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Transformation of Urban Form and the Effects on Travel Behavior in Iran
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Abstract

During the past decades, complex transformation of Iranian cities has occurred in physical and socio-economic aspects. Some of the less-studied outcomes of these transformations are the urban travel impacts. It is useful for our transport research and practice to know more about the influences of the changes in land use and household characteristics on the specifications of urban trips. This study applies a typology of different urban forms in Iranian cities: traditional, in-between, modern, and sprawled. In a case study in west of Tehran, the prominent role of socio-economics and human perceptions of neighborhood facilities are shown. As concluding remarks of this study, neighborhood-level design concepts for enhancing non-motorized travels based on centralized Iranian neighborhood patterns are suggested. Finally, a number of topics for further investigations are presented in order to complete/extend the results.

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1. Introduction

Although the Land Use/Transportation Interactions (LUTI) are basically accepted as an international research theme, it should be noted that this topic is largely affected by the cultures and life styles in different regions of the world. Mobility culture is a part of the culture of society, which has roots in social and historic ideologies. Thus, it is not surprising that public transit use culture in Jakarta, Indonesia varies from that of San Francisco. In addition, the way the built environment affects the transportation is dependent to the mobility culture. For instance, there are differences in the relationship between the density and the urban travels in Europe and the United States. This relationship is stronger in Europe (Tae-Hyoung, 2012). The scientific literature of this topic largely comes from the Anglo-Saxon countries. This literature is older and numerous, while the studies of other countries, especially the developing countries have been published in recent years and cover fewer methodological approaches. Local empirical research is needed for improvement and diversification of this subject.

This paper is based on these regional differences, and attempts to highlight some of the recent studies on Iranian cities. One aspect of urbanism that is highly valued in this manuscript is urban form, or to be more exact: neighborhood-level land use. The other spectrum of causes affecting mobility decisions in Iranian cities which are focused on in this study is the socio-economics of neighborhoods and cities. Recent studies on Iran and other developing countries show strong effects of socio-economics on transport choices.

The above is discussed on neighborhoods in Region 5 of Tehran as a case study representing urban textures located in large cities of the Middle East and North Africa Region (MENA). The paper starts with a brief explanation of the urban form and transportation interactions in international and Iranian contexts. Then, the transformations in the urban fabric of Iranian cities are discussed and the historical transformations within the Iranian cities and neighborhoods during the past century are described. A summary of the recent findings of the author is presented in form of a case study on two neighborhoods in Region 5 of Tehran. Theoretical conclusions and suggested future research close the paper.
2. The Urban Form-Transportation Interactions

Although considering the reciprocal effects of urban form and transportation dates back to the first half of the twentieth century, the output volume of such studies has dramatically grown during the past three decades. In order to review the related literature, the previous studies are divided into two geographical groups: North America and the rest of the world. The LUTI studies have been an all-American subject, but recently theoretical and empirical research have been carried out in other parts of the world. During the past two decades, western European and Australian studies have grown rapidly with a delay after North American ones. Since less than a decade, the scholars of developing and emerging countries have published the results of their observations and tried to connect what they found in their cities to the international state of the art. To give better understanding of the geographical distribution of the studies, they are reviewed in separate sections.

This paper refers to studies that explain the effect of land use on transportation, in particular urban travel behavior, by (1) collecting travel behavior data about travel habits, behaviors, and choices, and (2) measuring urban form by special quantification methods.

2.1. North American Studies

A large body of the LUTI investigations comes from North America. The North American studies are older and by far more in number. Three main sub-topics of urban form have been targeted in many North American studies: density, design, and land use. The following is a review of the studies that founded a basis for today’s international studies, using these three thematic categories.

2.1.1. Density

Density is considered as the most important urban form factor, whose impacts on transportation have been examined. In this paper, density includes construction density, population density, and employment density, which also can bear the notion of compactness. Density is a concept that can be measured and explained quantitatively, while compactness is a qualitative concept that is related to the form of the urban textures. Nevertheless, since both are in connection with the volume of constructions, activities, and population, both are considered in one single section. The studies on density in the scale of city and neighborhood are discussed here together.

Studying the effects of density on transportation, particularly urban travel, dates back to mid-twentieth century. One of the oldest studies of this type was performed by Levinson and Wynn (1963), who showed that increase in neighborhood density and proximity to Central Business Districts (CBDs) would lead to decrease in average household Vehicle Miles Traveled (VMT) or Vehicle Kilometers Traveled (VKT). One of the other primary studies was done by Pushkarev and Zupan (1977) on the density impacts in the scale of the city. They considered population density and distance to Central Business District (CBD) as important factors in defining the location of the rail transit...
systems. They recommended a necessary minimum amount of density of at least nine residential units per acre (0.4 hectare) within a fifteen-mile radius from downtown to make transit headway of five minutes feasible. John Holtzclaw did a continuous investigation on the impacts of density on car ownership, and car travel in the 1990s and the early 2000s. In 1990, Holtzclaw compared the annual driving mileage of the residents of San Francisco and a suburb called Danville and found that the San Franciscans drove only one-third. Holtzclaw continued his observations on density (1994) in 28 Californian neighborhoods and found that when densities doubled, the number of automobiles and VMT decreased by 25 percent. Both values fell by 8 percent when the transit services doubled. In each case, the household income was controlled. In 2002, he and his colleagues concluded similar results.

As another type of density, employment density seems to have considerable effects, especially on travel mode choices. Cervero (1994) noted the importance of large concentrations of employment opportunities in defining the mode choice of the inhabitants of the transit-based areas in San Francisco.

Density has become a basis for the phenomena of compact city, which has been introduced as a solution to avoid urban sprawl. Although the compact city notion has been a source of debate, it has still retained its importance as a sustainable urban and transportation planning topic. In the North American context there is evidence that compact growth strategies are able to initiate travel and emissions changes compared to fairly urbanized urban areas (Niemeier et al., 2011).

Some of the studies have found little relation between density and travel. An example is a research made by Schimek (1996). According to him, a 10 percent increase in density resulted in only 0.7 percent decrease in household automobile travel. A 10 percent increase in household income led to 3 percent increase in car travels. This shows how the socio-economic values may function more effectively than land use measures in decreasing car use. The socio-economic factors that may be effective on the number of car travels can be age, gender, household size, education, employment, household income, and the like.

On the other hand, Schimek’s research shows that density has just a little effect. The effectiveness of density seems to be higher in the neighborhood scale (Cervero, Kockelman, 1997; Greenwald, Boarnet, 2001).

