TOWARDS URBAN EQUITY: USING GIS FOR INVESTIGATING THE CONNECTIVITY AND LOCATION CHARACTERISTICS OF URBAN PUBLIC PARKS IN ANKARA

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TOWARDS URBAN EQUITY: USING GIS FOR INVESTIGATING THE CONNECTIVITY AND LOCATION CHARACTERISTICS OF URBAN PUBLIC PARKS IN ANKARA

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ABSTRACT

TOWARDS URBAN EQUITY: USING GIS FOR INVESTIGATING THE CONNECTIVITY AND LOCATION CHARACTERISTICS OF URBAN PUBLIC PARKS IN ANKARA

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In polarized or segregated cities, public amenities can not be accessible to everyone, especially to minorities and poor neighborhood residents. Urban public parks, unlike neighborhood parks, represent a significant public amenity as they provide sports and recreation opportunities for each community member. However, poor neighborhood residents are much deprived of such "low-cost resources" because of the limited mobility or lack of urban facilities. This thesis addresses this issue. In Turkey, unlike some other counties, recreational facilities and urban parks are provided by local governments. Metropolitan and district municipalities carry authority to supply recreational facilities to the public, but that may cause inequality because of the political and economic reasons. This thesis focuses on urban public parks named "prestigious parks" by the Metropolitan Municipality in Ankara. By using the tools of Geographic Information Systems, connectivity analyses were performed for each urban public park in the city. Additionally, arguing that the value of housing reflects the income of people living in a specific urban area, by using secondary data on the value of rented and sale hosing in Ankara, this thesis questions the location of urban public parks in the city regarding the economic characteristics of the residents living nearby these public amenities. Thematic maps were produced to investigate these

relationships. Study findings were discussed from an equity perspective. Study results show that there are no urban public parks in the southwestern development corridor of the city. Urban public parks with a high connectivity index tend to be found in the inner-city areas while low connectivity index-urban public parks are in the periphery of the city. The high connectivity index does not mean to have a grid street pattern of the neighborhood, windy street patterns also have a high connectivity index. Generally, low connectivity parks are located around low-income neighborhoods.

Keywords: Equity, GIS, Urban form, Connectivity, Urban public parks

ÖZ

KENTSEL EŞİTLİĞE DOĞRU: CBS KULLANIMIYLA ANKARA'DAKİ KENT PARKLARININ KONUM VE BAĞLANTISALLIĞININ İNCELENMESİ

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Kutuplaşanın ve ayrışmanın olduğu kentlerde, kamusal kaynaklar herkes için eşit erişilebilir olmayabilir. Bu durum, özellikle kimi azınlık grupları ve düşük gelirli bölge sakinlerini etkiler. Kent parkları, önemli kamusal kaynaklardandır. Toplumun her bireyine spor yapma ve hoşça vakit geçirme imkanı sağlamaktadır. Ancak, düşük gelirli mahalle sakinleri, hareket imkanlarının kısıtlı oluşu ve yaşadıkları yerlerdeki kentsel tesislerin eksikliği sebebiyle bu düşük maliyetli kamu kaynağından çoğunlukla mahrum kalmaktadır. Bazı ülkelerden farklı olarak, ülkemizdeki kent parkları ve rekreasyon alanları yerel yönetimler tarafından sağlanmaktadır. Ancak hem büyükşehir hem de ilçe belediyelerinde olan bu yetki, politik ve ekonomik nedenlerden dolayı, kaynağın halka ulaştırılma noktasında kentsel eşitsizliği doğurabilmektedir. Bu tezin eğildiği sorun budur. Tezin odak noktası, Ankara Büyükşehir Belediyesi tarafından prestij parkları olarak adlandırılan kent parklarıdır. Kentteki her bir kent parkı için Coğrafi Bilgi Sistemleri aracılığıyla bağlantısallık analizi uygulanmıştır. Buna ek olarak, Ankara'daki kiralık ve satılık konut değerinden ikincil veri elde edilmiş ve belirli bölge sakinlerinin durumları tartışılmıştır. Bu tez, kent parklarının konumu ile yakın çevresinde yaşayan insanların ekonomik ilişkisini irdelemektedir. Bu ilişki, tematik haritalar yardımıyla gösterilmiştir ve çalışmanın

çıktıları kentsel eşitlik çerçevesinde tartışılmıştır. Çalışmanın sonuçlarına dayanarak, kentin güneybatı gelişim koridorunda herhangi bir kent parkı bulunmadığı görülmüştür. Yüksek bağlantısallık indeksine sahip kent parkları kentin merkezine yakın konumlanırken, düşük bağlantısallık indeksine sahip parklar kentin çeperlerinde bulunmaktadır. Yüksek bağlantısallık indeksi, ızgara biçimli (grid) sokak formlarını nitelememekle birlikte; düzensiz sokak formları da yüksek bağlantısallık indeksine sahip olabilmektedir. Çoğunlukla düşük gelirli mahalleler düşük bağlantısallık indeksli parklar etrafında konumlanmıştır.

Anahtar Kelimeler: Eşitlik, CBS, Kentsel form, Bağlantısallık, Kent parkları

To my beloved family

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CHAPTER 1

INTRODUCTION

"I will start serving the places where I have received the most votes"

İ. Melih Gökçek (2014).
Mayor of Ankara Metropolitan Municipality between 1994-2017.

1.1. Introduction

Since the early Republican period, Ankara, the capital of Turkey, has been transforming itself from a city providing various green open spaces (Şahin and Bekişoğlu, 2009) to a city with fewer recreational opportunities for its residents (see, Evered, 2008). Until its declaration as a capital city in 1923, like many other urban amenities, parks were not part of the public realm. Lörcher and Jansen introduced the first plans for the city, where urban public parks were created to represent and sustain the ideology of the young republic (Ekinci and Sağlam, 2016). Over the last thirty years, however, like many Turkish cities, Ankara has been facing radical changes in its economic, political, demographic, social and cultural structure, triggering the replacement of urban open spaces by large-scale housing and transportation projects (Uzun, 2005).

Cities are shaped by a variety of political, economic and social forces (Harvey, 1989). The forces affect the distribution of public amenities and the location of the social groups residing in the urban geography. Thus, when we examine cities, as in many US and European cities, we can observe that ethnic/racial minorities or people from particular economic backgrounds usually live in neighborhoods associated with their own social identities. In such polarized or segregated cities, like many public ameniries, parks are not accessible to everyone, causing to an urban inequality (Loukaitou-Sideris and Stieglitz, 2002). There is voluminous literature discussing the

benefits of public parks for residents (Loukaitou-Sideris and Stieglitz 2002; Giraldo, 2008; McConnachie and Shackleton, 2010). These studies found that such areas provide various opportunities for residents such as recreation, physical exercise, socialization and stress reduction. Accessing to public green spaces is particularly important for low-income residents, since these groups are likely to have limited mobility (Wendel et al., 2012). Urban public parks can provide low-cost resources for residents to get benefits from social, psychological and physical health conditions (Tinsley, et al., 2002; Taylor et al, 2006; Hughey et al., 2016; Knapp et al., 2019).

The classification of urban parks may vary from country to country. In the United Kingdom, the hierarchical classification of urban parks can be divided into four types: 1) Principal-city-metropolitan park: More than 8.0 hectares with a mixed physical resource and a large variety of facilities. 2) District park: Up to 8.0 hectares with a varied landscape features and sports/playing facilities. 3) Neighborhood park: Up to 4.0 hectares with landscape features and facilities. 4) Local park: Up to 1.2 hectares with play and informal green area and landscape features but lack of other facilities (Council, 2000; Swanwick et al., 2003). The National Recreation and Park Association in the USA classified, parks as regional, large urban-metropolitan, district, neighborhood, vest-pocket, play-lots and mini parks. In Turkey, there are different approaches to classify green spaces (Gürer and Uğurlar, 2017). Tümer (1976) and Ertekin (1992) grouped parks based on their sizes (i.e., neighborhood, district, urban and regional parks) (Özkır, 2007). Further more, their open spaces can be used for active or passive purposes. “Active green open spaces are” spaces where individuals can actively engage with park facilities. Examples include children’s playground and playfield. Based on the Turkish Construction Law, dated 1985 and numbered 3194, minimum of 10 m^2 active green space per capita is recommended in an urban area. Out of this 10 m^2, a minimum 1.5 m^2 should be provided as a children’s playground, 2 m^2 as a neighborhood park, 3.5 m^2 as an urban park and 3 m^2 as a playfield (Demir, 2004; Demir et al., 2007).

