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Location of Big Box Retailers and Its Accessibility for Minority and Low-income Communities: The Case of Austin, Texas, USA*

대형 할인마트 입지와 취약계층 및 저소득층 주민의 접근성 분석 : 미국 텍사스 오스틴 사례를 중심으로

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Abstract

Despite its close proximity to downtown, East Austin is one of the underprivileged and under-developed areas in the City of Austin, Texas in the United States. Ethnic minorities and low-income persons in inner-city areas often lack access to big box retail due to the store being disproportionately located outside of their neighborhoods. The aim of this study is to identify the accessibility of big box retail for East Austin's residents in order to confirm the potential impacts of big box retail growth on minority and low-income populations. Using GIS-based network analysis, it measures whether the residents in East Austin have equal access to big box retail stores, compared to the average of the city. The results of the analyses suggest that East Austin has less access to certain category of big box retail. Although residents in East Austin have greater accessibility to neighborhood-type retail like automotive part stores, drug stores, small-format value stores, and supermarkets, they have less accessibility to community-type big box retail like furniture store, home improvement stores, department stores, and large-format value stores. Socio-economic characteristics of East Austin neighborhoods include a high percentage of individuals living below the poverty line, high disability rates, low to no vehicle ownership, and high percentages of female headed households. Consequently, the persons in those neighborhoods of lesser accessibility are potentially hurt more by the location of big box retail establishments. However, the research found a denser development with mixed-use and mixed-income strategies might help fill retail gaps and significantly improve retail access for minority and low-income population.

Keywords: Big Box Development, Spatial Inequity, Accessibility, Network Analysis, Low-income

I. Introduction

The dramatic growth of big box[1] retailers, including Wal-Mart, Target, and Home Depot, is a controversial issue in the United States. Supporters and opponents of big box developments offer conflicting forecasts for the

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potential impact of big box retail on the local retail environment and the local economy. Local officials are often interested in attracting big box retail establishments. They argue that big box retail is desirable because these stores offer lower priced products and an opportunity (afforded by superstores) to buy more goods in one stop (Bianco and Zellner 2003; Hausman and Leibtag 2005). Moreover, they believe that big box retailers generate significant sales and property tax revenues for local governments (Texas Perspectives and Gateway Planning Group 2004). For these reasons, most local government officials encourage or even provide public funds or sales tax rebates to retail developments to attract big box stores (Evans-Cowley 2006).

However, a growing number of studies find that the big box development model can also generate costs in terms of social, economic, and environmental outcomes. Several reports analyze the potential disadvantages associated with big box development, such as lower employee wages, increased urban sprawl, competition for existing local business, rising cost for public services and infrastructures, severe traffic congestion, and dying town centers (Evans-Cowley 2006; Houston, Oden and Spelman 2005; Mitchell 2006). Therefore, the opponents of big box development argue that the availability and low prices offered by big box merchants should be weighed against the potential negative impacts when approving or rejecting their development (Clanton and Weinberg 2004).

Despite various efforts to access the true costs and benefits of increased big box development, there are a lack of studies that address the location of big box retail and spatial inequity of retail establishments. As inner city stores may experience lower sales and profits due to customers' more modest disposable incomes and large elderly populations, the supermarket industry has tended to disinvest in inner city neighborhoods (Marion 1982). As a result, residents in low-income areas inevitably have less accessibility to stores.

Using the City of Austin, Texas in the United States as a case study area, this research aims to analyze the location of big box retailers and the accessibility of minority and low-income residents to retail. It investigates the hypothesis that big box retailers are disproportionately located outside of minority and low-income neighborhoods, especially East Austin areas, and that residents in those areas have less accessibility to retail compared to other residents in more affluent areas. In addition, the research investigates how a denser development with mixed-use and mixed-income strategies can improve retail access for minority and low-income populations based on the case of the Mueller development project.

II. Disinvestment in inner cities and impacts on urban neighborhoods

Historically, big box retailers had shied away from locating in urban neighborhoods. An empirical study on big

1) While there is no single definition of big box retail, most definitions focus on the square footage of retail outlets rather than the items sold inside the stores (Pan 2003). It is typically a stand-alone building ranging in size from 20,000 to 260,000 square feet with a large parking lot or part of a larger shopping center (Evans-Cowley 2006).

box retailers' location preferences found that those retailers in California between 1992 and 2009 were more likely to locate in affluent resident areas with lower population density but higher employment density, far away from the CBD (Schuetz 2014).

Several factors are cited in the literature as reasons for retail divestment in the inner city and relocation to the suburbs or exurbs. Inner city markets typically experience lower sales and profits. Because the inner city has a relatively high proportion of modest disposable incomes and a large elderly population, per customer expenditures are frequently lower than average. Consequently, total sales volume tends to be substantially lower than for suburban markets, affecting profit as a percentage of sales (Citizens Research Education Network 1984). In addition, because of difficulties to find affordable land inner cities and older suburbs, large chain retailers' overwhelming preference has been for greenfields and land parcels on the outskirts of urban areas, which can accommodate large building footprints as well as lots of parking (Alwitt and Donley 1997; Fitzgerald and Leigh 2002).