As a conclusion of the international research on the role of density in travel behavior, in 2006 Newman and Kenworthy estimated that 35 jobs and/or persons per hectare can be a threshold for obtaining sustainable transportation. This study suggests a maximum value for employment density in contrast to the minimum densities that were suggested before to encourage walking, biking, and transit use. According to them, in densities more than this, there would be a decrease in slow mode and transit travels.
In a general view, high-density urban patterns have been addressed in different studies as an effective factor for decreasing greenhouse gasses (GHG), traffic congestion, environmental pollutions, and energy depletion (Dunphy and Fisher, 1996; Newman, Kenworthy, 2006; Ewing et al., 2008). Despite discussions about the circumstances of the impacts, the existence and presence of these impacts is accepted.

2.1.2. Design

Cervero (1993, 220) gives more importance to macro-factors like travel costs and density rather than micro-factors like design. However, the role of design has been emphasized in a number of other studies. It seems that design can be influential especially in mode choice. Parsons Brinckerhoff Quade and Douglas (1993) did a study about pedestrian friendliness in Portland, Oregon. The project called Land Use Transportation Air Quality (LUTRAQ) measured ease of street crossing, sidewalk continuity, local street characteristics, and topography in different neighborhoods and found out that neighborhoods with better pedestrian environments generate more transit trips. Nevertheless, pedestrian-friendliness was considered to have little correlation with neighborhood VMT. Kitamura et al. (1994) examined different factors like mixed uses and density, accessibility, neighborhood quality, and pedestrian/bike facilities in 5 communities of San Francisco Bay Area. In general, they observed 16300 person/travels of all purposes and used 0-1 dummy variables for all descriptors. They found neighborhood characteristics absolutely important in defining the modal split.

A number of the studies have focused on the impacts of the connected street networks on encouraging people not only to have more mobility, but also to use more sustainable modes of transport. Such research has been classified as a part of design measures here. Using well connected street networks to promote biking, pedestrian and transit trips was reintroduced by the theorists of Neo-Traditional Development (NTD) like Andres Duany, Elizabeth Plater-Zyberk (1991, 1992), Katz (1994), and Peter Calthorpe (1993). The works of Kulash, Anglin and Marks (1990) and McNally and Ryan (1993) support the NTD proposals. They showed how connected networks reduce VMT and average travel speeds. Other studies done by Handy (1996) gave some more explanation on how the neighborhood design affects urban travels.

Smaller neighborhood attributes have also been examined. Block size and continuity of sidewalks have been introduced as important neighborhood measures that can reduce the number of car trips and VMT (Ryan, McNally, 1995; Crane, 1996; Plaut, Boarnet, 2003). Cervero (2002) noted that neighborhoods with developed sidewalks in Montgomery County, Maryland can affect mode choice and draw people to walk or use public transportation services. Nevertheless, Rodriguez and Joo (2004) find the impacts of these attributes on enhancing slow modes in areas near University of North Carolina in Chapel Hill weak.
The general influences of the built environment on walking have been examined by Cao et al. (2005). Handy et al. (2005) investigated different neighborhood attributes such as accessibility, physical activity options, safety, socializing, outdoor spaciousness, and attractiveness, and checked their relation with travel behavior. From the above, accessibility was proved to have the most influence on driving. In more accessible neighborhoods inhabitants drive less. In other words, when all the other factors are equal, increase in accessibility may lead to decrease in driving. It is especially important to note the impacts of neighborhood retail, grocery stores, shops, etc. on encouraging people to walk or bike. Cervero (1996) tested this hypothesis by use of walking distances. He found that having retail and shops in 300 meter’s distance of the residential units encourage people to walk, bike or use public transit. This finding was a result of examining the transportation data of 44 largest U.S. cities.

There is also evidence that shows street connectivity around transit stations is associated with walking when controlling for land use mix, personal attributes, transit service characteristics, and population density (Özbil and Peponis, 2012).

### 2.1.3. Land Use

Density and design can be parts of land use, but these two important concepts are considered separately here. All other notions related to land use are studied in this section.

Fehrs and Peers Associates (1992) suggest that the walking and transit travels of the traditional neighborhoods of San Francisco Bay Area were more than that of the conventional suburbs of the same area. The work has been criticized because of not controlling for the socio-economic measures and the levels of the transit systems. Handy (1993) did a comparative study on traditional neighborhoods and the auto-oriented neighborhoods of San Francisco Bay Area and concluded that the inhabitants of the traditional area did two to four walk/bike travels to the neighborhood stores more than people living in automobile-oriented areas, who travel by car to the large shopping malls. However there were no differences between the car travels to the strip retail stores in the two types of the neighborhoods. Frank (1994) found significantly high on-foot travels to work in mixed-use areas, while there was no such a conclusion for the shopping trips. In the same year, six neighborhoods in Palm Beach, Florida were observed by Ewing et al. (1994). They indicated that the per capita VHT in the sprawling neighborhoods were two-thirds more than in the traditional neighborhoods. Cervero and Radisch (1995) investigated combinations of mixing of land uses, pedestrian-oriented environments, and compact neighborhoods and conventional suburbs. They found significant differences in mode choices. The residents of the compact mixed-use neighborhood made 28 percent of the non-work trips under one mile by foot, and 66 percent by car, while only 6 percent of the trips were made by foot in the conventional suburb and 81 percent were made by car. Both communities were located in San Francisco Bay Area and factors like
household income, vehicle ownership, regional location, and levels of transit and freeway services were controlled.

The above findings lead to a theory of existence of lower car ownership rates in compact, mixed-use neighborhoods. Hare (1993) did an observation and found low car ownership rates in the compact, mixed-use neighborhoods of Montgomery County, Maryland.

There are also observations that give the impression that the impact of land use on travels is small. For example, Crane and Crepeau (1998) concluded that land use of San Diego, California had little effects on travels by considering GIS data. The relationship between urban form and travel has also been questioned by some scholars like Ewing et al. (1996) and Stead (2001).

2.2. Studies on Other Countries

A number of the studies on countries other than the Anglo-American ones target a large-scale view on the subject. Newman and Kenworthy (1989) note how the density of the cities increase the fuel use in different parts of the world and Cox (2008) consider the role of density and land use in the megacities of the developing world. This study is also done in the scale of metropolitan areas.

According to Lin and Yang (2009), who have examined LUTI in Taipei, Taiwan, land use mix increases the private modal split in Taiwan and other Asian countries. That is inconsistent with the North American results. They also found a positive correlation between density and trip generation and a negative relationship with private modal split. This looks like what the North American studies show. So is the negative correlation between pedestrian-friendly design and private modal split. There are other Asian studies like Lin and Hsiao (2006) that confirm the effect of mixed land use on reduction of trip generation.