This study focuses on urban public parks. In a study that examines urban equity in a developing country like Turkey, the author believes that investigating the distribution of urban public parks and the connectivity of these settings might be more important than focusing on the location and connectivity of neighborhood parks. The primary reason of this is that, as in many other countries, planning laws in Turkey necessitates planners to provide social and recreational amenities per specific number of inhabitants. As more residential areas are planned, planners are required to provide more green, cultural, educational, social and religious amenities. However, in many cases, primarily for economic reasons, planners put little emphasis on providing large-scale parks for residents. As emphasized by various scholars including Swyngedouw et al. (2002) and Enlil (2011), in a globalizing world, governments' policies to attract (or distract) footloose capital and flows of trade, tourists and qualified labor determine where prestigious amenities (like urban public parks) should be urban areas. The locations of large-scale urban parks are usually determined with small-scale plans because of their scale. This is why one can see hundreds of neighborhood parks arguably distributed almost evenly in cities, but just a dozen urban public parks located in particular districts. Access to urban parks is especially important for disadvantaged populations because compared to neighborhood parks these areas provide more recreational and social opportunities for their users. In a neighborhood park one can enjoy meeting with new members of the community but in urban public parks they can meet with people from different communities. Sociologists like Goffman (1963) argues that only in public (rather than community) spaces can the people be aware of their social identities; know who they are and where they are coming from.

The link between the location of urban facilities and different social groups can be achieved by measuring the accessibility of parks by the residents (Talen, 1997). Nevertheless, the concept of accessibility is quite complex (Geurs and Van Wee, 2004). Accessibility of a destination point is affected by car ownership, presence of a strong public transportation system, neighborhood walkability and individual, physical and psychological barriers, such as natural or impenetrable conditions or

safety concerns (Talen, 1997; Alfonzo, 2005). Urban form directly affects walking behaviors and access to a destination point that usually covers the measurement of the street connectivity of a street network (Ewing, 1996; Frank et. al, 2004). According to The Victoria Transport Policy Institute, the well-connected streets or path network cause to the less travel distance and the more alternative routes by lots of intersections. So, the more accessible system can be created (The Victoria Transport Policy Institute, 2017; Tresidder, 2005). In this paper, the author is specifically interested in the connectivity of urban public parks as an indicator of park accessibility. Various connectivity measurements were defined by scholars in view of the fact that the type of GIS data, GIS methods and/or particular purpose. So, intersection points (nodes) per unit of area calculation was used in the study. The calculation is named intersection density by conducting the network analysis tool. The higher connectivity index means the more intersection points (more connected) in an area.

1.2. Research Question and Aim of the Study

The aim of this research is to measure the connectivity of urban public parks in Ankara. It also aims to investigate relationship between the connectivity of these settings and the income of the residents living near these settings. In this context, the thesis asks the following research questions:

(1) What is the buffer-connectivity index of each urban public park in Ankara? Where are the most problematic urban public parks located in the city regarding their connectivity?

(2) Is there a relationship between neighborhood income and urban public park connectivity?

This dissertation aims to contribute to social inequality and health geography literature in a number of ways. Research in health geography has gradually focused on unequal access to places that promote health (Kulkarni and Subramanian 2010). There is a growing body of literature examining the accessibility of parks, some of which were approached from the perspective of urban inequality (see, e.g., Talen, 1997; Yin and

Xu, 2009; Zhang et al., 2011; Wen et al., 2013). However, most of these studies have been conducted either in the Global North or the developing countries of Asia. This thesis adds a unique Turkish perspective by examining the accessibility of urban public parks in one of the developing cities of the Global South, Ankara, where urban planning practices have been shaped primarily by various political and economic factors. This research also has implications on a local level. The location of physical activity resources needs to be considered when there is unequal provision of public amenities among low and high-income populations. The thesis herein used conventional access measures by GIS network analysis to reveal the degree of the connectivity of urban public parks and thematic map representation techniques of this tool for understanding the socioeconomic characteristics of the residents living nearby these settings. As will be discussed in Chapter 2 in detail, none of the studies conducted in Turkey on the accessibility of urban amenities used Geographic Information Systems (GIS) as an analysis tool to investigate the connectivity of public parks. Thus, one of the main contributions of this thesis to the scientific literature in Turkey is the use of GIS to analyze the accessibility and location of urban parks in a city of Turkey, Ankara.

1.3. Structure of the Thesis

The thesis is composed of five main parts. The following chapter aims to provide a theoretical framework for understanding the relationship between the accessibility of urban public parks and urban equity. It defines key concepts like urban equity, urban form, accessibility and connectivity; explains how various political and economic factors affect the location, planning and design of urban public parks; and reviews the literature regarding how to measure the connectivity of these settings. The third chapter focuses on the method. The planning approaches of Ankara and effects on urban public parks are briefly discussed within its own unique history. Then, the chapter mentions the site selection process. 18 urban publics parks determined by Ankara Metropolitan Municipality are described. Google Earth images are used to indicate location and other physical facilities. Next, the methods used for answering

each research question are explained. The fourth chapter presents the results of the study. The thesis ends with the fifth chapter, which discusses the results from the perspective of urban equity and the implications of the findings for future research and urban planning.

CHAPTER 2

THEORETICAL FRAMEWORK

This chapter aims to provide a theoretical framework for understanding the relationship between the connectivity and location characteristics of urban public parks and urban equity. It provides a definition for the concepts of urban equity, accessibility and connectivity, explains how various political and economic factors shape urban spaces, the relationship between urban form and urban equity and reviews the literature on the accessibility of parks and urban equity. It also provides a discussion on how to measure the accessibility of urban public parks. Here, the thesis puts an emphasis on the concept of "connectivity," defines this term and discusses ways to measure it.

2.1. The Concept of Urban Equity, Accessibility and Connectivity

This section gives a definition of the concepts of urban equity, accessibility and connectivity, and discusses how they can be measured.

2.1.1. Urban equity

Equity (justice or fairness) is related to the distribution of public resources, opportunities or outcomes regardless of social, cultural, gender, economic or other differences in a society. The equity theory asserts that individuals judge the equity or fairness of what they receive (e.g., economic benefits and recreational opportunities) through a comparison with others; if one recognizes that others receive greater outcomes for same or less effort, then an inequality will be perceived (Adams, 1965).

Ensuring equity is the primary concern of planning studies. One reason to this is that, as some scholars like Winch (1971) and Oxley (1975) emphasized, an economic system can operate successfully if and only if there is equity in distribution. An ideal

condition in any planning decision is that it should not adversely affect any group at all. This is the approach embodied in the pareto criterion (Pareto, 1927): "However much some may gain, say, from the implementation of a particular land development proposal, such a proposal should be rejected if there are others who are going to lose by it" (Corkindale, 2004: 43). Nevertheless, as the term pareto efficiency suggests, it might be impossible to make one party better off without making another party worse off. Thus, "who gets what" and "who pays" questions are fundamentally linked to the main discussion of equity planning (Talen, 1998; Litman, 2002). Despite the growing literature, there is no consensus on how urban amenities can be equally distributed, which is still an unresolved issue (Talen, 1997). In the field of transportation and urban planning, there are methodological difficulties in allocating resources to different social groups (Talen, 1997).

Lucy (1981) distinguished equity from equality. The general quality principle of local government services is "Everyone should receive the same (equal) service". This is what equality means; the treatment of everyone equally. According to Lucy (1981) this principle has three limitations. Firstly, there is an inconsistency between equality and the needs, demands, preferences and willingness of the society. Distributing services equally may lead to inequity because every individual, group or organization may have different characteristics than the others. For example, offering a physically disabled individual the same opportunities provided to physically nondisabled individuals (e.g. providing only sidewalks between origin and destination points) might hinder disabled individuals' access to recreational opportunities. Thus, equality may not always ensure equity. Secondly, there is a physical impossibility of equal distribution of public services to individuals since libraries, parks etc. cannot be perfectly equidistant from every person. They can only be in a distance range. Thirdly, there is a coherent data analysis problem when service data is analyzed systematically (Lucy, 1981). For instance, equality of service resources such as street width or police patrol officers, do not directly lead to equality of service results (equal traffic or equal arrest rates).

According to Litman (1999), there are two main categories of equity: horizontal equity and vertical equity. Horizontal equity (fairness and egalitarianism) is based on the "equal treatment of equals". Equal individuals or groups share public resources equally. Each group or individual is considered equal in ability and need.

Vertical equity, on the other hand, addresses the differences between individuals and groups with respect to need and ability. Lucy (1981) considered this kind of equity as "unequal treatment of unequals". There are two types of vertical equity. One of them mostly focuses on income and social class. In this type, disadvantaged groups or individuals differ in abilities and needs by income and social class. This definition includes some discount and special services for disadvantaged groups (Litman, 1999). The other type of vertical equity focuses on only need and physical ability. There is no consideration for disadvantaged groups by income and social class. It questions which of the transportation systems can meet the needs of travelers with mobility impairments. This definition is used for supporting "universal design" (or accessible and inclusive design) and needs of travelers including those who have mobility needs (Litman, 1999). In the spatial context, there are various equity definitions and measurements (Hay, 1995). Equity evaluation and measurement require the categorization and grouping of people with respect to their demographic characteristics and physical environmental features (e.g., location of different land uses, neighborhood location, etc.) (Karner and Niemeier 2013; Hine and Mitchell 2001; Jiao and Dillivan 2013).