The problem of location is exacerbated by the operating conditions of inner city markets. Inner city stores tend to have higher operating costs than suburban stores. Security costs, greater "shrink" (loss of product due to employee theft, shoplifting, etc.), greater numbers of bad checks, and high labor costs, due to frequent turnover and more inexperienced employees, account for a large percentage of the difference in operating expenses. Other factors include higher real estate taxes, insurance, repair and maintenance to older stores, depreciation, and shopping cart loss (Gottlieb, Fisher, Dohan and O'Connor et al. 1996). Crime and the perception of unsafe conditions are also major barriers to inner city investment. A 1997 survey of inner city-based companies indicated that crime and security issues significantly affect inner city business activity (Porter 1997).

As a result, residents in the inner city – in particular, minority and low-income residents – inevitably have less accessibility to retail. One of the studies investigating the extent of access to food disparities within Philadelphia found that there is a 50% greater need among poor adults to travel to a grocery store than among the non-poor; nearly half of poor adults (44%) travel outside of their neighborhood to a grocery store, compared to 30% of the non-poor (The Food Trust and Philadelphia Health Management Corporation 2006). Another study estimated that 11.5 million low-income people (or 4.1 percent of total U.S population) live in low-income areas[2] more than 1 mile from a super market or large grocery store (USDA Economic Research Service 2009).

Increasing number of studies have argued that "food dessert", an area devoid of a supermarket, in urban neighborhood causes poor nutritional quality and increase risk for obesity and its associated health conditions (Boone-Heinonen, Gordon-Larsen, Kiefe and Shikany et al. 2011; Lee 2012; Inagami, Cohen, Brown and Asch 2009; Swinburn, Egger and Raza 1999; Townshend and Lake 2009; Walker, Keane and Burke 2010). Several studies show that smaller stores located in urban low-income areas offer not only a relatively smaller quantity and

2) Low-income areas are defined as an area where more than 40 percent of the population has income at or below 200 percent of Federal poverty thresholds (USDA Economic Research Service 2009).

variety of food options but also fair or poorer quality food (Glanz, Sallis, Saelens and Frank 2007; Hendrickson, Smith and Eikenberry 2006; Walker, Keane and Burke 2010; Zenk, Schulz, Israel and James et al. 2006). In addition, food prices in the urban food dessert are more expensive than a non-food desert areas (Chung and Myers 1999; Freedman 1991; Hendrickson, Smith and Eikenberry 2006; Kaufman, MacDonald, Lutz and Smallwood 1997; Walker, Keane and Burke 2010).

Overall, low-income residents in inner city are potentially more affected by big box establishments. If they have access to big box stores, they can enjoy significant savings and stretch their consumption dollar. However, many big box retail put downward pressure on wages, and low-income households are vulnerable to a threat of the low wages. Moreover, low-income households have a hard time accessing the benefits of low prices due to big box location and yet experience low wage employment offered by big boxes. Also, big box location pattern may translate into fewer and smaller retail establishments geographically accessible to low-income households.

III. East Austin neighborhoods

East Austin's[3] geographic and political history has produced a demographic and socio-economic makeup that had traditionally differed from the rest of Austin. As shown in Table 1, East Austin had a predominantly minority population, with Hispanics comprising 50.9 percent of the population, followed by African-Americans who comprise 22.5 percent of the total population in 2000. While Whites constituted 52.9 percent of the total population of Austin, East Austin had a modest White population of 9.0 percent. East Austin has a relatively younger population than the city; the median age in East Austin was 28.9, comparing to 29.6 in the City of Austin.

Family households constituted a larger percentage of total households in East Austin than in the city. In 2000, the average household size in East Austin was 2.77 persons compared to the average household size of 2.40 persons in Austin. In addition to the number of family households and average household size, U.S. 2000 Census data indicated that East Austin had a relatively high number of households headed by females who have no husband, and with children under 18 years of age. While those female households constituted 13.0 percent of the total number of family households in Austin, East Austin had greater number of female households (16.9 percent of the total family households).

Income and poverty statistics reveal that East Austin is a poor area of the city. East Austin had a 25,458 dollar median household income, whereas median household income in the city was 42,689 dollar. The median household income in East Austin is approximately 40 percent lower than in the city. In addition, people who are

3) There is no single term or definition for the boundary of East Austin. In this research, East Austin is defined as the area east of Interstate 35, south of U.S. Highway 290, west of U.S. Highway 183/Ed Bluestein Road, and north of Ben White Boulevard. When East Austin is defined as east of Interstate 35, there is a great diversity of cultural groups and economic levels (see Figure 1).

living below poverty level constituted 27.0 percent of the total population of East Austin, while the rate was only 14.7 percent in the city as a whole.

There is a significant difference in the rate of vehicle ownership. The percentage of households with no vehicle in the city was 15.1 percent. Meanwhile, large numbers of people in East Austin were not able to drive their own vehicle: 28 percent of total households. Moreover, East Austin had a large disabled population (36,672 persons), whereas there were 177,412 disabled persons in the city.