Senbil and colleagues (2006) examined the socio-economic, land use, and travel characteristics in Jabotabek metropolitan area in Java Island of Indonesia by means of person-trip data set covering 433125 individuals and 158631 households. They concluded that the socio-economic and demographic characteristics of the households and individuals influence on the medium-term mobility decisions like vehicle ownership and commute mode choice. On the other hand, the land use and transportation system specifications seem to have significant effects on the short-term mobility decisions and little impacts on longer-term decisions like commute travels and vehicle ownership.

Among Asian countries, maybe China has a large share of the related literature. The fast urbanization, urban transformation and motorization of China have made the urban travels long. This can be a basic reason for traffic congestion (Yang, Gakenheimer, 2007). There is evidence that in Dalian and Shenyang the urban density affects travel demand (Peng, Lu, 2007). The
difference in the activity-travel patterns caused by built environment has also been studied in ten neighborhoods of Beijing, China. The study indicates significant differences in car ownership, trip rate, time spent for out-of-home activities, and travel time. Interestingly, the effects of the urban form are more significant for men than women (Wang et al., 2011).

City-level accessibility to public facilities is a strong determinant of the urban travels to the city center of Chennai, India, where majority of jobs and facilities locate. People who live near downtown are more likely to walk or bike to their work places (Srinivasan, Rogers, 2005). This probably happens in many poor cities of the world that people who live near city centers have better access to jobs and the poor people, who live in the peripheries, have less access to downtown and its employment and facilities. This is intensified more by weak public transportation.

There are few land use-related observations in countries with geographical and/or cultural similarities with Iranian cities. An example of recent studies has been done on a 35-Kilometer roadway connecting two regions of Cairo (New Cairo and Nasr City), in which Sabry and Talaat (2015) found land use along with three other factors effective on travel speed reliability. The importance of street layout and connectivity has also captured the attention of Middle Eastern scholars. Another example is in connection with the design of neighborhoods and its contribution to walkability for children on their way to school and back home. The mobility activities of 231 students in seventeen schools in Amman, Jordan were surveyed. The results showed that existence and quality of sidewalks are correlated to specifications of trips to school and back. This study recognizes the need for developing pedestrian-friendly sidewalks in Jordan in order to promote safety of schoolchildren (Shbee, Awad, 2013).

The street structure and its impact on travels of elementary school students has also drawn attention in Turkey. A recent study on students of 12 to 14 years of age in 7 elementary schools in Istanbul revealed that street network characteristics such as street length accessible to walking, number of pedestrian crossings and traffic signals, and sidewalk width significantly influence on route choice of students (Özbil et al. 2014). Finally, Özbil (2013) examined the street connectivity and layout in three neighborhoods in Istanbul (Nişantaşı, Erenköy, and Moda), each of which have different land use and street layout characteristics, and found significant correlations with pedestrian flow. She suggests integrating more socio-demographic variables including population and employment densities to derive more extended results. More in-depth GIS-based studies are found useful by her research to establish and represent correlations between different spatial variables and walking trips. According to her, in İstanbul retail still relies on “passing trade”, “because of the finer grain not only of the street network but also the size of businesses”. This is a pattern that seems to exist in many Middle Eastern settlements, and can be theoretically conceptualized. This is also in line with international literature explaining the importance of local accessibility and presence of local destinations in enhancing walking and biking.
2.3. Studies on Iran

Like several studies that were mentioned at the beginning of the last section, Bertaud (2003) has a large-scale look to the spatial structure of Tehran and its impacts on transportation and pollutions. He considers Tehran as a dense and polycentric metropolitan area with weak public transportation. This type of urban form, according to him, is a reason for traffic congestion. Defining a polycentric form for Tehran has made the city be located well out of the density-polycentric/monocentric forms trend line. More studies seem to be needed to clarify the status of the center(s) of the metropolitan Tehran.

![Relationship Between Density and Monocentricity](image.png)

Fig. 1: Urban form and density of Tehran as effective factors in car-oriented transportation. Source: Bertaud, 2003.

The inter-city and regional-scale research is seen in a number of studies like the one conducted by Mirmoghtadaee (2012), who examined the commute travels to and from the new city of Hashtgerd in the west of Tehran-Karaj region. She uses a combination of small, medium and large geographical scales; mix of land uses and accessibility to educational and shopping facilities in small to medium scale, and proximity to regional job opportunities in medium to large scale are significant in reducing the commute travels’ distances. Mirmoghtadaee has also examined the role of socio-economic characteristics like car ownership, household specifications and income in defining the travel behavior characteristics in Hashtgerd New Town as a representative of the contemporary Iranian cities.
In another study, the association of urban travel specifications with socio-economic characteristics, urban physical attitudes, and public transport variables in 47 Traffic Area Zones (TAZ) of Shiraz (Soltani, Esmaeili-Ivaki, 2011). The observation was made based on a diary of 5% of the 1.4 million population of the city, which was made by Shiraz University. The authors conclude that the most relevant explanatory variables of intra-zonal trip generation are the socio-economic factors including education level, age groups, employment, number of households, population, immigration, and number of students. The urban form factors including land use mix and network connectivity are concluded not to be effective on intra-zonal trip generation. However, the researchers note that these factors might be influential in inter-zonal scale. The findings about the non-urban form factors are consistent with a previous study that indicated that household income and the number of full-time workers were best descriptors of trip generation. The results were based on a data collection by 4300 questionnaires in Rasht in north of Iran (Arabani, Amani, 2007).

What have more importance for this study are the micro-scale characteristics of land use and its impacts. There are three main obstacles against conducting empirical research on Iranian cities in this subject. Firstly, accessing data, especially about transportation is hard enough to block the researchers. Secondly, even if the transportation data is accessed, there is another problem that makes the studies, which focus on slow modes difficult to conduct; the pedestrian and bike travels are often not considered as urban travel in the transportation censuses. Therefore doing the mentioned type of research would be very difficult or impossible to do by using census data. Thirdly, in case the research is done generally on urban trips and there is no focus on slow modes, there is difficulty in defining the neighborhood, zone, and district boundaries in a way that it can be usable for research. The smallest areas that are determined in Iranian urban planning system is neighborhood, which is larger than what can be used in so-called microscopic land use study. As seen in this study, the neighborhood areas do not match the area of the traditional Iranian neighborhoods.

As a consequence, the number of the empirical land use/transportation studies is less than expected in comparison to other fields of urban planning and transportation. This scarcity is seen more in micro-scale studies. Few of them are available, which have been mainly published during the recent years.