The analysis of equity is important and unavoidable in transportation and planning studies (Litman, 1999), since planning is about making decisions on how to allocate public amenities like public parks, schools, health centers and libraries. The maps produced by the Chicago School, which show the spatial distribution of such land uses in Chicago in the late 19th and early 20th century, are some of the first examples of such analysis conducted at the urban scale. Planners have also relied on such spatial analyses to understand the structure (macroform) of cities. After the introduction of the Concentric Zone Theory by Burgess, who provided the foundation for the Chicago

School, two models were suggested to explain the macroform of cities regarding the location of different zones (e.g., residential zones, business zones, industrial zones): Hoyt's Sector Model and Harris and Ulman's Multiple Nuclei Model (See Figure 2.1). The purpose of planning is to regulate the urban space, including its macroform, which is influenced by political, economic and social forces.

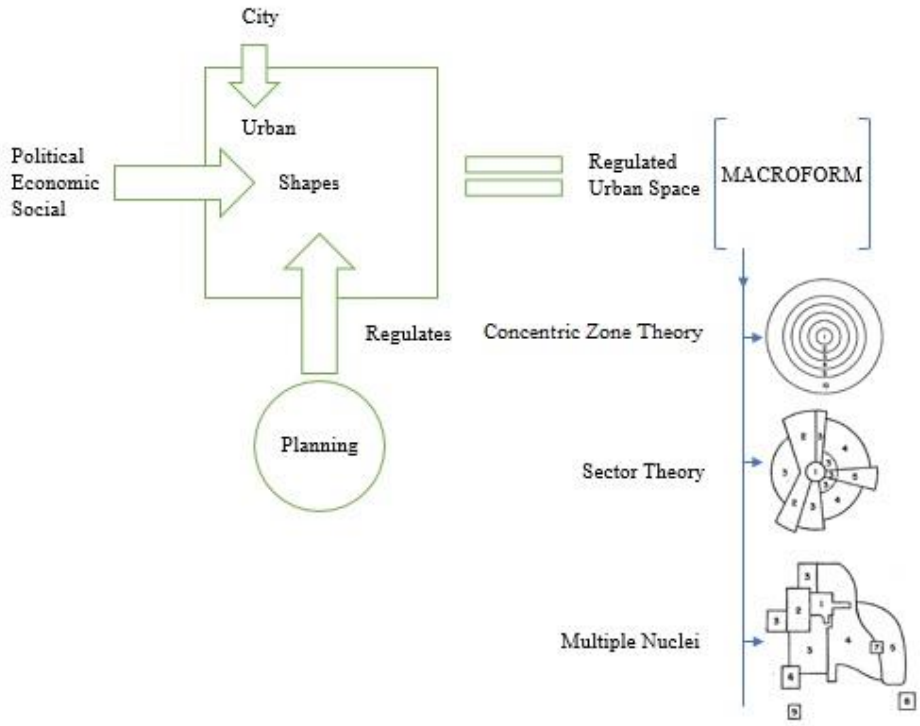


Figure 2.1. The development macroform of the cities (produced by the author).

The measurement of spatial equity comprises the locational distribution of urban facilities. The link between location of urban facilities and different social groups can only be achieved by measuring the accessibility of such facilities to different segments of the public (Talen, 1997).

There is a growing body of literature in urban planning linking equity issue to the production of urban space. Equity issues in marginal populations' (like women,

children, blacks and Latino groups) access to workplaces, schools, recreational opportunities, nature and healthy food; living close or away from sources that pollute the environment or disaster-prone areas (e.g., which groups live near factories or flood-risk areas); and more recently, the physical environmental features of the place of residence (like living in high-rise buildings versus low-rise buildings or in streets with 'broken windows' versus in safer streets) are only some of the many areas of inquiry that have contributed to the literature in planning (see, e.g., Metzger, 1996 ; Blumenberg, 1998; Gifford, 2007; Aytur et al., 2008; Horst et al., 2017) (see Figure 2.2). Urban equity is a highly complex and multi-dimensional concept investigated by researchers from different fields of study. There is a significant number of studies focusing on the relationship between urban equity and accessibility (Cutts et al., 2009; Grengs, 2015; Guzman and Bocarejo, 2017; Litman, 1999; Rigolon, 2016).

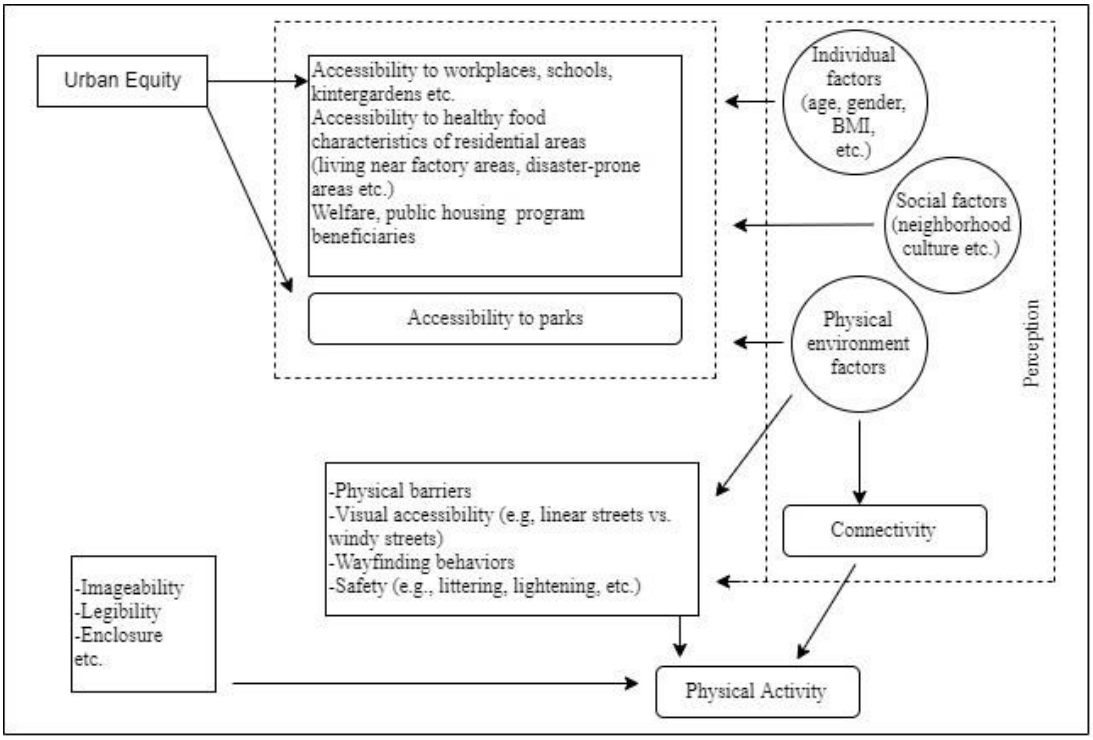


Figure 2.2. Urban equity and physical activity relations (produced by the author).

2.1.2. Accessibility

A review of the literature shows that despite the widespread usage of the concept of accessibility, there is still misunderstanding, poor definitions or unsatisfactorily organized measurements of this concept. The concept of accessibility is quite complex (Geurs and Van Wee, 2004) and so there are various accessibility definitions. Hansen (1959) defined accessibility as "the potential of opportunities for interaction." Litman (2002) defined this term as "individuals' ability to reach desired public opportunities." Various factors like car ownership, presence of a strong public transportation system, and neighborhood walkability (which is associated with proximity of different land uses, connectivity of streets, presence and continuity of sidewalks, comfort of the sidewalks for walking, street safety, and so on) influence individuals' access to public opportunities like goods, services, activities and destinations (Talen, 1997). According

to Alfonzo (2005), accessibility is the most significant physical environmental factor affecting one's walking behavior; once individuals consider a trip feasible to walk, they assess the level of accessibility of a destination point; individuals prefer not to walk if the point of destination is not accessible on foot. According to Carr et al. (1992) accessibility has three components (1) access to activities (which can be measured with the proximity of activity areas, presence/absence of sidewalks, barriers on the sidewalks for walking, etc.), (2) access to information (e.g., whether the public is aware of the location of the parks in a city), and (3) access to resources (e.g., whether low-income individuals can benefit from the facilities in a setting like ticketed events). There is a great deal of literature investigation how the accessibility to various activity areas like parks can be increased for the pedestrians (see, e.g., Carr et al., 1992; Speck, 2015; Forsyth, 2015; Akkar Ercan and Belge, 2017). For example, in an article published in the Journal of Transport and Land Use in 2015, Vale et al. (2015) presented the findings from a systematic literature review of papers on active accessibility (walking or bicycling) written in English and published in peer-reviewed journals and conference proceedings. Their analysis led to a total of 84 papers (excluding literature review papers). In a more recent literature review article, Park (2017) reviewed all the papers published in Google Scholar and English on topics related to "park accessibility," "perception," and "park use". His analysis yielded 34 papers that focused on these three concepts in the same study, 24 of which were quantitative, 10 qualitative and 2 literature review article.