In sum, East Austin is portrayed by its socio-economic characteristics to be a minority and low-income community than other communities in the city. Meanwhile, it can be expected that East Austin may be "retail poor," in relation to the rest of the city areas, if big box retailers are more likely to locate in affluent resident areas far away from the urban poor areas. As shown in Figure 1, there is less retail activity in East Austin although it consists of 16.6 percent of the total population of Austin. Only 24 big box retail establishments – 8.9 percent of the total number of big box retailers in Austin – are located within East Austin, while the City of Austin has 246 big box retail establishments within its city jurisdiction. Further, most of the big box retailers located in East Austin are neighborhood-type stores rather than community-type. Therefore, it is necessary to empirically measure the accessibility of big box retail for East Austin's residents in order to confirm the potential impacts of big box retail growth on minority and low-income populations.

Table 1 _ Comparison of socio–economic characteristics

Category		East Austin	City of Austin
Demographics	Population (Population density: people per acres)	108,795 (6.65)	656,562 (4.13)
	Median age	28.9	29.6
	Race/Ethnicity (proportion of total population) White Hispanic Black Asian Other	 9,843 (9.0%) 55,403 (50.9%) 24,463 (22.5%) 2,961 (2.7%) 16,125 (14.8%)	 347,554 (52.9%) 200,579 (30.5%) 64,259 (9.7%) 30,915 (4.7%) 13,255 (2.0%)
Household characteristics	Number of family households	21,738	141,589
	Average household size	2.77	2.40
	Female household; children under 18 years and no husband (proportion of total households)	3,674 (16.9%)	18,451 (13.0%)
Income & poverty rate	Median household income	25,458	42,689
	Population below poverty level	29,365	96,268
	Rate of people below the level of poverty	27.0%	14.7%
Mobility	Household with no vehicle (proportion of total households)	6,093 (28%)	21,366 (15.1%)
	Disabled persons (proportion of total population)	36,672 (33.7%)	177,412 (27.0%)

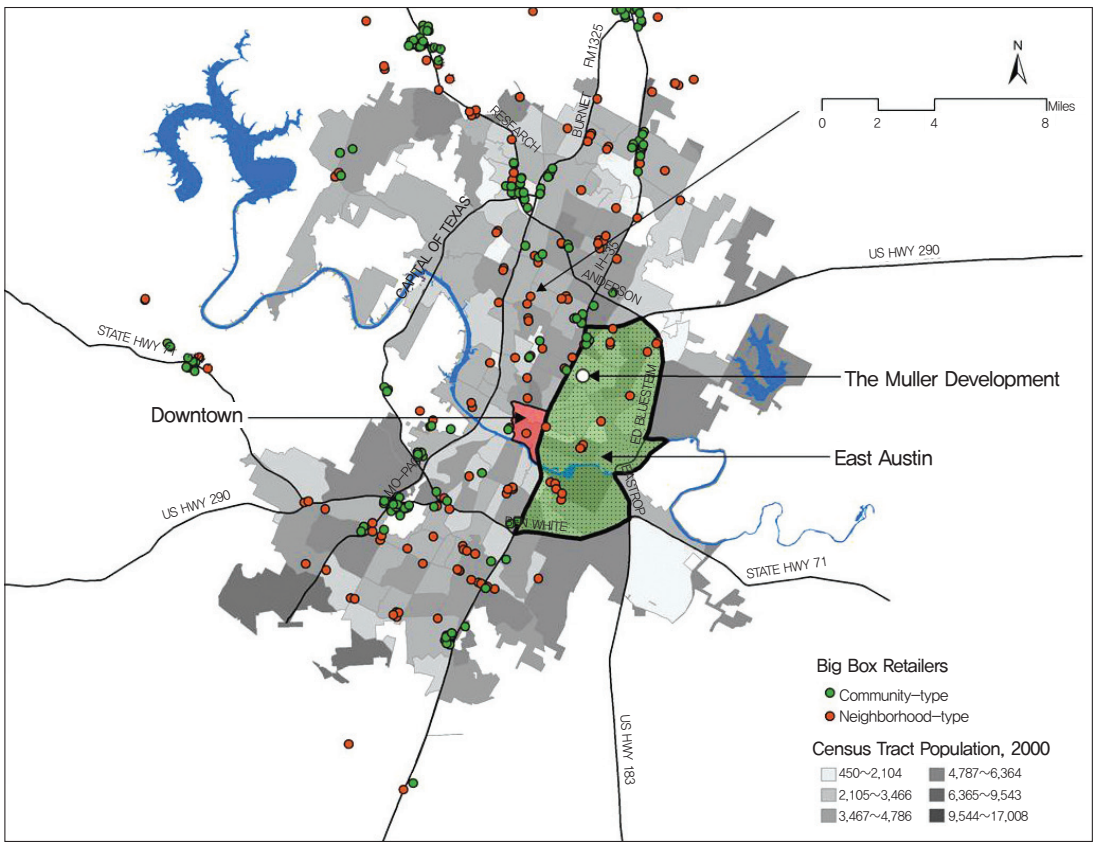
Source: U.S. Bureau of the Census. Census 2000 SF1 & SF3.