Soltani et al. (2008) found positive correlation between proximity of shops to houses and the frequency of home-based non-work trips. They also noticed that the density in the zone of origin had no significant impact on travels. In another research, Soltani et al. (2012) conducted observation on the impacts of land use and socio-economic factors on travels in four districts of Shiraz Metropolitan Area: two districts in Region 1 and two in Region 4 of the city. As a result of the bivariate linear correlation, the land use diversity was shown to be related to the frequency of the intra-zonal and extra-zonal urban trips. They also noted that, like the North American studies, the local facilities
encourage people to have more travels. The travel volume generated by different households was various. The families with more adults make more external trips and those with children travel less.

The impact of urban form and non-urban form on travel habits of school students to and from school has been another subject for a number of recent Iranian studies. The evidence show high significance of socio-economic characteristics of the households in defining the travel behavior of the students. This has been concluded in two recent studies. The first study notes the differences in travel behavior of elementary school students of four neighborhoods in Mashhad based on the households’ socio-economic characteristics including income, gender, driving license. In addition, distance from home to school has been found to be important. For the affluent families quality of school is the most important factor for selection of a school for their children. The urban form factors like good spatial distribution of schools, interconnected streets and sidewalks are considered to encourage students to walk or bike to school (Soltani, Zamiri, 2011). The second research of this type targeted the influence of socio-economic factors as well as neighborhood safety and the related urban form aspects on the students’ transportation mode choice (Shokoohi et al. 2012). The observation was done in 18 school sites of Tehran metropolitan area within three different income levels. This study shows how the social environment determines transportation mode of people, particularly that of school students. The parental perception of safety that is shaped by not only the urban form, but also by the social interactions, defines how families choose the transportation mode of their children.

3. Urban Transformations and Travel Effects

An assumption that this study is built on is that the urban transformations of the last one hundred years have influenced the urban travel behavior in the Iranian cities. The built environment and socio-economics have both been the subject of these transformations. Hence, in order to explain urban travel behaviors, the change in the urban form of the Iranian cities and its motives should be investigated. This section shows how the change in urban form has shaped the mobility attitudes of Iranian urban dwellers.

Different eras in the history of Iran have brought changes to the urbanism and urban form of the nation. In the eras of Medes (674 B.C.-550 B.C.), Achamenids (550 B.C.-330 B.C.), Sasanids (224-670), Buyids (933-1062), Seljuks (1029-1194), Safavids (1501-1786), and Qajars (1794-1925) specific measures, values, and forms were organically or systematically applied to build new cities or develop existing cities. Nevertheless, the remaining of the cities of these eras shape what we know today as the traditional city. This often organic and sometimes planned city consisted of three main parts of Arg (castle), Sharestan (the city), and Savad (suburb). Arg was the governmental center of the city, in which the governor or in case of the capital city the king lived. Sharestan included of residential neighborhoods, bazaar, and public infrastructures, spaces, etc. Most of the people lived in Sharestan,
which was protected by defensive walls. The complicated structure of the routes and dead-end allies that are today seen in the historical cities are related to this part. The highly-compact textures defended the residents from warm weather, sunlight, and attacking forces. Privacy and religious thoughts and beliefs also made the urban textures more compact. Outside the walls the suburbs included agricultural lands and gardens where people worked. During the times of war, people got back to the interior of the walls to be safe from the foreign forces.

The form of the traditional city survived until the first half of the twentieth century, when the new dynasty of Pahlavi started to change the view on the cities from traditional cities to modern ones that reflected a new wave of industrialization of the society. Apart from launching factories, changing the cultural habits like clothing, etc., change in mobility habits was needed to give a new appearance to the old cities. Automobile came to Iran for the first time in 1900. Then the import of cars increased in 1920. However, it was difficult or sometimes impossible for the car drivers to move in the narrow routes of the old cities that usually had a width of between two to four meters. In addition to the new mobility needs, a new and modern urban landscape was required to indicate that the traditional way of life had come to an end and the new technological city was born. There is a large body of literature about the drivers and circumstances of modernization in 1920s to 1940s in Iran. An example is the book written in Persian by Habibi (2009), who explains the relations between modernization and its social phenomena with interference in urban fabric with the aim of renewal and regeneration.

Therefore, the governmental regeneration plans were started practically in 1932 and officially in 1934 as a result of the construction and development of streets law. Ten years later, this law was followed by "Street Development Act", which came undone because of the Second World War (Hashemi, 1991, 1-2). The problem of lack of skilled human resources was responded by recruiting European engineers. These engineers had changed the form of the traditional cities according to their background of European cities and the related needs, but little was compromised about the vernacular urbanism and lifestyles out of their work (Center for Urban Planning Studies of the Ministry of Interior, 1991, 6).

These efforts made a definite change in the urban landscape of the cities. Two main urban forms and one in-between form resulted from these interventions. The first type is the historical (traditional) city, which has roots in at least two thousand years of known urban history. These textures that still exist in many of the cities are separated from other textures by a time border which is defined by the year 1925. The second type is the new city that gives the possibility of having rapid mobility by use of new technologies, large open spaces and squares, and a modern look. These quarters were built after 1950s. There is also an in-between form that is a combination of both mentioned morphologies.
To have a precise understanding of what happened to mobility behavior as a consequence of intervening in the urban form and growth of the old cities, these different morphologies should be studied carefully. One should be aware of the reasons why the new textures oblige people to drive car, in contrast to the traditional city that used to provide residents with short distance structures. To avoid a one-sided presentation of the historic trends, the reader should as well be informed about the positive outcomes of these changes for the Iranian cities. This point is often neglected by back-looking reviews of the urban scholars, who try to give a negative impression to their audience about every sort of change in the old values.

3.1. Traditional City and Neighborhood

To illustrate the potentials of the traditional urban form for new transport needs, one should know basically how it looks like and what characteristics it has. The specifications that are here addressed are claimed to have potentials to be used in the modern city, not only in Iran but also in other countries. Some of these characteristics contain human-scaled neighborhoods, centrality, and walkability. The combination of such phenomena gives the traditional city abilities that can be applied even in the new ages. These properties can be added to the new planned quarters to promote sustainable transportation.

