environment variables, such as population and employment concentration at the regional and neighborhood levels, as well as job/housing balance, block density, and walk score are significant predictors of transit mode share of commute trips.

Critics of studies on simple association or causal relationship between built environment and transit demand argue that attitude towards transportation plays a significant role in residential location and travel decisions, and that attitude, also known as self-selection, factors should be included in studies of the transit effect brought by TODs and alike land use policies (Cao et al., 2009). Self-selection in this context refers to conscious choices of people about travel and/or residential decisions "based on their abilities, needs, and preferences" (Van Wee, 2009). Self-selection is theorized to have both direct and indirect influence, as well as interaction effect on travel behavior through residential location decisions (Mokhtarian and Cao, 2008; Van Wee, 2009; Cao, 2015).

While significant progress has been made in this line of research, the effects of the built environment and attitude factors on travel decisions, after controlling for socio-demographic characteristics, remain debatable (Bohte et al., 2009; Olaru et al., 2011; Popuri et al., 2011; Cao, 2015; Cao and Chatman, 2016). For example, a study by Bagley and Mokhtarian (2002), which uses data in the San Francisco Bay Area and a structural equation model approach, shows that the effect of built environment is inconclusive after self-selection factor is considered. Based on analysis results of the survey data from residents of 13 new neighborhoods in UK using the k-cluster regression analysis technique, Susilo et al. (2012) conclude that some built environment variables, such as distance to public transport stops, along with car availability and household size have an impact on transit share of commute trips. However, the effect of attitude, measured by individual's concern over environmental issues, is not significant. On the other hand, several studies using the same or similar data in the San Francisco Bay Area are able to demonstrate the effects of built environment on transit usage after controlling for self-selection and other socio-demographic factors (Kitamura et al., 1997; Schwanen and Mokhtarian, 2005). Similar conclusions are made by studies using data from elsewhere in the U.S. and other countries (see, e.g. Scheiner and Holz-Rau, 2007; NÆss, 2009; Van Acker et al., 2011; Badland et al., 2012; Liao et al., 2015).

Research using quasi-longitudinal design also produces a range of results. For example, Aditjandra et al. (2009) analyze the determinants of change in travel pattern using survey data, which was gathered from about 200 respondents who changed residential locations during the last 8 years before the survey took place in 2007 in U.K. Specifically, a number of composite factors are created using factor analysis to measure perception towards or preference for characteristics of residential neighborhoods and travel attitudes, respectively. Regression analysis results indicate that increase in travel accessibility, in which easy access to and good transit service are major components of the factor with high loading values, is found to be significantly associated with increase in transit usage and the opposite is true. In addition, increase in preference for spaciousness of residential configuration, measured by the spaciousness factor, is found to be associated with less transit usage. However, the differences in other built environment factors, such as access to shopping and outdoor facilities, neighborhood safety and attractiveness, are found to be insignificant with regard to impact on change in transit usage. Using the structural equation model with the same data used in their 2009 study, Aditjandra et al. (2012, 2016) find that built environment characteristics, along with socio-demographic and travel attitude factors, display the expected effects in car and transit usage.

Using panel survey data in Germany and cluster-robust regression models, Scheiner and Holz-Rau (2013a) observe that car availability, as expected, affects car and transit usage. All else being equal, changes in quality of access to transit and parking at work place affect change in transit usage, but the effects of other variables, including some location variables, are mixed. After including changes in levels of satisfaction with transit services in a structural equation model, Scheiner and Holz-Rau (2013b) find that changes in car and transit usage are significantly determined by changes in car ownership, household structure, public transport quality, and satisfaction with transit service. However, change in transit satisfaction shows an unexpected positive effect on change in car ownership, namely, an increase in transit satisfaction is associated with an increase in car ownership.

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