Travel behavior in gentrified neighborhoods: How accessibility affects the travel behaviors of Low-income populations

Huijun Tan

Professor Kelly Clifton

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Introduction

This paper aims to investigate the travel behavior of low-income populations in gentrified neighborhoods. Gentrification is always along with different levels of neighborhood change (Beauregard, 1983; Mallach, 2008). Accessibility increase is one of the significant features (Dawkin & Moeckel, 2015). Many transit-oriented development (TOD) projects enable mobility and opportunity, providing access to the city for those without cars. However, transit can also affect land values by providing accessibility to the opportunities that are valued by developers and investors, and capitalized into housing prices, resulting gentrification (Revington, 2015). The gentrification has positive and negative impacts on the travel behaviors of travel disadvantaged (TD) groups (Pollack, 2010). Therefore, it is important to filter out those effects and gain more insight into the factors influencing travel behavior for the policy implications.

Using the accessibility approach can help us to formulate a structured framework to achieve the goal of equity and sustainability since the accessibility reflects the social inclusion level in terms of the ease of reaching potential opportunities with existing transportation system (Bocarejo & Oviedo, 2011). Lacking the support from policies for accessibility in the minority and low-income areas will reinforce the social issues of spatial mismatch, neighborhood exclusion, and social segregation. Since the gentrification is a complex (social, political and economic) process with displacement and class change as major indicators, to understand the accessibility change of TD populations is beyond the analysis of the transportation services and the travel behavior disparities across the socioeconomic characteristics. The interactions between gentrifiers and the gentrified also affect their behavior respectively. Therefore, this paper provides a review of travel behavior of TD groups in the gentrification setting built upon the existing travel behavior theories.

In the next section, I will discuss the relationship between the accessibility and travel behavior with different socioeconomic characteristics, and examine how accessibility is tightly related to social exclusion. This section is rich with studies that focus on the effects of land use

and transport system on TD groups' travel behavior. In the third section, I will discuss the relationship between accessibility and gentrification, and how accessibility affects differently on TD travel behavior under the setting of gentrification. Also, I will analyze the existing studies that apply different behavioral theories to explain the constraints of accessibility of TD groups in the fourth section. In the fifth section, I will look into how the behavioral change approaches can be used in accessibility and gentrification topic. The last section will provide the policy and planning implications based on the discussion of previous sections.

Accessibility, Social Exclusion and Travel Behaviors

In the past two decades, the planning has switched the mobility focus to accessibility. Accessibility becomes the center of contemporary transportation planning efforts and it is also the key criterion to assess transport policies and urban land use development (Benenson et al., 2011). Accessibility implies "the ease of access to desired destinations from any particular origin with the existing transportation network and land use configuration" (Handy & Clifton, 2001). And Van Wee and Geurs (2011) point out that accessibility can be viewed as "the extent to which land-use and transport systems enable individuals to reach activities or destinations by means of a combination of transport modes". These definitions both emphasize that the individuals' capacity to reach their destinations (or activities) relies on the spatial distribution of activities and the availability of transportation infrastructure. In another word, accessibility reflects the estimation of opportunities that are available as a result of both transportation supply and land use characteristics.

The concept of accessibility implies the time-space relationship, which indicates that travel always needs to consider the amount of time in going from one place to another (Ureta, 2008). In the premise that opportunities for life needs are distributed over space (and always unevenly), there is a set of potential actions restricted due to the physical, social, cultural, etc. constraints (described as capacity constraints, coupling constrains, and authority constraint) (Hagerstrand, 1970). Hegerstrand demonstrates those constrains in time-space aspects, which helps to shed

light on individuals' travel pattern due to different constraints within groups with different characteristics. Also, accessibility functions differently at the regional and local scale (Handy, 1993). Intercity or regional transportation improvements are more likely generate benefits in accessibility to suburban and rural areas outside urban core (Blanchard & Waddell, 2017), while local accessibility with high density in existing developments may result in less automobile travel than it would otherwise (Handy, 1993). Even if people live in a high worker-concentrated location and the area is connected to public transits, it does not mean they have higher accessibility to work or use the transit to commute if their jobs are in suburbs that the public transit can not reach. As Kwan (1998) describes that the accessibility differs according to characteristics and choice of individuals and households (individual accessibility) as opposed to the larger geographic unit (place accessibility). There are plenty of research investigating and identifying the disparities of transit accessibility across socioeconomic groups and neighborhoods in local and regional level for work opportunities (Grengs, 2010; Blumenberg & Manville, 2004; Sanchez, 1998).