The first capability of the old city is being human oriented. Residential neighborhoods are the main component of the traditional city. Neighborhood units are the basic elements that build the neighborhoods. The boundaries of the neighborhoods were defined by the social relationships of the people. Tehran in the last years of the historical era when the Iranian city was stepping to the new era had a population of 210000 people, who lived in four main neighborhoods including 10 smaller neighborhood units (Bazaar, Oodlajan, Sangalaj, Dowlat, Mohammadieh, Ghanat Abad, Qajarieh, Hasan Abad, Shahr-e Now, and Arg), each of which covered between 5% and 18% of the area of the city and each had a population of between 10500 and 37800.
people (Khaksari et al. 2007, 36). The city of Shiraz consisted of 10 main neighborhoods (Soltanzadeh, 2006, 32). Yazd as an important city had 35 neighborhood units that made a city of 600.2 hectares. There units were located inside the defensive walls. Later when the city grew, the number of the units increased to 56. The units had an area from 3.6 to 42 hectares (Ebrahimpour-Masoumi, 2012). The Smaller cities had less population; Kashan as the largest city of Esfahan province after Esfahan city, had a population of 40000 people accommodated in 511 hectares in 1932. Since the neighborhood units are shaped organically by human behaviors and activities and are not planned, human body and physical specifications have dominant effects on its size and area. The human activity was determining the area of the cities and neighborhoods.

![Illustration of the NUCs in the historical core of Kashan. Source: Masoumi, 2014a.](image)

The concept of centrality is a direct result of the existence of Neighborhood Unit Centers (NUCs). Every neighborhood had a distinct center that included public infrastructures, local open spaces, and facilities for everyday activities. Such centers were located almost in the geometrical center of the unit, as seen in case of Kashan in Fig. 3. Shops, neighborhood mosques, Ab-Abnar (traditional water reservoir), Hammam (bath), Madreseh (School) were some
of these facilities. The neighborhood centers were connected to each other by the main streets. This small and central texture gave the inhabitants access to what they wanted to serve their daily needs. In addition to this type of centrality (in the neighborhood scale), there were another kind of centrality that was in the scale of the city. The bazaar and the Jame mosque (the main mosque of the larger cities) functioned as the hub of the economic and social activities of the city. People traveled to bazaar for the goods that were not found in the local shops of the neighborhoods. That might happen once per one or two weeks and not every day. The Jame mosque worked as the collector of people for city-scale social activities. Because of small size, the urban textures were possible to be used by residents. People could easily access the public infrastructures of the neighborhoods and neighborhood units by walking short distances. Small areas of each neighborhood unit used to give residents a walkable environment.

The walking distances from the furthest house of each unit to the NUC gives a good measure of mobility behavior in the traditional city. The shortest walking distance among 44 neighborhood units of the historical core of Kashan is only 180 meters and the longest is 825 meters. Ninety percent of the walking distances of this old city are less than 670 meters (Masoumi, 2014a). This “city of short distances” was repeated in every neighborhood unit, so city as a whole was walkable as well.

### 3.2. Contemporary City

The governmental efforts for changing the traditional urban landscape led the Iranian cities to a new form. This new form can be divided into two structures. The first one is seen in the textures that were developed after the World War II until the 1960s. The cars could move through these new textures easier compared to the old cities. Less dead-end allies are seen and the streets have fewer curves. The building lots and the street network are more geometric but not completely based on the grid. The streets and allies have become wider than that of the old cities. Such areas are located around or very near to the historical cores. These districts in Kashan are situated around the historical core and in Naein they are in the south of the old city. Fig. 4 indicates the urban form of this era in four cities of Iran.

After the 1960s the urban form became more geometric and the street network got a shape of complete gridiron. The streets became wider and not only boulevards but also urban highways were constructed. This process accelerated after the revolution in 1979. The result of this era was quarters that were built according to complete grid-iron networks with similar lots. The examples can be found in most of the Iranian cities, such as those seen in Fig. 5.
Fig. 4: The urban configurations after the World War II until 1960s in Kashan (upper left), Yazd (upper right), Esfahan (bottom left) and Mashhad (bottom right). Images via Google Maps.

Fig. 5: The dominant urban form and street network of the new developments during the past 4 decades in Kashan (upper left), Yazd (upper right), Esfahan (bottom left) and Mashhad (bottom right). Images via Google Maps.
A trend that was started in the 1970s and accelerated after the 1980s is urban sprawl. There is demographic and morphologic evidence from the cities of the central parts of Iran that can be defined as a type of sprawl with special characteristics, majority of which can be generalized to many cities of the MENA region (Masoumi, 2014b). A handful of Iranian scholars have recently documented the negative effects of urban sprawl on the urban and peri-urban environment, particularly in and around larger cities (Shamsaei, 2003; Roshan et al. 2009; Hosseini et al. 2010a, b; Roshan et al. 2010; Zanganeh Shahraki et al. 2012).

Although the Iranian sprawl is in some aspects different from the western counterpart, but still there are so many similarities that it can be addressed as urban sprawl and also it is possible to place it among a universal tendency of dispersed automobile-oriented urban planning (Masoumi, 2012b). The main characteristics of the sprawling areas of the Iranian cities that are similar to the western sprawl are highly automobile-oriented urban planning, decrease in population densities in the new plans, leapfrog and dispersed developments, and lack of public spaces and facilities. On the other hand, there are differences in terms of suburban development, single-use developments/zoning, disconnected street network, low accessibility of the new developments, and commercial strip development (Masoumi, 2012b). Urban sprawl is now changing the form of the peri-urban areas. The impacts include not only social problems, but also transportation and as a result quality of life.

3.3. Travel Behavior Effects

The abovementioned transformations have had influences on urban travel behavior. It is obvious that this urban change is not the only factor that has laid effect on travels. The emergence of cars, public transit, and other transportation technologies along with change in social behavior, life styles and other socio-economic measures have been important in changing the quality and quantity of the travels. However, this just focuses on the role of urban planning and design. The historic view is important because it gives keys to find out what elements have been changed in the city 60 or 70 years ago and what has been the travel effect.

As already mentioned about the traditional and contemporary city, when the new wide streets cut through the old urban textures the cars had better opportunity to move through the dense neighborhoods. The curvy short routes and dead-end allies were replaced by straight and long streets that were optimized for car use. This made the street network more connected. This has been tested using Space Syntax theory\(^1\) in a research made by the

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\(^1\) Space Syntax theory is used for spatial analysis of the urban configurations including streets networks, open spaces, interior of the buildings, etc. The analysis is done by axial maps of the spaces where people can move. The analysis is done by mathematical measurements based on nodes and lines. The main indicators are total and global depths, integration, connectivity, visibility, Relative Asymmetry (RA), Real Relative Asymmetry (RRA), intelligibility, and so on. The indicators that are used in this study are
author of this paper (Masoumi, 2012a). This study made comparisons between the "connectivity" and "integration" in the historical core of Kashan and Yazd, two cities in the center of Iran, before the car streets were built in the 1930s-1950s period and after that. As two of the main Space Syntax measures, integration and connectivity are positively associated with high mobility. The more connected the street network is, the more people are encouraged to be mobile. The basic idea is that people move towards places that are accessible and visible for them. Integration is also highly correlated with mobility. This indicator is calculated according to the depth of a line (street) in the street network from other lines and from the entrance point of the system (axial map). Here, depth equals average distance from other lines, which represent streets. If a line has less depth from other lines, it means that it is more likely that the passenger moves from that point to other destinations. In other words, people move towards destinations that are near, visible, and accessible. The results of the spatial analysis of Kashan and Yazd indicate that both measures increased in the historical cores after the streets were constructed. Another comparison in the above study on Yazd and Kashan was done about the historical cores and the new developments planned and built after 1980. The outputs of the Space Syntax analysis show that the new developments have absolutely higher connectivity and integration than the historical textures with the new automobile streets or without them. This is shown in both observed cities. The meaning is that the new street networks are better prepared for motorized urban mobility compared to the traditional city.