Increasing the connectivity of activity areas is one of the mentioned strategies in the literature. From a review of 159 studies conducted on physical activity in developing countries, Day (2018) concluded that Geographic Information System (GIS) data was reported only in 22 studies and that future studies should put greater emphasis in objective measures of physical environment.

Similarly, the author reviewed all the studies that were conducted in Turkey and published in Google Scholar and English on topic related to: accessibility, connectivity, urban form and parks. Although not all of the results are directly related

with park accessibility (or, for example, connectivity), Google Scholar yielded 581 results. The author closely examined the abstract of each of these 581 studies. Studies conducted in Turkey are summarized in Table 2.1. The table shows that out of 15 studies, Ercan and Memlük (2015), are directly related to accessibility to parks. Among these 15 studies, Cevher (2014), focused on the connectivity issue. And among these studies none of them used GIS as a tool to conduct a network analysis to measure connectivity. As Table 2.1 also shows, most studies that were conducted in Turkey on the accessibility issue used subjective measurements (like surveys or observations). Some studies used GIS or Space Syntax but these tools are used to understand accessibility to other points of destinations like schools, open spaces etc.

Table 2.1. A review of the scientific studies (excluding literature review studies) on the concept of accessibility in Turkey.

Authors	Title	Type of Paper	Dimension of Accessibility	Methods
Yenice, (2015)	A method for evaluation of the efficiency of urban green spaces; Aksaray, Turkey	Journal article	Distance	Spatial analysis
Ozkan and Ozer, (2014)	Spatial integration and accessibility considering urban sustainability patterns: historical islands of Istanbul	Journal article	Quality of streets, attractiveness, terrain slope	Space syntax method
Ercan and Memlük, (2015)	More inclusive than before?: The tale of a historic urban park in Ankara, Turkey	Journal article	Physical and social barriers	Questionnaire

Table 2.1. (cont'd)

Kahraman and Kubat, (2015)	In the effects of accessibility factors on land values in the CBD of Izmir	Symposium paper	Distance	Network analysis and space syntax analysis
Ozbil et al., (2016)	Pedestrian route choice by elementary school students: the role of street network configuration and pedestrian quality attributes in walking to school	Journal article	Distance and other environmental physical features: sidewalk width, non-residential land uses	Face-to-face questionnaires and regression analyses
Eyüboğlu et al., (2007)	A new urban planning Approach for the regeneration of an historical area within Istanbul's central business district	Journal article	Visual accessibility	Space syntax techniques
Durmaz, (2015)	Analyzing the quality of place: Creative clusters in Soho and Beyoğlu	Journal article	Scale of place and its role on walkability effect	Interviews, observations, cognitive and cluster mapping

Table 2.1. (cont'd)

Cevher, (2014)	The link between station area design and transit usage: The case of Ankara	Doctoral thesis	Lighting Interface with parking (on street parking) Ease of pedestrian crossing - Landscaping and tree-lined streets, Flat terrain Availability of sidewalks	Micro scale analysis are the main point of the study as land use analysis by field observation. Node/link index was used in connectivity analyses (500m buffer) "Station served by multiple modes Number of bus lines feeding into the station Availability of parking facilities (car and bicycle) and Kiss-andride"
Yavuz and Kuloğlu, (2016)	Evaluation of spatial permeability concepts: A case study of the Trabzon Forum Shopping Centre	Book chapter	Distance	Space syntax, semantic differentiation

Table 2.1. (cont'd)

Özden, (2013)	Planning for sustainable communities in suburban residential neighborhoods: The case of Ümitköy, Ankara	Doctoral thesis	Physical features, transport-parking facilities, safety, quality of streets	Spatial and social feasibility analysis, questionnaire
Ince Kompil, (2017)	Analysis of urban growth in developing countries and strategies for sprawl management: The case of Izmir	Doctoral thesis	Distance	GIS, mapping, spatial statistics and analysis
Fırat, (2011)	"Evacuation and access" based casualty reduction proposal for high dense settlements in earthquake-vulnerable areas	Doctoral thesis	Distance	Space syntax
Nal, (2008)	Sustainable transport in city-regions: The case of İzmir city region	Master thesis	Distance	Interviews
Erdoğan, (2015)	Assessment of urban identity characteristics in public places: A case study of Ortaköy Square	Master thesis	Distance, attractiveness, safety etc.	Photo analysis, observation
Beyazit, (2013)	Transport and socio-spatial inequalities: The case of the Istanbul Metro	Doctoral thesis	Distance, social effects between different socio-economic groups	Aerial photos, interviews

2.1.3. Connectivity

The connectivity of a street network as an urban form component, affect pedestrians' walking behavior (Ewing, 1996; Frank et al., 2004; Chin et al., 2008). Connectivity refers to directness of links and frequency of connection in a road network (Tresidder, 2005). Grid pattern streets increase connectivity (and therefore walkability) by decreasing distances between the origin and destination points, and provide multiple route alternatives for the pedestrians (Jones, 2001; Tresidder, 2005; Chin et al., 2008). On the other hand, windy streets are less connected compared to grid pattern streets. According to Marshall (2004), the number of joint nodes throughout a road presents the connectivity. His work illustrates different type of street patterns (see Figure 2.3). Particular street patterns shows different connectivity index based on intersection points in a street layout (see Table 2.2). Sometimes the permeability term is used instead of connectivity. But connectivity is related to the road network. While permeability refers to accessible space that allows permeation (Marshall, 2004).

As can be seen from these figures and tables (see Figure 2.3, Table 2.2), regular grid streets (the term regular here refers to straightness of streets) have the highest connectivity, and the windy streets with superblocks and dead-end paths (as can be observed in the suburbs in US) have the least connectivity scores.

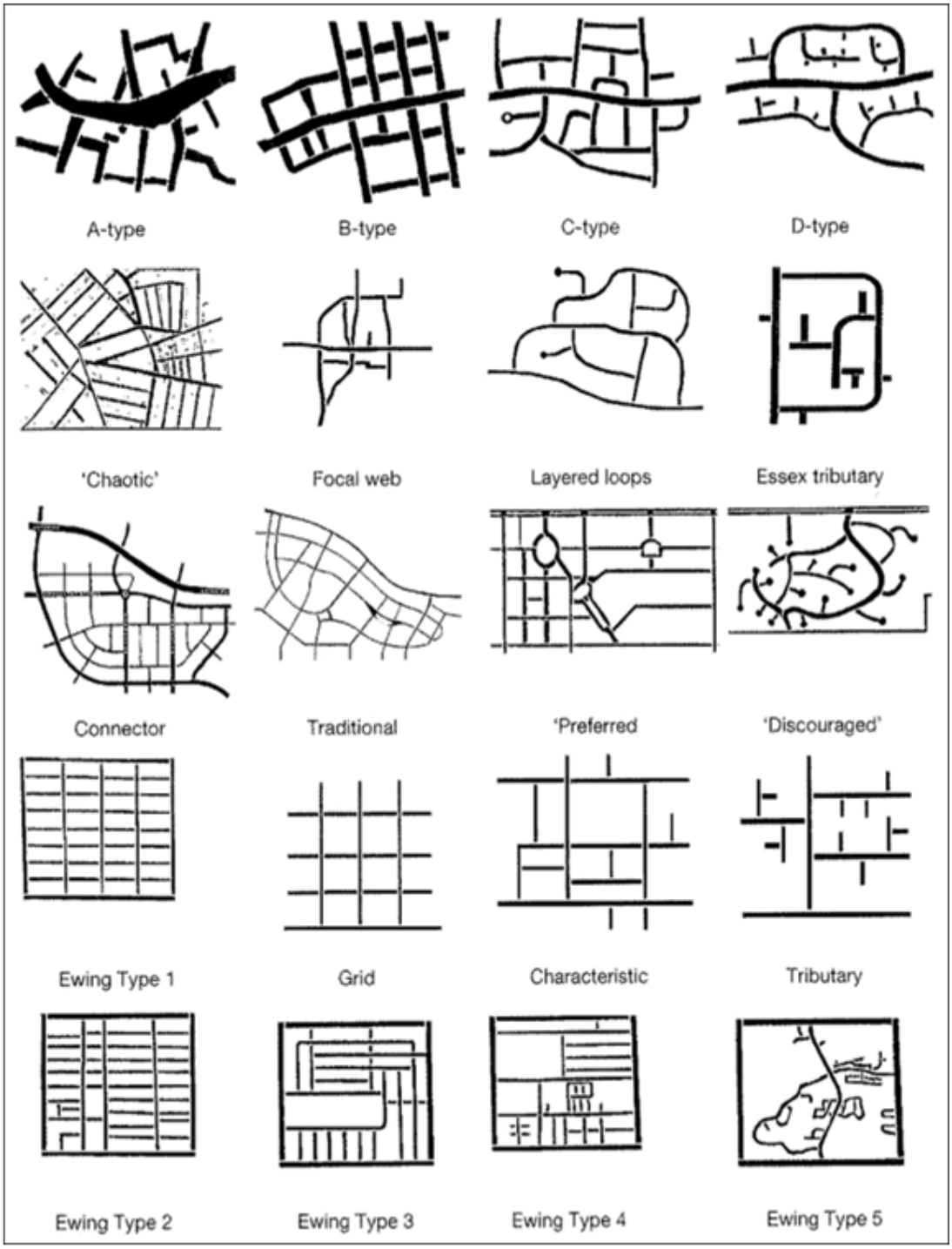


Figure 2.3. Marshall's typological study on street pattern (Marshall, 2004).