Therefore, accessibility is significant in transportation planning, and it is closely tied to the concept of social exclusion. The underlying assumption for conventional transportation planning (such as travel demand modeling) is that the travel conditions of all travelers have the equal travel demand (Duvarci & Mizokami, 2009). However, even TD populations are heterogeneous and assuming low-incomes groups are affected by poverty on the same level, or they have the same accessibility constraints are problematic in transportation planning (Clifton, 2003). Therefore, accessibility can be considered as an indicator of social inclusion and the potential of economic development at individual level (Bocarejo & Oviedo, 2011). Mobility-related social exclusion has been widely studied, and it is a process by which people are excluded from participating in the supposed economic, political and social life because of the insufficient or inexistent means to travel, which reduces the accessibility to opportunities (Kenyon et al., 2002). Church et al. (2000) conclude that there are seven possible exclusion types: (1) physical; (2)

geographical; (3) exclusion from facilities; (4) economic; (5) time-based exclusion; (6) fear-based exclusion; and (7) space-based exclusion. These exclusions restrict individuals and community access to goods, services, and facilities and also create the socially differentiated mobility patterns (Blair, Hine & Bukhari, 2013). Low-income households often experience a lack of access to different facilities and services compared to high-income groups (Preston & Raje, 2007). In many cases, low-income individuals not only face the economic exclusion but with other exclusions. According to Lucas (2012) "rather transport disadvantage and social disadvantage interact directly and indirectly to cause transport poverty. This, in turn, leads to inaccessibility to essential goods and services, as well as 'lock-out' from planning and decision-making processes, which can result in social exclusion outcomes and further social and transport inequalities will then ensue". Therefore, personal or socioeconomic factors and transportation system each plays a vital role in creating those barriers (Duvarci, 2015).

Accessibility methodology to analyze TD groups meanwhile considering socioeconomic conditions can provide evidence of disparities between different areas of the city and help with the development of adequate response strategies (Bocarejo & Oviedo (2011). Regarding the measurement of accessibility, Van Wee and Geur (2004) classify four types of accessibility measures—infrastructure-based measures (the performance or service level of transport infrastructure), location-based measures (accessibility of locations), person-based measures (accessibility at the individual level based on personal possibilities and constraints) and utility-based measures (economic benefits people gain from the access to the spatially distributed activities). Also, since different types of modes can get to different types of land uses or set of locations, transportation mode should have different dimensions for accessibility metrics.

There are empirical studies investigating the relationship between land use and travel behaviors across different socioeconomic groups. Cardenas et al. (2014) assert that the percentage of household income spent on transportation costs can vary depending on land use and built environment factors. Low-income individual living in peripheral locations away from

employment centers make longer journeys to employment locations than other groups in society (Titheridge & Hall, 2006). Adkins et al., (2017) reviewing 17 articles and using social-ecological framework investigate the land use impact on walking behaviors of TD population. They find that the built environment has weaker effects on walking and physical activity for TD than advantaged groups. Even if those who are living in supportive built environments walk more and are physically more active than those who do not live in those environments. It shows the effect was about twice as large for advantaged groups compared to TD groups. The explanation for the difference may be related to the fact that supportive social environments in some disadvantaged communities make up for some deficiencies in the built environment (such as social interaction, social cohesion, and social capital) (Clark & Scott, 2013; Cleland et al., 2010). Ewing and Cervero (2001) conduct a review of 50 articles to examine how and when built environment influence travel patterns with different individual characteristics. It shows that trip frequency and mode choices are influenced by both built environment and socioeconomic characteristics.

Therefore, we need to pay more attention to the social context when we investigate the impacts of built environment on different socioeconomic impacts. As Ureta (2008) points out, "to move or not to move is not trivial but rather a powerful indicator of the way by which societies are ordered and the positions individuals occupy within it". If the travelers are living in places that are compulsory and ruled by the sign of necessity, the whole experience of urban space they get is more likely to be a place of survival rather than a place of belonging. These financial, physical, temporal and organizational dimensions of accessibility mentioned in Ureta (2008) are the foundations to learn more about how social factors interacted with these dimensions and yield more complicated accessibility outcomes in different contexts, such as in the process of gentrification.