That is in the city scale, but when the observation comes to the neighborhood scale, interpreting Space Syntax analysis becomes problematic. The streets that were built in the historical cores have increased the connectivity and integration of some old neighborhoods and decreased that of some other ones. It is hard to conclude if mobility including all modes in neighborhood scale has improved or not. Another problem that is worth collecting more data about is the role of the urban transformations on mode choice. The above spatial observations tell us little about the effects on automobile use, pedestrian travels, or public transit use separately. In other words, it is clear that the new developments result in higher mobility opportunities including all modes like car use, public transit use, biking, walking, and the like; however, it does not give us a strong answer about the best choices for travels. We still do not know if the increase in mobility is in both car use and pedestrian travels or just automobile travels have got better conditions. That is why some studies have confirmed strong correlation of integration with pedestrian behavior in urban configurations (such as Hillier, 1987; Barros et al., 2009; Law, Zhao, 2009) and especially about pedestrian travels oriented integration and connectivity that show the possibility of higher mobility in urban spaces. The theory of Space Syntax was developed by Bill Hillier and Julienne Hanson (Hillier, Hanson, 1984; Hillier, 1999) and was completed and researched by others. A variety of software has been developed using this theory particularly in University College London.
to commercial and business destinations (Haeng et al., 2007). Nevertheless, the effects of the wide streets on the pedestrian travels in the neighborhood scale are still unclear.

The main reason that can be claimed is that with the organization of the city and neighborhood was destroyed by the rearrangement of the city in order to produce automobile streets. The neighborhoods, NUCs, and bazaars lost importance to the streets and the amenities that were located on their edges. As mentioned in previous sections, in the traditional city, it was enough for the residents to walk a small distance to the nearby NUC for daily activities like shopping and social behavior. Nonetheless, during the recent decades people hardly go to the neighborhood centers to cover their daily needs. Instead, they are encouraged to go to the main streets and probably to farther destinations for shopping or working. The street edges have become an attractive place for retail, shops and social/religious centers like mosques. This change in the daily activity pattern, along with some other factors, has pushed people to use car increasingly to access far-away destinations. Of course lack of efficient public transportation systems is one of these factors.

For collecting more sufficient information above the possibilities of Space Syntax, more empirical studies are necessary. Hence, a proper theoretical approach is needed to indicate the capabilities of neighborhoods in generating pedestrian short travels, regardless of the date of construction of the neighborhood. In accordance to the last paragraph, it is necessary to develop a research framework in a microscopic scale to show if the neighborhood centers, local facilities, and walking distances can be effective in enhancing sustainable transportation.

In the neighborhood scale, the concept of centrality can have importance in explaining how the NUCs can attract pedestrian and bicycle travels of the neighborhood and localize the travels. In a theoretical view, the local centers can be particularly effective when combined with walkable distances (for more explanations refer to Masoumi, 2014c). These notions are neglected in the new urban planning of Iran. The sprawled areas and even the denser planned districts have shortcomings in creating local centers that are accessible easily on foot. In many new districts, there are no concentrated amenities that can be named as centers. The main facilities that are available in these residential areas are the shops that are located on the edge of the streets. Therefore, people have no option for providing themselves with things that are not found in the local shops other than going to other parts of the city by car. Lack of local centers is worsened when there are signs of sprawl like dispersed and leapfrog developments. As seen in Fig. 6, there are many examples of new developments that do not enjoy concentrated local centers and contain disperse buildings.

Other aspects that can keep the non-commute travels local are attractiveness, aesthetics, and visual elements. These attractions can draw inhabitants to the NUCs to not only meet their needs, but also for social activities, entertainment, and passing time alone or with others. There is no
Iranian study about the impact of attractiveness on non-commute travels. This topic needs special studies that can show the role of urban design in not only making the trips sustainable, but also improving the social and personal wellbeing of the residents.

Fig. 6: Leapfrog developments in the periphery of the cities without neighborhood centers including local facilities and public open spaces in Esfahan (upper left), Khorram Abad (upper right), Neishabur (bottom left), and Sanandaj (bottom right). Images via Google Maps.

To describe the capabilities of the centered human-scaled neighborhoods in making the non-commute trips short and pleasant, Fig. 7 offers two schematic neighborhoods in automobile-oriented areas and in a neighborhood, which has a small center within the walking distance of all the residential units. Both are located among main or secondary streets, as many new Iranian neighborhoods are. The automobile-oriented area directs the travels to the main streets and other parts of the city because of lack of local facilities or attractiveness, while the centered neighborhood attracts some of the trips and makes them local. The result can be less traffic congestion in the main streets and the central parts of the cities.

This approach to different neighborhood forms can be completed by planning possibilities to make the centered neighborhood stronger in localization of travels. The size of the neighborhoods can be an important factor for the planners. The best measures are those that had shaped the traditional neighborhoods in the organic cities, because these places are built up according to the size and abilities of human body. Automobile or other new
technologies do not have any role in the formation of these settlements. Based on an observation, the maximum number of the buildings in a traditional neighborhood unit is about 300. Such a number of buildings are normally located in an area of less than 30 or 35 hectares. The outcome of this suggested neighborhood unit plan will be walking distances of less than 800 meters or usually 600-700 meters (Masoumi, 2014a). Moreover, to increase connectivity the block lengths can be limited to 100 meters. Also planning pedestrian and bike routes from different points in the neighborhood unit to the NUC can promote direct the travels to the center.

Fig. 7: Schematic illustration of automobile-oriented quarters and centered neighborhoods and their travel behavior: left: the pattern of the existing residential quarters with no center: people drive to other parts of the city for covering their daily needs. Right: a suggested neighborhood with a center that can draw residents with special elements and qualities like attractiveness, open spaces, retail, and local facilities. Source: Masoumi, 2012a.

Considering the above, precise evaluation of the effects of the historical urban transformations on travel behavior seems necessary for making the future practices more sustainable. In lack of sufficient transportation statistics, such evaluations should give an impression about the change in travel behavior as a result of change in urban land use. Of course other technological or social drivers may be more effective, but this should not make scholars neglect researching the land use effects.