Table 2.2. Relative connectivity values for example networks (Marshall, 2004).

Informal description	Demonstrative networks	Relative connectivity	Actual or *prototype network	Relative connectivity
Regular and connective grids	Ewing-1	0.50	*Ciudad Lineal	0.52
	Focal web	0.50	Glasgow Grid	0.50
	B-type	0.49	Tokyo Grid	0.48
	Ewing-2	0.47	Reykjavik Central	0.47
			Glasgow Southside	0.47
	Traditional	0.47	*Craig Plan	0.47
	Grid	0.46	Athens Inner	0.46
	Connector	0.46	Copenhagen Central	0.46
	Preferred	0.446	Dorchester Central	0.45
	Ewing-3	0.44	Sydney Inner	0.445
			Kentlands	0.44
			Hamilton	0.43
			Elmwood	0.43
			Bayswater	0.42
	Chaotic	0.42	Tunis Medina	0.42
			Bloomsbury	0.42
			Copenhagen Inner	0.42
Traditional grid-like structures			Cornhill	0.42
			Glasgow 1790	0.415
	Ewing-4	0.41	Shoreditch	0.41
			Kirkwall	0.41
	Characteristic	0.40	Babylon	0.39
			E.K. Village	0.39
Suburban 'grids' and cellular	A-type	0.39	St Andrews Central	0.39
	C-type	0.385	East Finchley	0.38
			Laguna West	0.38
			Tehran Inner	0.38
			Poundbury	0.37
	Layered loops	0.36		
			*Hilberseimer	0.36
Suburban	Ewing-5	0.35	E.K. Suburban 1	0.35
			Reykjavik Tributary 1	0.34
			Crawley Suburban	0.32
Suburban with significant tributary components			Reykjavik Tributary 2	0.315
			E.K. Suburban 2	0.31
			St Andrews Suburban	0.31
			Coventry Tributary	0.31
			Highworth Village	0.31
	Essex Trib.	0.275	*North Bucks New City	0.30
Tributaries and pure trees	Discouraged	0.275	E.K. Tributary	0.28
	D-type	0.265		
	Tributary	0.25	Thamesmead	0.26

Street connectivity can be measured in different ways. Trisidder (2005) specified eight ways while Dill (2004) referred thirteen measurements in her study. As will be discussed in the following chapter, in this study, intersection density analysis is used to estimate connectivity. Intersection density can be defined as the number of intersection points per unit area (Tresidder, 2005). After systematically reviewing the literature on the built environment and physical activity, Butler et al. (2011) found that while early research on concepts like connectivity or accessibility were based on

subjective measurements (like self-reports or observations), today, to examine such complex relationships, researchers generally rely on objective measures obtained through GIS analysis.

2.2. The Relationship Between Urban Form, Accessibility and Urban Equity

2.2.1. The link between urban form and urban equity

Urban form is an outcome of economical tensions and spatial conflicts, and it is closely related with different classes and ethnicities (Buss, 1996; Loukaitou-Sideris, 2003). Studies in the United States show that wealthy suburbs and planned-unit developments incline to protect their wealth and "community private" by creating gated communities, inner city areas turn into places of poverty, with run-down housing, poor services and high-level of crime (Garbarino et al., 1992; Loukaitou-Sideris, 2003).

An urban area has an impact on environment and socioeconomic space and they affect each other in many areas (Brambilla et al., 2013; Guzman and Bocarejo, 2017). In social sciences effects, the consideration of equity is substantial and equity studies in urban areas mostly contain accessibility analyses (Litman, 2014; Grengs, 2015; Guzman and Bocarejo, 2017). There is a growing body of literature discussing how globalization creates spatial inequalities on the urban geography. Bogota, İstanbul, Tokyo, Delhi and Mumbai are just few of these cities where one can see these inequalities (see, e.g,; Neuwirth, 2016). The common characteristic of all these cities is that different social groups settled in different regions of the cities. In some regions, urban services are adequate, while in other regions there are inadequate urban services. For instance, in Bogota Colombia, the inner city neighborhoods host high-income residents, high job opportunities and work places, low population density and good transport facilities. The peripheral side of the city, on the other hand, has poor transport facilities, low cost residential areas, high dense population and lack of urban amenities like urban public parks (Inostroza, 2017; Guzman and Bocarejo, 2017). Another example, Tokyo is a place of diversity of urban form and several kinds of urban sprawl areas (Sorensen and Okata, 2010). Tokyo has gained a form as "transit oriented, mono-

centric region" with developed railway transportation structure (Sorensen and Okata, 2010; Kaneko et al., 2019). Increasing population, rapid growth caused to expanded and intense urban area (Sorensen and Okata, 2010; Zhou and Gao, 2018; Kaneko et al., 2019). Planned but not applicable green belt zones hosted new railways (Sorensen and Okata, 2010). But overdependence on public transportation caused dense and mobile working population between city center and suburban areas in Tokyo especially in daytime and nighttime (Zhou and Gao, 2018; Kaneko et al., 2019). Additionally, insufficient public transit systems in some suburban areas turned into car-oriented neighborhoods. Thus increase in pollution, traffic congestion and low rate of accessibility to city center caused inequality in Tokyo (Sorensen and Okata, 2010; Zhou and Gao, 2018; Kaneko et al., 2019). In his book entitled "Shadow cities: A billion squatters, a new urban world, Neuwirth (2016) discusses how the presence of low-income classes is essential for the functioning of the global economic system, and how these groups create their own spaces – favelas in Brazil, gecekondus in Turkey, slums in Nairobi, and so on – all of which are characterized by particular urban form characteristics such as high building density.

2.2.2. The link between urban form and accessibility

From a socio-ecological perspective, a variety of factors influence people's physical activity levels. Studies found that individual, social and environmental factors (including urban form) may affect walking behavior (see, e.g., Pan et al., 2009; Trapp et al., 2012). However, it is not clearly known which one is more effective than others (Alfonzo, 2005). At the physical environmental level, the following factors affect walkability: accessibility, safety, pleasurableness and comfort (Moudon et. al., 1997; Frank and Engelke, 2001; Saelens et. al., 2003; Dumbaugh and Rae, 2009). According to Alfonzo (2005), accessibility is the most significant physical environmental factor affecting one's walking behavior; once individuals consider a trip feasible to walk, they assess the level of accessibility of a destination point; individuals prefer not to walk if the point of destination is not accessible on foot. The statistical evaluations between the walking time and the factors of the built environment supply information

to walkability studies. And so the walking behavior is proven to be linked to the condition of the urban form variables like the street layout, level of land use mix and urban density (Frank and Engelke, 2001; Choi, 2014). In their book entitled "Public Space," Stephen Carr and his colleagues (1992) have also closely examined these issues. As mentioned previously, accessibility was examined under three categories: physical, visual and symbolic accessibility. Physical access refers to whether a space physically reachable to the public or not. It is not only about the existence or lack of barriers or blockades, but also about the presence/lack of well-connected paths of circulation. Visual access can be used in a side where the primary concerns are the need for privacy, retraction or escaping from the daily hassles of life (Carr et al., 1992). A final one is symbolic access. There are design elements, which contain a cue or a signal for who is welcome or not welcome in a space (e.g., gatekeepers) (Carr et al., 1992). For example, in the case of an urban park, gates are usually used as symbolic barriers to hinder the access of homeless people. Similarly well-suited gatekeepers standing in front of commercial malls or public spaces may hinder unwanted social groups' access to these settings (e.g., teenagers, homeless people). All three factors have interaction with each other and they display a strong or ambiguous portray of who has a free entrance and who can control over the right of access (Carr et al., 1992). People tend to walk in a good walking environment with having minimum number of obstructions and physical barriers (Grammenos et al., 2002; Kelly et al., 2007). Conditions may vary depending on socioeconomic characteristics of a residential area. An important study was conducted to investigate the differences between walking environment and poverty level-racial differences in St Louis-Missouri, the United States (Table 2.3) (Kelly et al., 2007). The sidewalks were classified on their unevenness, obstructions and physical disorders. Sidewalk unevenness was grouped as having alignment, crevice, broken or destroyed section and weeds. Sidewalk obstruction was listed as rubbish bin, automobiles and trees. And the physical disorder title included abandoned buildings or desolate lots, existence of trash and graffiti, broken windows or abandoned automobiles. Residents were composed of African-Americans and whites. While some residents were highly poor, some others were

more affluent. As Table 2.3 illustrates poor conditions of walking environment are mostly found in poor areas. Such areas predominantly inhabited by African-American residents.