The Relationship Between Gentrification and Accessibility

Gentrification is "a pattern of neighborhood change in which a previously low-income neighborhood experiences reinvestment and revitalization, accompanied by increasing home

values and/or rent" (Pollack, 2010). The causal relationship between gentrification and accessibility is unclear. One of topics that are widely studied is to examine the relationship between the accessibility offered by transit proximity and housing value since transit-oriented projects are often capitalized into land and housing prices, and results in class (or income) stratification and displacement of the low-income populations (Dawkins & Moeckel, 2015), which is also called transit-induced gentrification. Meanwhile, transit can also affect land values by providing accessibility to the opportunities especially in urban core that is valued by developers and investors and also capitalized into housing prices (Revington, 2015). Many studies indicate the positive relationship between property value and light rail (Benjamin & Sirmins, 1996; Weinstein & Clower, 2002; Cervero & Duncan, 2002; Duncan, 2007; Agostini & Palmucci, 2008; Du & Mulley, 2012; Grube-Cavers & Patterson, 2014).

More recent studies tend to show a mixed story dependent upon the distance (to the transit station), planning implementation phases, neighborhood type or methodology the research use, etc. (Atkinson-Palombo, 2010; Ge, MacDonald and Ghosh, 2012; Yan, Delmelle and Duncan, 2012; Grube-Cavers and Patterson 2014; Brown 2015). Dominie (2012) examines the effect of gentrification on commuters' choice of transit mode near station areas, correlated to transit ridership, with the consideration of income, occupation, education and ethnic composition as gentrification indicators. He concludes that gentrification has a negative association with transit use but a positive correlation with driving. Joshi et al. (2006) state that the literature of the effects of transit accessibility on land-use change has, in general, supports the theory that higher accessibility to rail transit leads to higher land values around transit stops, which in turn leads to higher densities of development, but the effects in different zones with different racial and income compositions are mixed.

Besides the facts that the accessibility outcomes can be derived from land use and transit affects the neighborhood changes or gentrification, another factor contributing to gentrification makes the direction of this relationship seems reversal—self-selection. Self-selection relates to

the question of spurious associations between built environment and travel behavior instead of causal relationship, which means the simultaneous effect of preference on travel behavior decisions (Cao, Mokhtarian & Handy, 2009). The residential self-selection indicates that residents who prefer biking may consciously choose to live in a neighborhood that has biking facilities and conducive to access to the infrastructure and bike more frequently. In gentrification process, consumerism is used to explain why the urban lifestyle is touted, which "represents the consumerism and affluence of those unburdened by familial responsibilities and economic stringencies" (Beauregard, 1983). Therefore, people with different socioeconomic characteristics tend to work and live in places of substantially different urban environment (Silva et al., 2012).

Schwanen & Mokhtarian (2007) illustrates the characteristics of the built environment, personal travel behavior and what kind of people want to live in New Urbanism development. He summarizes that in the cities "where the global economy's command and control functions are concentrated, the relationship between neighborhood choice and sociodemographic variables such as household size, income, and education may have become more complicated through gentrification and the growth of employment in producer services and the information and communication technology sector". The public transit combined with land use can yield the desired outcomes of lower car use that provides a specific environmentally friendly lifestyle. And developers and investors speculate the properties in those areas (mostly in core areas) to attract the affluent people, young professionals and the creative class who have the preference and taste of liberal urban lifestyle and positive attitude toward active transportation like biking and walking (Silva et al., 2012). Metro (in most cases with intermediate public transport) is also attracting TOD residents, especially bus and motorbike users, whose activities are concentrated within walkable distance from the transit stations, and whose willingness to use metro is high when the fully integrated transportation network is developed (Chava, Newman & Tiwari, 2018).

These specific preferences (e.g., life-style or household specific needs) reflect the restrictions which could function as indicators to unobserved attitudinal variables (Danyluk &

Ley, 2007). The disadvantaged people who live in those neighborhoods have different impacts under the process of gentrification. On the one hand, the transit-oriented development does bring potential benefits to low-income groups to improve access to jobs, healthcare, goods and other services, and lower the transportation cost due to the well-connected neighborhood in proximity to transit (Cardenas, 2014). Also, low-income households living close to rail transit stations can take the cost-saving benefit of transit by spending less on owning and using private cars (Hamidi, Ewing, & Renne, 2016). The results of the National Household Travel Survey and many regional travel surveys consistently show that households with lower incomes and fewer vehicles tend to use public transit than wealthier households (Giuliano, 2005; Thompson, Brown, & Bhattacharya, 2012). Dong (2017) finds that Portland light rail was more likely to be installed in low-income neighborhoods in suburban Portland and lower-income household more likely to use public transit than higher-income groups.