Ⅳ. Data and methodology

This research uses several data sources to investigate the locations of big box retailers and the accessibility of minority and low-income populations. Big box retailers were selected by identifying national chain retailers listed in the SAP Top Hundred Retailers 2007 (Schulz 2008). Among the top one hundred retailers, 47 national chain companies, which have at least one store in the Austin area, were chosen and grouped into 13 main categories: automotive parts and accessories, furniture and home furnishings; electronics and appliances; home improvements; supermarket and drugs; clothing and accessories; sporting goods, hobbies, books, and music; department stores; large-format value stores; small-format value stores; office supplies; and pet and pet appliances.

As shown in Table 2, these category retailers have different trade areas or trade area drive times. The trade area is often defined as the geographical area that encompasses the majority of a firm's sales. To calculate the trade areas of big box retailers, 13 categories of retail establishments were grouped into two main types of urban retail centers: neighborhood and community centers. The neighborhood center, offering the sales of convenience goods and personal services, has a typical Gross Leasable Area (GLA) of about 50,000 square feet and normally serves a

Figure 1 _ Boundary of East Austin and location of big box retail establishments in Austin



Source: adapted from Park 2008, 38.

Figure 2 _ Network-based accessibility analysis

A. Euclidean- vs. network-based service area analysis

B. Finding the closest retail establishment from each household

Source: Park 2008, 31; 32.

trade area of 3,000 to 40,000 people within a 1.5 mile drive (Beyard and O'Mara 1999).

The community center provides a wider range of stores than the neighborhood center. It typically has a GLA of about 150,000 square feet and typically serves a population of 40,000 to 150,000 who will often travel more than 3 to 5 miles to reach the center (Beyard and O'Mara 1999). This research presumes the neighborhood and community centers have 1.5 miles and 4 miles of trade area, respectively.

A database containing store locations in Austin are obtained from the official websites of the selected national chain companies. All of the data is integrated into GIS through geocoding process. Upon completion of the geocoding, a total of 246 big box retail establishments are shown within the city boundary. The big box retailers located nearby or bordering the city are also accounted for, regardless of their location being on the boundary. The

Table 2 _ Types of urban retail centers

Type of Center	Typical Gross Leasable Area	Gross Leasable Area Range (sq. ft)	Minimum Site Area (acres)	Primary Trade Area Radius (miles)	Primary Trade Area Drive Time (minutes)	Minimum Population Support Required
Convenience	20,000	15,000 ~30,000	–	–	–	–
Neighborhood	50,000	30,000 ~100,000	3~10	1.5	5~10	3,000 ~40,000
Community	150,000	100,000 ~450,000	10~30	3-5	10~20	40,000 ~150,000
Regional	450,000	300,000 ~900,000	10~60	8	20	150,000+
Super Regional	900,000	500,000 ~2,000,000	15~100+	12	30	300,000+

Source: Beyard and O'Mara 1999, 8; 46.

intent is to avoid 'border effects' in the accessibility calculation.

To map the location of residential households in East Austin and other communities, three datasets are combined into geo-dataset. The first dataset, provided by Travis Central Appraisal District Office, contains property location, land, and property boundaries. The second dataset is the land use and zoning geospatial database from the City of Austin. These geospatial datasets are combined with parcel information to identify the specific land-use type for each parcel. Finally, the census block and block groups GIS data for the Austin area are joined with the 2000 Census SF1 and SF3 datasets, containing population, ethnicity, gender, median household income, vehicle ownership, and number of children.

The term 'spatial equity' involves comparing the locational distribution of facilities or services to the locational distribution of different socio-economic groups (Talen 1998). The traditional measure in accessibility studies is the 'Container Approach,' which finds the number of facilities or services contained in a spatial area.[4] However, considering people travel by road, this method does not reflect the actual accessibility to the site. Therefore, for measuring accessibility, this research employs the minimum distance method, with the shortest network distance between each household and big box retailers.

Using GIS-based network analysis, two types of analyses were conducted: trade areas (or service area) of big box retailer and average distance between big box retailer and household. The trade area is a region that encompasses all accessible streets, that is, streets that lie within a specified impedance. As shown in the left map (A) in Figure 2, trade areas are used to identify how much land area and how many residential properties are within 1.5 miles and 4 miles distance from neighborhood- and community-type big box retailers, respectively.

GIS-based network analysis also allows the measurement of the distance between a household in each neighborhood and the closest one of the big box retail stores (see the right map (B) in Figure 2). Once the shortest path between two points along the road networks by car transportation was calculated, it was possible to calculate the average distance in order to compare accessibility.

Ⅴ. Results: Accessibilities to big box retailers

1. Differences in East-Austin versus whole city area of Austin

The results of GIS-based accessibility analyses are summarized in Table 3 and Table 4. Compared to the City of Austin as a whole, the 1.5 mile service area of big box retailers in the neighborhood-type contains a greater proportion of the East Austin area (see the first eight rows in Table 3). The trade area of drug stores covers 54.1

4) The four measures most commonly used in accessibility studies are gravity potential, average distance between each origin and all facilities, minimum distance (the distance from an origin to the nearest facility) and the number of facilities or services contained within a given unit (Talen and Anselin 1998).