4. Case Study

The following is a summary of a study on Region 5 of Tehran aiming to provide evidence about the connections of land use, socio-economics, and travels in large Iranian cities. The study was undertaken to answer three questions: (1) What is the role of human perceptions of neighborhood attractiveness and
facilities in encouraging them to have non-motorized urban travels? (2) Which groups of determinants are dominant in defining the non-commute travel mode choice behavior of residents? Perceptions of neighborhood amenities or socio-economics? (3) What is the most important basis for residential location choices in large Iranian cities? Transport-related issues or socio-economics?

4.1. Case-Study Area

Region 5 of Tehran has been selected as case-study area because it has typical characteristics of the new developments of the Iranian cities. Such areas have been developed during the past two or three decades. Most of them have dispersed areas in the periphery of the medium-sized or large cities.

Fig. 8 illustrates the location of Region 5 located in northwest of Tehran and almost in the center of the Tehran-Karaj Region. The bus accessibility catchment areas do not cover a large part of the region (Fig. 9). Most of the characteristics of Iranian urban sprawl like leapfrog developments, lack of public open spaces, low densities, etc. are seen in the pattern of such districts (Masoumi, 2012b). Fig. 10 illustrates the location of the two neighborhoods in region 5 of Tehran.

The survey about the role of land use on urban travels was undertaken on two neighborhoods in the south of the region; one (Keyhan) representing the central and compact neighborhoods that have a strong local center, and the other one a scattered neighborhood with no center (Bahar). The neighborhood populations were estimated to be 18000 and 9500 inhabitants respectively. The boundaries were defined based on streets in a way that a
small area about 35 hectares can be identified as a neighborhood or a neighborhood unit (Fig. 10).

Fig. 9: Accessibility to bus stops by 800-meter catchment areas in Region 5 of Tehran. Source: Tehran Municipality (left).

Fig. 10: Location of the two case-study neighborhoods: Keyhan (green) and Bahar (red) are illustrated in Region 5 of Tehran (below).

It should also be mentioned that the neighborhoods defined here are significantly smaller than those recently defined by the Municipality of Tehran, so the area that is taken as a neighborhood unit (sub-neighborhood) is a part of a super neighborhood determined by the City.
4.2. Data and Method

The survey was done in autumn 2012 by interviewing 192 persons in the two selected neighborhoods and provided primary data for answering the research questions. With precision of ±10 percent, the sample sizes were calculated to be 95.53 and 95.09, so 96 persons were interviewed in each neighborhood.

In order to answer research questions 1 and 2, Multinomial Logit Regression modeling (MNL) was taken. All the variables were developed as categorical, while transport mode choice was the dependent variable and evaluation of neighborhood retail and public space, satisfaction of neighborhood entertainment facilities, gender, holding a driving license, age, household income, and household car ownership were taken as explanatory variables.

For answering research question 3, descriptive statistical analysis was applied to the raw data derived from the data collection. In the survey people were asked about the main reason for choosing the place they live (in personal living place or rented unit). Every interviewees were allowed to give one answer. The aim was to understand the share of transportation in determining the residential location choices.

4.3. Findings

The MNL model ended up in different results in the two neighborhoods. In the centralized neighborhood (Keyhan), age, household income, and household car ownership were found to be significant determinants of mode choice, while the variables were not significant in the sprawled neighborhoods (Bahar). However, by studying each mode more useful outcomes may be derived, i.e. satisfaction of neighborhood entertainment facilities, age, and household income significantly determine walking behavior in centered neighborhoods. Household income has a strong negative correlation with walking, while it is a significant and negative predictor of other modes. Age is a very strong determinant of all modes.

Based on the findings, question 1 can be answered: in centralized and compact Iranian neighborhoods located in large cities, human perceptions and judgments about entertainment facilities can define mobility mode choice (for full description of the research design and findings see Masoumi, 2013a). Since only two variables representing perceptions were built in this study, it is possible that some other predictors can be recognize in future research.

The MNL model provides material to answer research question 2 for the centralized neighborhood: the socio-economic variables are the stronger predictor of mode choice compared to the evaluation of residents about neighborhood facilities.

Finally, only 5 to 7.5 percent of people have chosen their residential location based on mobility requirements in the two observed neighborhoods. Economic needs like the rise of housing price are the most important reasons for residential self-selection. This is in contrary with the findings about the
western countries like the U.S., U.K. and Germany (for more detailed discussions refer to Masoumi, 2013b).

5. Conclusions

The discussions presented in this paper can be conceptualized for practical works, such as development plans, neighborhood concepts, revitalization plans, etc. by providing neo-traditional norms based on the traditional form of the Iranian cities. The outcomes can be generalized to similar Middle Eastern urban settlements (Masoumi, 2014).

Based on these primary findings and suggestion, new research framework can be designed, which a part of which is explained in section 5.2.

5.1. Urban Form Strategies for Sustainable Mobility

Section 3 of this paper showed how the urban transformations of the early and mid-twentieth century resulted in automobile-oriented planning which was led by the top-down planning of the central government. This orientation caused the neighborhoods lose importance; social interactions like face-to-face talks in the social open spaces of the neighborhoods were reduced and people traveled to local centers less than before.

To give strategies for making the travels more human-oriented this paper suggests localization of travels and destinations. This can especially target non-commute travels such as trips for shopping and entertainment. The claim of this paper is that the new urban patterns of the Iranian cities encourage people to travel to far-away destinations. Thus, the number of the motorized travels increases and because of inefficient public transportation systems, people are urged to use personal cars.

A part of such process can be changed by the change in land use and promoting public transportation. The outcome will be shorter non-work travels that can be done with public transportation outside the neighborhoods and on-foot inside them. The following strategies are suggested to enhance sustainable transportation within a so-called “neighborhood-oriented planning”:

At present the smallest administrative urban units are the zones that are parts of the regions. The regions form a city. The municipality of Tehran is made up of 22 regions. The zones and regions have municipality offices and mayors. Recently smaller limitations have been defined as neighborhoods in the detailed plan of Tehran. Such areas are not the basis of planning and are just used to organize local events or giving social services. However the areas of these neighborhoods are this large that people cannot call them their living places. Traditionally a small place that people identify it as living environment is called a neighborhood. The current limitations that are called neighborhoods cover about 200 or 300 hectares which is by far larger than that of the traditional ones within the historical cores. By defining small areas
as the smallest legal units, it would be easier to plan local centers, social open spaces, and neighborhood amenities. In addition, it would be more efficient to organize local public participation plans.