On the other hand, the gap between the attitudes (in low-income groups) and neighborhood changes may enlarge when it persists, and the built environment actually offers a contrast effect of negative reinforcement, leaving those dissatisfied people who will take the opportunity to move to a more compatible neighborhoods over time (Silva et al., 2012). This is a hidden in the process of gentrification apart from many other subtle indicators shown in neighborhoods in early stage of gentrification, such as minor cosmetic residential renovations and higher-end landscaping (UCLA, 2015). In next section, we focus more on low-income population's travel behaviors in gentrification process and see how newcomers (gentrifiers) interacted with the ones under the risk of being gentrified.

Travel Behaviors of Low-income Population in Gentrified Neighborhoods

There are articles examining the relationship between gentrification and displacement reveal that that gentrification induces the low-income household to stay in the neighborhood, at least for the initial decade, instead of displacing them. (Vigdor et al., 2002; Freeman & Braconi, 2004; Freeman, 2005; Gould Ellen & O'Regan, 2011). However, little empirical evidence shows how

the travel patterns change for those low-income households during this specific period of time. I review some articles comparing the differences in travel patterns between gentrifiers and the gentrified in gentrification process and synthesize the interactions between these two groups to explain the differences.

Danyluk and Ley (2007) exploring the linkage between gentrification and the preferred travel mode for commuting through reviewing survey and ethnographic records show residents in many gentrified districts used public transportation less than those in non-gentrified districts but in some of these areas automobile commuting was used more than all other modes. The potential explanation they provide that it is because of the ideological difference between cohorts associated with different stages in the gentrification process.

The diversity of neighborhood also reflects the complex travel patterns resulted from factors intertwining and influencing each other. Dukakis Center (Pollack, 2010) finds that a new transit station in a neighborhood may create a cycle of consequences that reduces neighborhood residency by those groups most likely to use transit in favor of groups more likely to drive. Also, in some transit-rich neighborhoods, car owners crow out the most likely potential transit riders who turn out to be less likely to use transit regularly. These consequences impose the concern of equity on the transportation system, because transit riders (or transit dependents) are predominantly people of color and/or low income. There are some articles looking into how gentrifiers compete or cope with the spatial capital in gentrifying neighborhood for their benefits. Rerat & Lees (2011) show the middle-class gentrifiers have sought locational advantage in new-built gentrifying cities in order to gain the spatial capital (resources) that they need to negotiate and cope with dual-career households and the restrictive job markets (such as using technology to maximize their time) in Swiss. The mobility practices of these gentrifiers show how they are both hyper-mobile and hyper-fixed over time. However, at the beginning stage of gentrification, gentrifiers do face some barriers to being infused the neighborhood. DeSena (2006) studying the school selection in a gentrifying community in Brooklyn, New York implies that the

action of gentrifiers and how the process of gentrification affects ordinary people in their everyday lives. It shows that gentry families gain admission for their children to public schools outside of the neighborhood, which is contrasted with working-class and low-income residents whose children attend local schools. The rejection of local social space by the gentry suggests the social mixing status in which social relations between gentrifiers and lower-income residents are segregated and stratified (Mazer & Rankin, 2011).

Mazer & Rankin (2011) conducted a study to explore the mediation of social space under the displacement pressure so that to see the everyday life of gentrifying urban neighborhoods. The population people they access are those who (they perceive) are at risk of displacement. It shows that homeowners (HO, more likely to be the gentrified) and capture commercial or rooming-housing tenants' (RH, more likely to be the gentrifiers) live parallel but separate lives. Also, it does not seem to have social mixing between those groups. Regarding the activities they engage, RH tenants make very use of local social services such as health clinics, soup kitchens, drop-in center, etc., but a limit use of commercial spaces (such as discount grocery stores, thrift stores, laundry facilities); HO's activity reflects a wider range of frequent places across a wider geographic area. However, the neighborhood boundary of RH tenants based on the conceptual maps shows that they have a broader, more needs-based notion of the neighborhood, including essential services, places of past and present employment, homes of family members, and past residences, while HO's concept of 'neighborhoods' are more restricted, complying with official designations and the urban grid. This study reveals the high potential of displacement for people whose original community is more homologous with the social spaces of their neighborhoods. The process of marginalized people experiencing neighborhood changes is resonant with the concept of habitus to understand gentrification, in which "working-class are largely displaced by an overriding concern with understanding and explaining habitus of gentrifiers" (Butler, 2003). This emphasizes the social capital (social, emotional, and symbolic) dimensions of displacement by which people are dislocated from their previous neighborhoods as they continue to physically