Table 3 _ Total land area and the number of properties within trade area

[unit: acres, number of properties (%)]

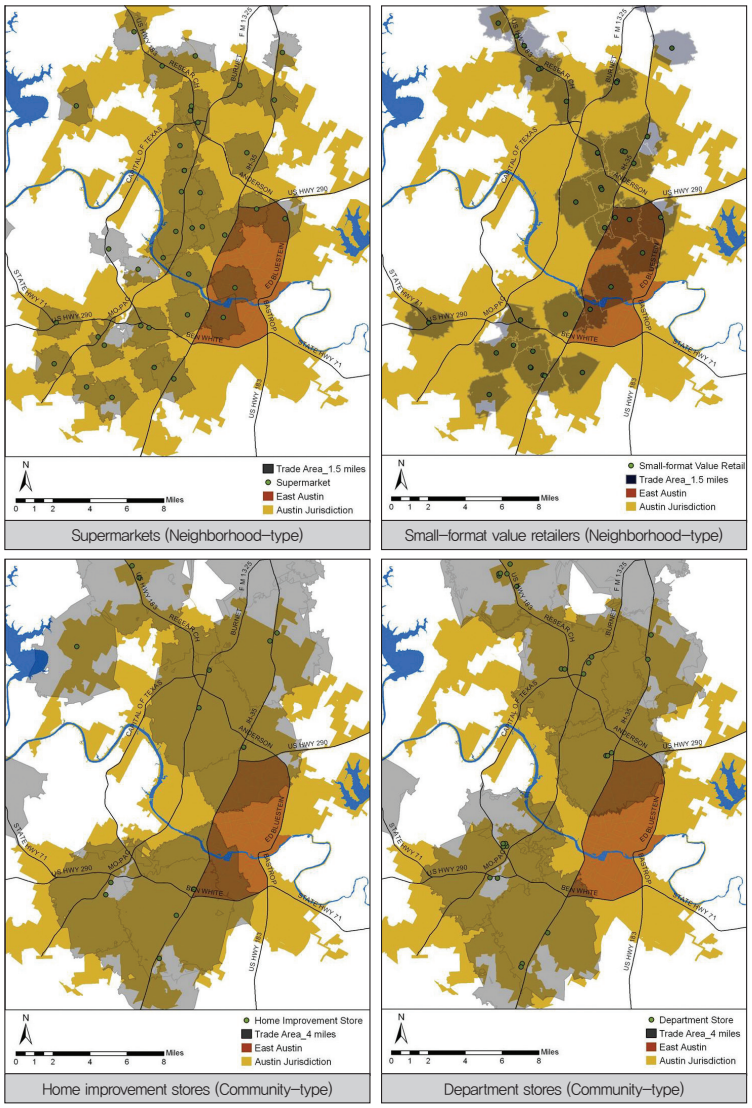
Category			Land Area (Proportion)	The number of Residential Properties (Proportion)
Neighborhood -type	Automotive Parts & Accessories Store	East Austin	6,593 (40.3%)	14,070 (44.3%)
		Austin	23,509 (14.8%)	55,797 (27.4%)
	Drug Store	East Austin	8,844 (54.1%)	20,767 (65.3%)
		Austin	65,382 (41.2%)	134,794 (66.1%)
	Supermarket	East Austin	7,689 (47.0%)	17,311 (54.4%)
		Austin	57,289 (36.1%)	110,287 (54.1%)
	Small-format Value Retailer	East Austin	10,025 (61.3%)	21,748 (68.4%)
		Austin	48,014 (30.2%)	106,134 (52.0%)
Community -type	Furniture and Home Furnishings Store	East Austin	0 (0.0%)	0 (0.0%)
		Austin	44,025 (22.7%)	63,222 (31.0%)
	Electronics & Appliance Store	East Austin	0 (0.0%)	0 (0.0%)
		Austin	59,644 (37.6%)	88,723 (43.5%)
	Home Improvement Retailer	East Austin	8,948 (54.7%)	17,538 (55.2%)
		Austin	97,905 (61.6%)	154,880 (75.9%)
	Clothing & Clothing Accessories Store	East Austin	7,805 (47.7%)	18,949 (59.6%)
		Austin	89,077 (56.1%)	151,878 (74.5%)
	Sporting Goods, Hobby, Book & Music	East Austin	4,044 (24.7%)	9,761 (30.7%)
		Austin	83,797 (52.8%)	142,761 (70.0%)
	Department Store	East Austin	5,325 (32.6%)	12,172 (38.3%)
		Austin	90,788 (57.2%)	149,721 (73.4%)
	Large-format Value Retailer	East Austin	11,812 (72.3%)	26,207 (82.5%)
		Austin	112,421 (70.8%)	176,296 (86.4%)
	Office Supply Store	East Austin	11,811 (72.2%)	26,397 (83.1%)
		Austin	93,709 (59.0%)	161,523 (79.2%)
	Pet & Pet Appliance Store	East Austin	33 (0.2%)	7 (0.02%)
		Austin	64,978 (40.9%)	106,387 (52.2%)

Source: adapted from Park 2008, 40; 45.

percent of East Austin, while only 41.2 percent of the Austin area falls within it. Small-format value retailers also extend over a greater proportion of the East Austin area (61.3 percent), although they cover a relatively small part of Austin areas, as a whole (30.2 percent). In terms of the number of properties within the trade area, the result indicates that a great proportion of the population in East Austin experiences greater access to these retail categories. Not surprisingly, therefore, it can be anticipated that residents residing in East Austin travel less distance to access these big box retail establishments.