Table 2.3. The pattern between sidewalk conditions and race-poverty (Source: Kelly et al., 2007).

	Sidewalk unevenness (a lot) (n = 1122)	Sidewalk obstruction (a lot) (n = 1120)	Physical disorder (any) (n = 1780)
Total	141 (12.6%)	65 (5.8%)	933 (53.0%)
Poverty rate			
<10%	9 (2.9%)	10 (3.2%)	224 (31.6%)
10–19%	34 (11.5%)	17 (5.7%)	238 (53.04%)
20+%	98 (19.0%)	38 (7.4%)	471 (78.0%)
Racial distribution			
>50% African-American	126 (20.6%)	54 (8.8%)	618 (67.9%)
>50% White	15 (3.0%)	11 (2.2%)	315 (37.0%)

2.2.3. Variables of urban form and their impact on walkability

Urban form affects physical activity (Moudon et. al., 1997; Frank and Engelke, 2001). A variety of factors may influence people's physical activity levels. Studies indicate that individual, group, regional and environmental factors may affect walking behavior. But it is not clearly known which one is more effective than others (Alfonzo, 2005). The statistical evaluations between the walking time and the factors of the built environment supply information to walkability studies. And so the walking behavior is proven to be linked to the condition of the urban form variables like the street layout, level of land use mix and urban density (Frank and Engelke, 2001; Choi, 2014). Urban form variables can be at various scales, including micro, meso and macro (Figure 2. 4). Micro scale spatial variables define the interrelationship of buildings or private spaces and neighboring street segment. That micro scale spatial analysis addresses the positioning of residents-housing in a street network, entrances of buildings and their effect of forming of the streets, from private space to public space by degree of topological depth, and finally inter-visibility of doors and dwellings across streets (Van Nes and Lopez, 2007). So individuals and their behaviors can be imaginable in the micro scale. The meso scale urban analyses reflect the investigation of urban development in the large scale. But there are no additional computational variables of

the classic large scale model. It has enough detail of reflecting dynamics which can not be shown in macro scale analysis or another equilibrium simulations. For the decision makers and urban planners, the meso scale does not afford too much information. But weighted urban utilities are generally used by the meso scale land-use models (Zünd, 2016). The main point in the meso scale is interaction between groups and urban amenities. Different types of groups and their behaviors are simulated in a probabilistic manner rather than a deterministic manner for individual agents (Zünd et al., 2016). And apart from the micro scale, the meso scale is an area based measurable urban components. For example, street aspect ratio is a micro scale, but when it is called a meso scale, it means urban properties in an entire neighborhood. Or street connectivity is meso scaled, If the whole city is focused, the macro scale is counted.

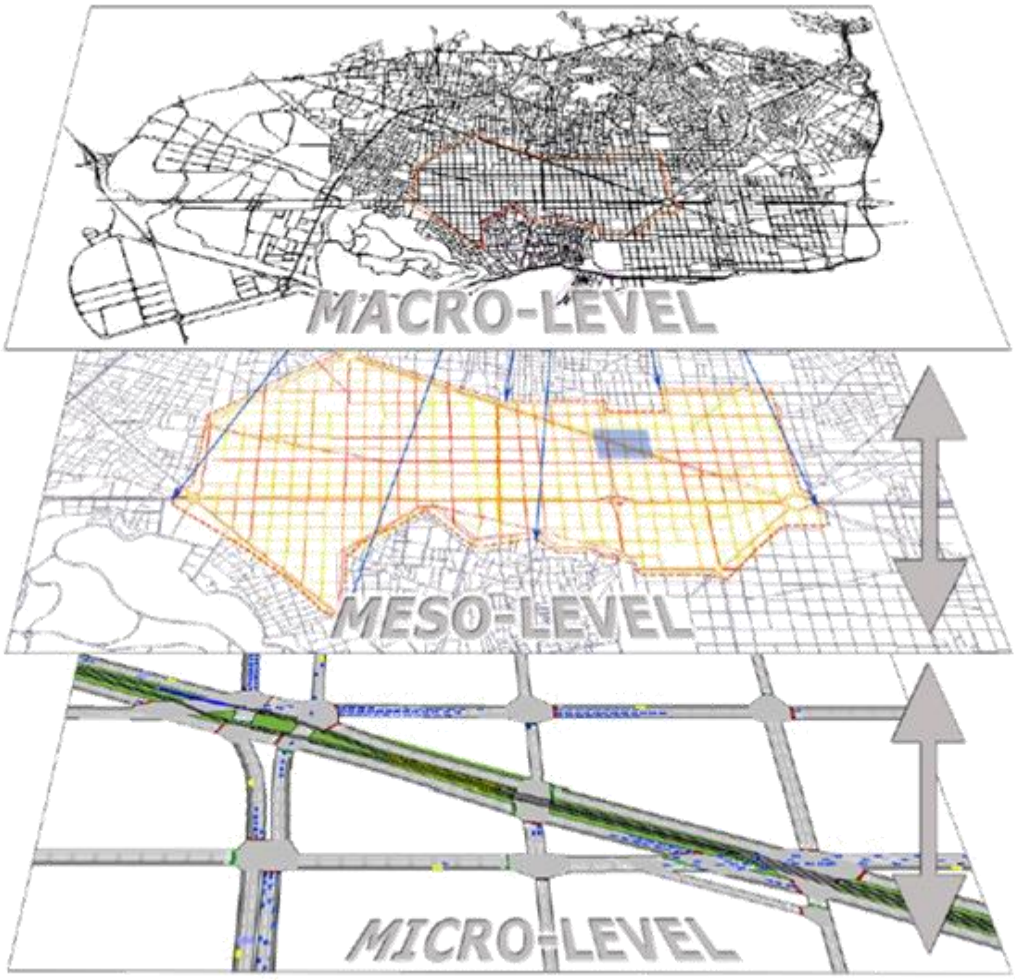


Figure 2.4. From macro to meso and meso to micro urban scale (Source: Barcelo et al., 2005).

There is a growing body of literature investigating the role of urban form variables on walking behavior (Frank and Engelke, 2001; Saelens et. al., 2003; Lee and Moudon, 2006; Dumbaugh and Rae, 2009; Akkar Ercan and Belge, 2017). At the micro urban scale, urban form variables affecting walkability include the presence of graffiti, dirty streets, lightening, type of vegetation, presence of large automobile parking areas and sidewalks, etc. (Carr et al, 1992; Loukaitou-Sideris, 2003). At the meso urban scale, some urban form variables affecting walkability are: street layout, urban density, level

of land use mix, block size, etc. (Owens, 1993). Walking is a way of transport and can be defined as green transport with having a low environmental effect, minimizing congestion and conserving energy. From an urban design perspective, having a high quality walkable environment has become even more important with respect to the concept of equity (Forsyth and Southworth, 2008). Urban form is likely to play a significant role in people's walking choice. According to some planners (Southworth, 2005; Akkar Ercan and Belge, 2017), micro design qualities like path design, landscape and street furniture might influence pedestrian behaviors. Such factors can affect urban equity in a number of ways (Handy, 1996; Southworth, 2005). For example, studies have shown that residents living in urban sprawl areas have less opportunity to walk in their spare time than residents living in compact inner-city areas (Giles-Corti et al., 2005; Cutts et al., 2009). Quality of the walking environment, presence of walking facilities and meso scale urban form variables such as land use mix, urban density, block size and street layout may affect the amount of walking (Saelens et al., 2003; Forsyth and Southworth, 2008). Poorly walkable neighborhoods lead to urban inequality especially for a low-income groups since they have limited access to private car and/or public transportation. Studies found that smaller blocks contribute to walkability of neighborhoods (Sevtsuk et al., 2016). Shorter blocks lead to more interaction and more meeting chance for people between the residents of a grid. They also increase street connectivity. A rich connected street or path network attracts walking and that provide a greatly walkable environment (Southworth, 2005; Sevtsuk et al., 2016). In their famous work, Duany and Talen (2002) proposed an approach entitled "transact planning" for examining the form of US cities. The approach takes a section cut of a typical US city, where districts are divided into 7 zones, from urban to rural, based on their building size, block size and level of greenery. On the section cut line, the closer we are to the core of the city, the smaller the block sizes. The closer we are to the rural, the larger the block sizes. Thus, as we move from suburban areas to urban areas, street connectivity increases. The method can be effectively used to understand the walkability of planned cities, (e.g., for understanding the connectivity of streets in different neighborhoods in a city) rather

than poorly planned cities like the ones in Turkey, where one can see large-scale developments with superblocks both in inner- and outer-city areas.