inhabit those neighborhoods (Urry, 2007). And demographic change (with relative affluence of in-movers) in gentrifying neighborhoods appears to have consequences of lower rates of intra-neighborhood mobility (may be due to the rising of housing price) (Freeman, 2005). For low-income populations, the dismantling social capital inhibits their mobility since they are more likely to rely upon social capital for travel around (Carrasco and Miller, 2006; Roy et al., 2012; Shin, 2017).

Another dimension in the gentrification process creates a barrier to accessibility equity building is the lack of public engagement in decision making among low-income populations. The process of public engagement not only to obtain inputs from this target groups but also to provide information for them who may not have full access to information. An engagement with a public policy perspective, what should be done in the name of communities and societies in relation to these changes, necessarily requires us to provide sophisticated assessments of where and how such interventions should be carried out (Atkinson-Palombo, 2008). One prominent mode of local organizing for resistance to displacement derived from gentrification concentrated on on-going attempts to influence local processes and decision-making through community engagement in local planning processes (Lees & Ferreri, 2016). A bottom-up approach can be more customized for individuals. Other institutional impedance will be mentioned in planning and policy implication section.

Overall, besides the accessibility dimensions mentioned by Ureta (2008) in section II, a social-ecological framework can complement accessibility metrics to assess the constraints for certain socioeconomic characteristics (Adkins et al., 2017). The core concept of this method is to evaluate intrapersonal (biological, psychological), interpersonal (social, cultural), organizational, community, physical environmental, and policy dimensions (Sallis, Owen & Fischer, 2008). With the framework to gain a fuller picture of low-income populations travel patterns, next section we will discover the behavior changes and the effective interventions.

Behavior Change Approaches for Disadvantaged Populations

To the characteristics of travel behavior for TD populations help to formulate effective interventions for travel behavior change. The discussion usually focuses on the effects of changing the transportation system since constraints imposed by a public transport system such as limited service area, inadequate operation times, and inadequate transport infrastructure cause adverse impacts on TD populations (Raje & Preston, 2007). Blair, Hine & Bukhari (2013) use multiphased empirical research technique (combined with modeling, socio-spatial, and qualitative analysis) to investigate how transport network change has the potential to impact on user's participation in social and economic activities both positively and negatively, which illustrates the advantages and barriers to opportunity. They find out that the trade-off decision TD populations make related to access to employment, often depends on private transport in place of public networks over expenditure on personal amenities. Therefore, understanding the decision making process for TD populations is essential for behavior change.

Bamberg, Ajzen & Schmidt (2003) conducts a longitudinal study to examine the effectiveness of interventions on bus usage based on planned behavior theory and the role of past behavior on the behavior change. They conclude that choice of travel mode is mostly a reasoned decision and this decision can be influenced by interventions that generate changes in attitudes, subjective norms, and perceptions of behavioral control. Also, the past travel choice contributes to the prediction of later behavior only if circumstances remain relatively stable. The role of new information is also highlighted on behavior change (such as frequency of new bus system, ticketing method, etc.). This can be applied to TD populations in gentrification that is accompanied with subtle or dramatic neighborhood changes in transport network and system.

Ampt (2003) focusing on the motivations for behavior change reveals that the (energy usage) behavior change is influenced by their personalities, attitudes, previous actions, their income, the attitudes and actions of their friends and associates, and by the community and culture(s) they belong to. Therefore, to understand the motivation for target populations is the key to successful travel behavior change. Motivation is highly related to the field of psychology that also varies

across different socioeconomic characteristics. Behavioral and psychological effects derived from travel feedback program (TFP) were investigated on the basis of norm activation theory, which describes the psychological process of altruistic behavior proposed in social psychology (Taniguchi et al., 2003). Regarding behavior change in gentrification context, diverse, economically based, mobility potentials also generate contrasts (or even conflicts) between older and newer residents in local vernacular landscapes (Krase, 2016). Krase also mentions that some ethnic or religious groups are very tied to specific locales making them more resistant to change their behaviors even under pressure by outside forces. Also, we need to pay more attention to the fact that higher-class privileges impose (directly or indirectly) different levels of limitation on motility of the less affluent in different gentrification stages.