Local centers like NUCs can attract short non-commute travels from the surrounding residential units. Unlike the regional or city-level centers, NUCs should be located inside the neighborhoods like within residential alleys so that people do not need to travel to the main streets by car. This would reduce traffic congestion. Larger urban centers are generally located on the edge of the main streets. Therefore using personal cars for reaching these destinations seems reasonable. The NUCs can cover the daily needs. They can contain retail and shops, libraries, culture houses, small open spaces like urban parks, and other pedestrian spaces.

Attractiveness is a notion that can draw residents to the NUCs permanently. It can be the visual objects that attract residents to the center or the neighborhood amenities that draw them to themselves. In any case, the NUC facilities should present interesting local possibilities to the people.

Such facilities are given within very short distance to most of the houses. This makes the NUC accessible for most of the neighborhood residents. As seen in previous sections, the traditional urban form of Iran gives a walking distance of about 670 meters as easy accessibility threshold. The walking distances and the small areas of the neighborhood units work together closely. The mentioned walking distance to the center necessitates location of about 300 buildings in an area of about 30 to 35 hectares.

Fig. 9: A schematic concept depicting the ideal role of neighborhood- and regional centers in promoting accessibility to public transit and walking/biking routes. Source: Author.
High-quality walkways and bike routes urge people to travel to the local centers for daily non-work activities. Lighting, social security, and safety are the factors that should be addressed in neighborhood plans.

Nonetheless all of the above will not work without linkage to an efficient public transportation network. A hierarchical network of walkways and bike tracks should connect the NUCs to each other and to the zonal center. The centers of zones and regions should be connected to the city-level transportation like metro or light rail stations.

The above is explained in more details in Masoumi, 2014a and c.

5.2. Suggested Future Research Design

In absence of efficient transportation and socio-economic data, it is necessary to collect data about disaggregate travel behavior and household socio-economic specifications, in parallel to urban form measures. The insufficiency of Iranian statistics for being used in such an observation as this study includes the following:

- The scale of transportation statistical blocks: The Iranian transportation statistics do not cover the small areas that are called neighborhood in this study. The areas of the administrative areas that are called neighborhood in Iran are quite larger. As mentioned in the last parts of this paper, the human-oriented neighborhood units in the historical cities used to have an area of less than 30 or 35 hectares. This is smaller than the statistical blocks, on which the statistical information is based.

- The scale of socio-economic statistics: The smallest areas that are covered in the census and the development plans are areas called “neighborhoods”. Nevertheless, such neighborhoods have larger areas than that of those seen in organic historical cores. Region 5 of Tehran is a good example of such difference. With 5287.3 hectares, the region is divided into 7 zones (Nahieh) and 27 neighborhoods (Mahalleh). The areas of the neighborhoods that are seen in Table are not comparable to those of the traditional ones.

As seen in Table 1, the areas of the administrative neighborhoods are too large to suite micro-scale comparative studies about travel behavior.

Modal split in transportation statistics: Another problem with the transportation statistics is that they do not consider the pedestrian or bike travels as urban travels. There are estimations about bike travels for some of the large cities like Tehran and Mashhad, but they are only general information about the transport trends and do not reflect exact attitudes of people. Therefore, it is not possible to apply these figures in neighborhood-scale studies.

Neighborhoods: For focusing deeply enough to consider the land use affects travel, it is needed to have especial look to neighborhoods. As mentioned in the previous sections neighborhoods have been changed extensively through modern history and especially in mid-twentieth century. The outcome of
studying the historical urban transformations gives us the impression that without micro-scale consideration of urban form effects, it is impossible to study the transportation influences. Because of the aforementioned reasons using the census results are not sufficient. Therefore applying small-scale surveys is suggested for the intended studies.

The main factors that should be measured are local centrality and attractiveness. The intention is to compare the travel habits of residents of neighborhoods with different centrality and attractiveness with each other. Theoretically, it is assumed that compact urban forms with a central structure will lead people to the local center for non-work destinations. It is also hypothesized that attractiveness of local centers like Neighborhood Unit Centers (NUCs) will add to this trend.

Two types of residential districts can be compared to each other. The first type is the neighborhoods that are necessarily not old or traditional but have a central structure within accessible distances. Such places have a high percentage of houses near to local facilities. The shops and retail of these neighborhoods are situated in a place near to the geometrical center of the area. Although such an imaginary neighborhood is not old and can be constructed in recent decades, but it is taken as a representative of the traditional human-oriented ones.

The second type is the representative of the sprawled and dispersed districts. Leapfrog developments and dispersed shops are the clear characteristics of these districts. Numerous districts like this can be found in the new parts of the fast urbanizing cities of Iran. The new developments of northwest of Tehran are mostly like the mentioned.

The aim of the comparative studies like this could be measuring the differences between travel behaviors in the two types of districts. For this purpose, the main factors that should be compared are; a) mode choice in non-commute travels, especially pedestrian travels for shopping/entertainment/social trips, b) length of travels, c) car ownership, and d) residential self-selection.

It is likely that the residents of the central neighborhood are more interested to do their shopping or social activity inside the neighborhood so they have the possibility to make it on foot. Therefore, the pedestrian travels can have slightly a larger share in these districts. In either of the neighborhoods people travel to the central parts of the city or to regional shopping centers to shop or especially for entertainment. It would be of interest to know where these destinations are and if there is any difference between the figures of the two neighborhoods. The question is: does the centrally structured neighborhood have the capability of shortening the non-work travels and keeping a part of the urban trips inside its boundaries? Testing car ownership is unlikely to show any special differences, because possessing a car in societies like in Iranian cities is more than just a problem of economy or accessibility and it has become a social effect. Moreover, the poor accessibility to public transportation and the discomfort of using these systems has pushed the
Iranian large-city dwellers to use cars widely. However, it would be interesting to produce new findings. Finally, residential self-selection can be a very attractive theme that can be measured in the suggested study. The self-selection of the living location can have fundamental differences with the ones in North America and Europe. The results of such research can make the nature of the selection clear. What is expected is that the socio-economic aspects have stronger effects on the location decisions in Iran than they have in western countries.

In the suggested research framework, some variables should be controlled for to make the comparison acceptable. Distance to the city center is one of them. The residents of the two neighborhoods should have similar geographical opportunities to access the city-level facilities. It is clear that if this distance varies, then the people travel to the city center differently. In addition, socio-economic factors like household income and the social class should be controlled as well. It would be irrelevant to compare neighborhoods of different sub-cultures even with similar distance to city center and household income, because the social and cultural norms of traveling might be various, while urban travels are affected by lifestyles and individual preferences, and these are affected by the people’s cultures and sub-cultures.
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