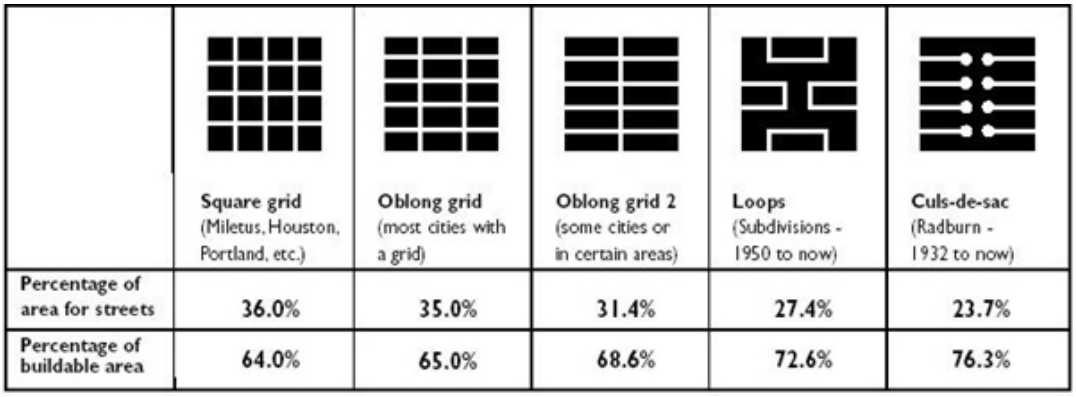
Factors like safety of a walking line, its visual character and level of comfort can contribute to neighborhood walkability as well (Speck, 2015; Akkar Ercan and Belge, 2017). In a grid, reducing plot frontages is an effective way to promote more accessibility for pedestrians (Saelens et al., 2003; Sevtsuk et al., 2016). Additionally, the plot depths and street width play a role in pedestrian accessibility. Decreasing plot depths and street width are alternative ways to improve pedestrian accessibility (Saelens et al., 2003; Sevtsuk et al., 2016). The same "smaller is usually better" apply to street width (Sevtsuk et al., 2016).

Various scholars have discussed the role of presence of neighborhood retail including healthy food stores in creating pedestrian friendly environment (Owens, 1993; Krizek and Johnson, 2006). Proximity to such destination points has been one of the most mentioned factors affecting walkability (Rigolon, 2016). Lack of access to healthy foods may contribute inequalities in diet, BMI and non-communicable diseases (Beaulac et al., 2009; Murphy et al., 2017). This is a problem especially for people living in poverty. Lowest income neighborhoods have nearly %30 less supermarkets than the highest one (Weinberg, 1995; Walker et al., 2010). Similar problems might be observed in the proximity of urban parks in low income neighborhoods.

Gehl (1986) mentions the role of "soft edges" in making a neighborhood walkable. Such spaces provide a comfortable social and leisure environment for the park users. However, when the residential buildings and sidewalks are separated by soft edges (e.g., by front yards) and the width of these settings are above a certain threshold (>18 feet), they may loosen the connection between the house and street, decreasing people's willingness to walk (Gehl, 1986; Owens, 1993). For half of the century, residential street design has been done by considering automobile drivers (Untermann, 1987; Owens, 1993; Grammenos et al., 2002). Streets are shaped wider, smoother and

more uniform to improve driver visibility. So drivers became fast, streets became less walkable (Bosselmann, 1987; Owens, 1993).

Walkability and sociability are mostly affected by heavy automobile traffic (Grammenos et al., 2002). Loops and cul-de-sacs street patterns are mostly suburban. Discontinuous streets create safe and social environment for pedestrians, but these streets are originally created for automobiles. Curvilinear streets increase the distance between street intersections (thus, it decreases the street connectivity), and walkability decreases. Grid pattern, on the other hand, has high connectivity (Figure 2. 5).



	Square grid (Miletus, Houston, Portland, etc.)	Oblong grid (most cities with a grid)	Oblong grid 2 (some cities or in certain areas)	Loops (Subdivisions - 1950 to now)	Culs-de-sac (Radburn - 1932 to now)
Percentage of area for streets	36.0%	35.0%	31.4%	27.4%	23.7%
Percentage of buildable area	64.0%	65.0%	68.6%	72.6%	76.3%

Figure 2.5. Typical street forms and their areal comparisons (Source: Grammenos et al., 2002).

Street patterns influence the degree of not only connectivity but also complexity (Owens, 1993; Grammenos et al., 2002). Small and complex street patterns lead to rich and attractive places for pedestrians (Owens, 1993; Grammenos et al., 2002; Saelens et al., 2003). Closely positioned buildings in neighborhoods provide a strong spatial enclosure to the streets and sidewalks, particularly in the mixed-use commercial areas (Figure 2. 7) (Owens, 1993). In Lake Hills, Owens (1993) observed that widely detached buildings led to a weaker perception of the street boundary by the pedestrians, decreasing people's willingness to walk. Scattered buildings across the landscape were perceived in no comprehensible pattern, both in multi-family and

commercial areas. Moving between them is not attractive sometimes not possible (Owens, 1993; Grammenos et al., 2002). Compared to Lake Hills, in Wallingford, differentiation between the zones was less clear (Owens, 1993). There was an interwoven street pattern and it reduced walking distance by having three times as many intersections over the same area and provided various route choices (Figure 2. 6) (Owens, 1993). In Lake Hills, there was no direct connections between points of origin and destinations; loop street and cul-de-sac patterns, lack of internal connections obstructed pedestrian travel and so decreased walkability (Figure 2. 6) (Owens, 1993). But there is a negative impact on pedestrian walkability in the street grid of Wallingford neighborhood. This type provides various route choice for automobiles as well as pedestrians, thus there can be raised conflictions between pedestrians and automobiles on residential streets (Owens, 1993). Cul-de-sac and loop patterns of Lake Hills, establish long trip lengths for automobiles and pedestrians (Bookout, 1992; Owens, 1993). In Wallingford, connectivity (as defined by intersection density and pedestrian directness) is mainly ensured along the edge of the street and greater total street length presents more frontage and so more extensive zone of public/private interaction can be formed (Owens, 1993). This interaction zone is critical to serve pedestrian life (Gehl, 1986; Owens, 1993; Dumbaugh and Rae, 2009).

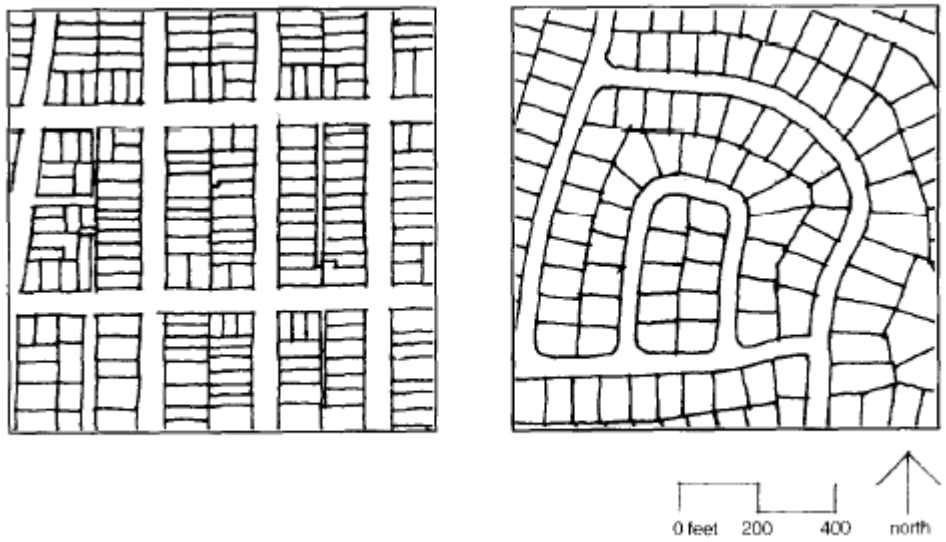


Figure 2.6. Wallingford (left) and Lake Hills (right) Neighborhoods (Source: Owens, 1993).