Rose & Ampt (2016) investigate the public engagement campaign approach for behavioral change, which is based on a voluntary behavioral change as opposed to a regulatory approach. They reveal that volition, which is regarded as a crucial determinant for actions, has a strong relation to personality. Also, they assert "the climate for change is produced through a variety of factors that relate to the manner in which travel behavior change programs engage individuals". Public engagement provides the opportunities for individuals to seek for changes that suit their lifestyles instead of being imposed by someone else or regulations. As we have reviewed the individual factors that cover a wide range of contexts for change in previous sections, people may find the motivation to change in public engagement even if they are not necessarily interested in the actions such as improving the environment through reducing car use.

In sum, different travel behavior theories can generate various approaches to generate the behavior change intervention. Rashid, Kushair, and Yigitcanlar (2010) suggest a multi-indicator approach for TD populations and the account the indicators for individual effects. They propose to use four approaches in determining or measuring TD populations, which include poverty approach, mobility approach, accessibility approach and equity approach, and apply capability approach for behavioral change since it can unfold a circumstance of capability sets rather than

the means or functionings. The complexity of travel behavior of TD populations requires us to examine behavioral change with more systematic and well-structured approaches.

Planning & Policy Implications

There has been limited policy or planning discussion about how to overcome the accessibility disparities through behavioral interventions. The institutional suggested methods for analyzing transit services equity largely focus on proximity and ridership instead of service quality (Karner & Golub, 2016). Even if the Title VI requires the environmental justice evaluation for federal funded projects to improve the accessibility, it is hard to target the equity concern on local institutional levels. Therefore, it is desirable for policymakers to have a better understanding of the framework that indicates various factors influencing travel behaviors of disadvantaged populations.

Planning accessibility is to focus on the ends rather than the means, which is the core question about whether people have access to the activities that they need or want to participate in (Handy, 2005). Handy (2005) distinguishes mobility and accessibility in transportation planning in their goals, measures, and strategies. She points out the measures for accessibility in plans are more toward jobs and other destinations within specified travel times or distance, travel modes and the needs of specific populations groups. However, the existing plans with integration of accessibility objectives still lack multi-criteria accessibility-based indicators that can guide their decision-making processes (Boisjoly & El-Geneidy, 2017). Transportation planning emphasizes more on the goal of accessibility in the past decade, and MPOs are "mandated to assess the feasibility of any transportation infrastructure improvement projects with special reference to accessibility being achieved across various groups of people" (Debnath, 2017). However, most of the plans supporting either increasing auto ownership among the disadvantaged or improving transit service, but few planning specifics include how to improve the transit access from low-income neighborhoods (Boarnet et al., 2017). Boarnet et al. (2017) suggest that the cities or transportation agencies can improve job access among low-income

residents through exploring of bringing ride-sharing (such as Uber or Lyft) or biking sharing services that provide the on-demand service to or from transit stations. This indicates that more flexible planning strategies for accessibility to essential needs in life can be explored by investigating the constraints (and their magnitudes) that impede to increase local TD accessibility.

Qviström (2015) proposes that "the accessibility of a place is characterized by specific coordination of presences and absences that depends as much on boundaries and exclusions as on mobility" rather than just relying on the modern conceptualization of accessibility (based on space and time need). He argues that the discourse on accessibility reveals simplified arguments for densification, progress, and metropolitan ideals, contradicting the initial inclusive intentions of the strategy. Accessibility to all jobs does not represent the opportunities that are available to different groups of populations. Therefore, accessibility also needs to have equity analysis based on accessibility indicators, which assess the specific vulnerable groups relatively the general populations, using detailed accessibility metrics instead of simplified indicators such as VMT that is affected by sociocultural, lifestyle, or socioeconomic factors (McGuckin et al., 2005).

Regarding the area in the process of gentrification, the TOD policy must include affordable housing policies, to accommodate people with low income and low vehicle ownership, as their willingness to use the metro is higher than the gentrifiers (Chava, Newman & Tiwari, 2018). Many studies show that there is a policy mismatch between many welfare recipients (especially public housing programs) and their transportation needs (Levine, 1998; Coulton et la., 1999; Blumenberg, 2008; Anderson & Hughes, 2009; Welch, 2013). Except for job-housing balance for low-income populations, the change of land use characteristics is one of the strong indicators for gentrification that have significant effects on travel behavior. City's zoning (or land use code) policy should balance the goal of revitalization/redevelopment and the goal of accessibility equity (Mallach, 2008).

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