Table 4 also indicates East Austin has better accessibility to the neighborhood-type big box retailer. Compared to the average in the whole city, populations in East Austin travel 1.06 miles less to access an automotive parts and accessories

Figure 3 _ Trade areas of big box retailers (selected categories)



Source: adapted from Park 2008, 42; 46-47.

store. Populations in Austin are 1.48 mile away from a drug store, but populations in East Austin travel 1.28 miles to access one. East Austin also has greater access to supermarkets relative to the average in Austin (1.52 and 1.64 miles, respectively). Additionally, small-format value retail stores are relatively closer to properties in East Austin than in Austin (1.25 and 1.90 miles, respectively).

Although residents in East Austin have greater accessibility to neighborhood-type retailers, they have less accessibility to community-type retailers. The bottom two maps in Figure 3 indicates 4 mile trade areas of the selected two categories community-type big box retailers: home improvement and department store. At a glance, individuals in East Austin are at a disadvantage when they buy a product in these retailers because there are fewer and smaller retail establishments geographically accessible to them.

Compared to the City of Austin as a whole, the 4 miles trade area for community-type big box retailers overlays small parts of the East Austin area (see Table 3). Although the trade areas of home improvement retail, large-format value retail, and office supply stores cover more than half of the East Austin area (54.7%, 72.3% and 72.2%, respectively), sporting goods, hobby, book, and music, and department stores provide their services to a small proportion of the area (23.7%, 32.6%). Surprisingly, there are few or no populations of East Austin who live within a 4 mile distance from three categories of retailers – furniture and home furnishings, electronics and appliance, and pet & pet appliance stores.

Table 4 _ Average distance between household and big box retail establishment

(unit: mile)

Category		Average Distance (mile)		Difference
		Austin* (A)	East Austin** (B)	A-B(t-value)
Neighborhood -type	Automotive Parts & Accessories Store	2.71	1.65	1.06(-255.4***)
	Drug Store	1.48	1.28	0.20(-58.5***)
	Supermarket	1.64	1.52	0.12(-31.5***)
	Small-format Value Retailer	1.90	1.25	0.65(-167.9***)
Community -type	Furniture and Home Furnishings Store	5.49	9.44	-3.95(503.0***)
	Electronics & Appliance Store	4.92	8.90	-3.98(567.6***)
	Home Improvement Retailer	3.26	3.76	-0.50(69.9***)
	Clothing & Clothing Accessories Store	3.21	3.85	-0.64(59.7***)
	Sporting Goods, Hobby, Book & Music	3.48	4.66	-1.18(157.0***)
	Department Store	3.35	4.67	-1.32(140.9***)
	Large-format Value Retailer	2.77	3.08	-0.31(44.6***)
	Office Supply Store	3.04	2.96	0.08(-11.1***)
	Pet & Pet Appliance Store	4.03	7.49	-3.46(369.4***)

Note: * N=203,992, ** N=31,782, *** $p<0.01$.
Source: adapted from Park 2008, 43; 49.

In addition, Table 4 indicates that East Austin has less accessibility to those categories of big box retailers, compared to the average distance to them in the City of Austin. Populations in East Austin need to drive 0.31~1.18 miles more to access home improvement, clothing and clothing accessories, sporting goods, hobby, book, and music, department stores, and large-format value retail stores, in comparison to the city average. In addition, residents of East Austin have the least amount of access to furniture and home furnishings stores, electronics and appliance stores, and pet and pet appliance stores. Those retailers are 7.49~9.44 miles away from households in East Austin.

Although East Austin has better accessibility to neighborhood-type big box retailers, populations in East Austin travel more miles to access community-type retailers. As shown in Table 1, a large number of people in East Austin are not able to drive their own vehicle, compared to people of the city. This means that residents in those areas of East Austin have not only fewer retail services but also less retail access due to restricted transportation options. The persons without access to a vehicle may experience difficulties carrying their goods home from a big box retailer because door to door transportation such as taxis is relatively expensive and mass transit system is inconvenient due to its long waits, multiple transfers, or long walks to bus stops (Gottlieb, Fisher, Dohan and O'Connor et al. 1996). Moreover, the less accessible area in East Austin has a large proportion of people with disabilities and single female households with young children. Those persons would not only need to travel a long distance to get to a big box retail establishment, but would also struggle to get home while carrying several bags of goods.

Table 5 _ Comparisons of the new average travel distances with the previous for East Austin

(unit: mile)

Category	Previous (St. Dev.)	New (St. Dev.)
Furniture and Home Furnishings Store	9.44 (1.40)	3.64 (1.40)
Electronics & Appliance Store	8.90 (1.25)	3.73 (1.39)
Home Improvement Retailer	3.76 (1.28)	2.88 (1.10)
Clothing & Clothing Accessories Store	3.85 (1.91)	3.22 (1.65)
Department Store	4.67 (1.67)	3.37 (1.31)
Pet & Pet Appliance Store	7.49 (1.67)	3.62 (1.40)

Source: adapted from Park 2008, 55.

2. Increased access to retail by a denser development

Based on the case of the Mueller development project, this research examines how a denser development with mixed-use and mixed-income strategies can improve retail access for minority and low-income populations. The redevelopment of the old Robert Mueller airport is a new mixed-use and mixed-income model in Central East Austin (see the location in Figure 1). When Austin's airport moved to its current location at the old Bergstrom Air Force base, the Robert Mueller airport became ripe for developing: 711 acres of land, just east of Interstate 35. The City of Austin has created a master plan that includes a variety of housing styles, private businesses, and retail stores. The area, now referred to as the Mueller development, is designed to be a transit-oriented and pedestrian-friendly model of new urbanism and sustainability, with park space and an emphasis on green building.

The Mueller development is different from what Austin has typically seen before. Affordability is a key element in the ambition and vision of the development. The Mueller master plan was designed to assure that more than 1,150 of the new homes (25 percent of the total) at Mueller remain within reach of moderate-income families. The homes, both for sale and for rent, are set aside for families with lower than Austin's median income. Affordable for-sale homes are reserved for families with incomes 80 percent less than that of the city's median family income (MFI). And, affordable for-rent homes are available for families with income at or below 60 percent of the MFI.

Denser development resulting from new urban residential infill projects is another key element in the Mueller development. The development includes denser neighborhoods that will mix 4,600 single-family homes ("yard houses"), row houses, mixed-use "shop houses", multi-unit "Mueller Houses" and mixed-use apartment houses that would be carefully configured to encourage diverse and inter-generational populations.

It should be noted that the denser development might be an important factor for many retail developers to shift location strategy from suburb to inner city. The denser urban neighborhoods might support more retail than is usually supposed. Despite less income per household, aggregate income in denser urban neighborhoods may be much higher than expected. High aggregate income can translate into a substantial and more concentrated buying power (Alderslade 2005). Therefore, retailers, especially national chain big box retailers, are recognizing

that the greater population density (particularly in central cities) can compensate for lower household incomes as well as constitute sufficient market or consumer purchasing power (Fitzgerald and Leigh 2002).

With local retail demand in a high density environment and a location advantage, at the heart of one of the nation's fastest growing cities, many of the major national retailers and locally owned independent businesses are moving in to the Mueller project area with the approximately 650,000 square feet of retail space. The national retailers include some categories of big box retailers: Bed, Bath & Beyond (furniture and home furnishings), Home Depot (home improvement retailer), Old Navy (clothing and clothing accessories), Marshalls (department store), and PetSmart (pet and pet appliance store).

After adding the locations of these new big box retailers on the GIS-based network analysis map, this research evaluated whether the Mueller development offers a way to improve retail access for low income families, in particular East Austin households. Table 5 shows the result of the measurement of accessibility for East Austin residents to access big box retailers, and the comparisons of the previous travel distances with new average travel distances. On the whole, East Austin has better accessibility to all six categories of big box retailers. For example, a pet and pet appliance store is now located within a distance of 3.62 miles from East Austin households, while previously a drive 7.49 miles was required to access the closest store. Residents in East Austin now have 2.6 times greater accessibility to a furniture and home furnishings store.

VI. Conclusion

Historically, inner city retail gap has been caused by disinvestment and neglect. Residents of low-income inner city neighborhoods have been unable to purchase basic goods and services in their own neighborhoods and have instead spent their dollars in suburban communities. As this research examined, there are fewer and smaller national chain big box retailers in East Austin which has predominately minority and low-income populations although it consists of a high proportion of the total population of the city. East Austin has less access to certain category of big box retail. Although residents in East Austin have greater accessibility to neighborhood-type retailers, they have less accessibility to community-type big box retailers. Socio-economic characteristics of East Austin neighborhoods include a high percentage of individuals living below the poverty line, high disability rates, low to no vehicle ownership, and high percentages of female headed households. Consequently, the persons in those neighborhoods of lesser accessibility are potentially hurt more by the location of big box retail establishments.

Based on the case of the Mueller development project, however, this research found that a denser urban neighborhood with mixed-use and mixed-income strategies might help fill retail gaps and significantly improve retail access for minority and low-income populations. A denser model might be more attractive to retail investors. Despite the conventional perception that inner city markets typically experience lower sales and profits, some groups have argued that there is a lot of hidden market potential in the inner-city. For example, Social Compact

– a Washington D.C. area nonprofit organization – assumes that a significant reason for inner-city disinvestment is the economic market failure to provide good market information (Alderslade 2005). They utilize an innovative research method called the Neighborhood Market DrillDown to measure the hidden economies and true business potential that conventional market analysis may not find. Putting this nontraditional market analysis technique to use, they have found that a denser, low-income neighborhood in the inner-city has higher retail demand because combined income is much higher than expected, despite lower than average income per capita (Alderslade 2005). This finding is a powerful tool to attract much needed retail variety and help fill retail gaps in lower income urban communities because high aggregate income signals more concentrated buying power.

Therefore, it should be addressed how city planners might better fill the retail gaps in low-income communities. City planners need to work hard to overcome the negative perceptions of inner city communities. A nontraditional market analysis allows that the inner city communities begin to look more attractive from the perspective of retail investors. In addition, it is important to remember for city planners that a mixed-use and mixed-income model like the Mueller development might help improve retail access for low-income people. The mixed use development typically includes denser neighborhoods actually having a lot of hidden market potential. A lot of retail demand in urban denser neighborhoods is strong enough to attract retail investments. Therefore, the model is a desirable way to fill retail gaps in the previously underserved neighborhoods.

City planners may use economic development incentives for big-box retailers to encourage the redevelopment of inner-ring suburbs and low-income inner-city neighborhoods. These incentives include land acquisition or assembly, sales tax rebate, development fee waiver, tax increment financing, property tax abatement, job creation tax credits (Evans-Cowley 2006). However, the incentives can be offered only if the cost-benefit is justified.

In addition, some European countries take an anti-sprawl approach to control the size and location of new retail development. For example, Land Use Ordinance (BauNVO) in Germany restrict large-scale retail stores larger than 800m^2 to inner cities and designated areas where their impact on nearby facilities, traffic, population, and landscape could be minimized (Gerhard and Hahn 2005; TLG Immobilien GmbH 2014). The 'town centers first' policy in the United Kingdom redirects retail developments in outskirts of urban areas and focuses attention back into central urban areas by adopting the 'Sequential Test',[5] which was introduced in Planning Policy Guide 6 and remains key tod judging a proposal of retail development (Findlay and Sparks 2013; Sadun 2014). For the Sequential Test, retail developers have to show the proof that no other central location was suitable for the new retail shop. These anti-sprawl approaches under land use planning and building regulations have great influence on the locations of new retail developments.

The dataset used in this research is too old to represent current conditions of accessibility to retail. However,

5) Initially, the Sequential Test was combined with the 'Need Test', the proof that the new development is needed to meet local demand conditions. But the need test was dropped in the Planning Policy Statement 4 newly adopted in 2009 (Findlay and Sparks 2013).

the techniques in the research is methodologically replicable and extendable, and thus it can provide a decision-making tool for new proposed retail developments. Using an updated dataset, a further refined accessibility measurement – considering transportation modes, travel time, types of goods and services, and so on – is required for future research to provide more realistic assessment for retail access.

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요약

주제어: 대형 할인마트, 공간적 불공평성, 접근성, 네트워크 분석, 저소득층

본 논문은 미국 텍사스 오스틴 시를 사례로 개발에 소요되는 부지면적이 압도적이어서 소위 Big Box라고 불리는 대형 할인마트의 입지가 도시의 취약계층 및 저소득층 주민들의 접근성에는 어떠한 영향을 미치는지를 분석하고자 하였다. 연구 대상은 취약계층과 저소득층이 주로 거주하고 도시 중심부 가까이에 위치하나 상대적으로 저개발되었으며 쇠락한 지역인 동부 오스틴(East Austin)을 선정하였다. 그리고 GIS에 기반한 네트워크 분석을 통해 대형 할인마트 유형별 상권(trade area) 분석과 더불어 주거지에서 대형 할인마트까지의 평균거리를 오스틴시 전체와 비교 · 분석하였다.

분석 결과, 동부 오스틴 지역의 주민들에게 약국, 슈퍼마켓, 소형 할인상점(small-format value retailer) 등의 근린형 상점(neighborhood-type retail)은 비교적 좋은 접근성을 가지고 있었다. 하지만 상대적으로 규모가 큰 백화점, 대형 할인상점(large-format value retailer), 대형 건축자재 및 인테리어 도구 판매점(home improvement retailer) 등의 커뮤니티형 상점(community-type retail)을 찾아가기 위해서 주민들은 보다 먼 거리를 통행해야 함을 밝혔다. 동부 오스틴 지역은 저소득층, 장애인, 그리고 여성가장의 비율이 높고, 자동차 보급률은 매우 낮은 지역으로 대형 할인마트 위주의 상업시설 개발은 이들의 접근성에 부정적 영향을 미치고 있었다. 반면, 복합용도(mixed-use) 및 혼합소득(mixed-income) 방식으로 개발된 곳은 접근성이 높아 도심의 취약계층 및 저소득층 주민들의 상업시설 이용의 형평성을 재고하기 위한 정책적 · 계획적 수단으로써의 활용 가능성이 있음을 확인하였다.