Micro scale urban form factors also affect the quality and character of neighborhoods. Presence of generous porches, stoops, modest setbacks, front walks and/or important city icons, topographic thresholds, main transport lines, linearities and consecutiveness, etc. attract pedestrian's attention and causing them to walk more frequently (see e.g., Owens, 1993; Akkar Ercan and Belge, 2017). The position of the buildings, presence of display windows at the ground floors of buildings, presence of different building types (e.g., row houses, detaches houses, single family houses, cottages) are some other factors influencing people's walking behavior (Owens, 1993; Akkar Ercan and Belge, 2017). If pedestrians or users of an area can map in their mind of an area through these urban items, this area is considered successful by orientations. A research that was conducted in a walkable street of Ankara, Tunalı Hilmi, supports such findings. Ghadimkhani (2011) found that Tunalı Hilmi street is an ideal walking environment for pedestrian because of a number of physical environmental attributes: the street is linear, predictable, legible, there is color harmony in buildings defining

the edge of the street and there are various landmarks and nodes along the street, some of which help people to orient themselves in the urban space

Such orientations are important components of accessibility (Akkar Ercan and Belge, 2017). Pedestrian sidewalks would be with less interruption and well defined by the parallel lines of street trees and parked automobiles (Akkar Ercan and Belge, 2017). Parked automobiles on street, narrow street widths and design of planted roundabouts at intersections are efficiently causing to slow traffic. And so walking friendly environment can be created. Additionally, large street widths and lack of other slow down messages may lead to some uncomfortably high speeds even the traffic incline to be light in this urban form (Owens, 1993; Grammenos et al., 2002).

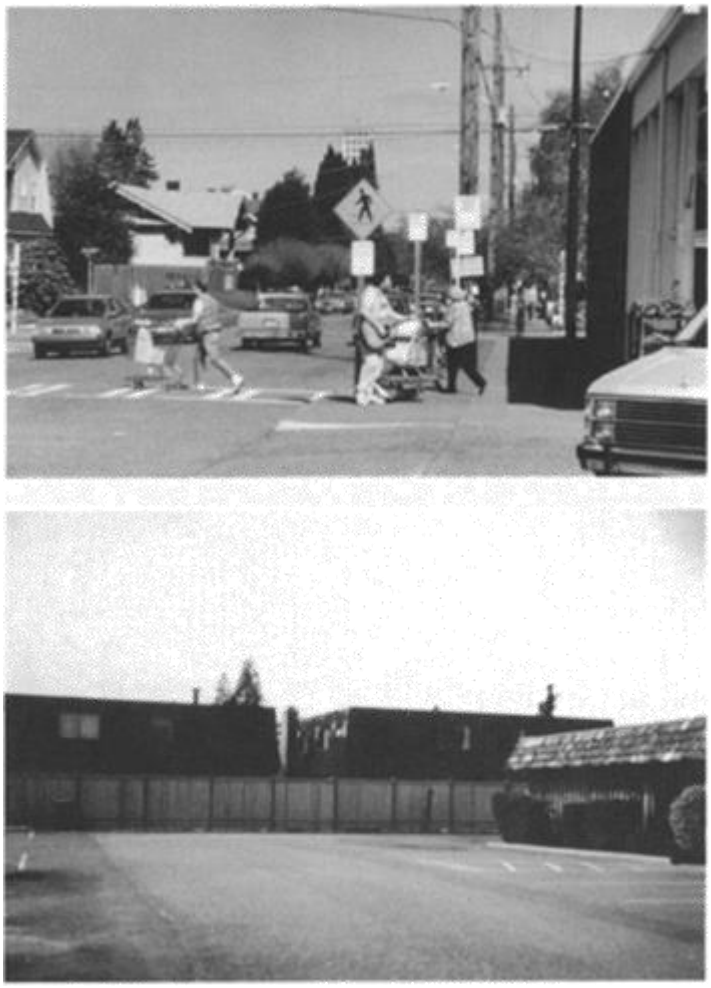


Figure 2.7. Two different type of scale patterns and their spatial usage by the pedestrians. Smaller scale pattern of Wallingford (above) and abrupt separation zones in Lake Hills (below) (Source: Owens, 1993).

2.2.4. Accessibility of urban parks and urban (in)equity

Researchers found that parks and open spaces have a significant role in social and cognitive development of young people (Saegert and Hart, 1978; Loukaitou-Sideris and Stieglitz, 2002). These settings provide less restrictive platform to residents than home, workplaces and schools. Parks are especially important for young people. Children can not only burn their surplus energy in them, but also improve their motor

skills by interacting with other children and park furniture (Saegert and Hart, 1978; Loukaitou-Sideris and Stieglitz, 2002). For all age groups, parks can provide a place for socialization with peers and getting involved in sports and physical activity (Burgees et al., 1988; Loukaitou-Sideris and Stieglitz, 2002; Ellis, 2004; Severcan, 2019). Parks provide a natural environment for residents. Exposure to nature reduces stress and anger, make people feel relax and happy, and improve academic performance (Burgees et al., 1988; Loukaitou-Sideris and Stieglitz, 2002; Hansmann et al., 2007; Louv, 2008; Faber Taylor and Kuo, 2009). According to Young (1995), parks act as a "pleasure ground" with a curative role that help to foster the "virtues of a good society" with public health, social coherence, affluence and democratic equality. Parks provide a common physical environment for all people. They can share academic and social activities at one point. Children can understand different cultures by celebrating diverse holidays and festivals. This make possible to contact across cultures, classes and races (Loukaitou-Sideris, 2003; Hansmann et al., 2007; Faber Taylor and Kuo, 2009). There is growing evidence showing the health benefits of parks on elderly (Fisher et al., 2004; Gómez et al., 2010; Gong et al., 2014).

Parks are valued by all people regardless of their socio-economic background. However, location of parks affects people's use of the settings. Studies have shown more usage of parks in poor inner-city communities than in suburban and exurban areas (Johnston, 1987; Loukaitou-Sideris and Stieglitz, 2002). Wealthier neighborhood parks have more financial support than poor ones. And access-user fees have an impact to continue or to expand some park programs (Loukaitou-Sideris and Stieglitz, 2002).

Parks serve as common grounds for different publics. That means, being together from different racial, socioeconomic and cultural backgrounds in one environment. But in recent years, lots of inner city parks have faced different kind of problems. In some cities in US, children and their families substituted with drug traffickers, vandals and gangs (Loukaitou-Sideris, 2003; Esteves, 2012). Green structure contaminated by waste material, equipment got worse and so many programs lost their significance

(Loukaitou-Sideris, 2003). Thus, many urban parks were seen as problematic urban unit, causing public officials to wipe out or privatize these settings (Loukaitou-Sideris, 2003). Much of these issues can be observed in low-income neighborhoods.

Some micro urban scale factors like graffiti or broken glasses can have a negative impact on sense of safety of park users (Schroeder and Anderson, 1984). Crowdedness, dirty streets, lack of public restrooms, and presence of gangs and homeless people may also have negative impacts on park users. For instance in Virginia Avenue Community Center, 75% of children stated relaxed, feeling free and comfortable in the park but some children reported their discomfort or fear because of the activities of homeless people. Finally, many parks in the United States were obliged to set user charge to supply service and run programs (Loukaitou-Sideris, 2003). Research has shown that these changes negatively influenced people's use of urban parks in the US (Cunningham and Jones, 1999; Loukaitou-Sideris, 2003).

A review of the literature shows how different segments of the community are excluded from urban parks (see, e.g., Nemeth, 2006; Kayden, 2005). For example, Nemeth (2006) examined the case of Love Park, Philadelphia, from the perspective of equity. The research narrates the story of the transformation of an inclusive urban public park into a privatized space that excludes skateboarders (youth) from the setting.

Much of the studies in poor urban neighborhoods reflect the non existence or insufficient urban amenities (e.g., public parks, restaurants, movie theaters etc.) (e.g., Neuwirth, 2016; Severcan, 2019). Similarly, a theory was developed and named as "de-institutionalized ghetto", which only focus on the link between poverty and deprivation (Small and McDermott, 2006). But new approach demonstrate that concentrated poverty can have a relation with segregation and depopulation. According to Small and McDermott (2006), in some poor neighborhoods of New York, the high rate poverty may attract new establishment in the area, it has a similar trend with the proportion of foreign born residents (or migrants). But rising in black

population leads to decrease in small establishments. That shows the poor neighborhoods may get the opportunity to reach public resources but some groups still remain excluded. So recovery in parts of the poor neighborhoods can be observed. According to Peterson et al. (2000), by increasing the level of sense of community, presence of recreation areas in poor neighborhoods decrease the crime rates. This finding shows how important recreational areas are to cope with social problems. Other studies support this argument. For instance, having troubles with extreme poverty, high rates of violence and high urban inequality, a segregated city Medellin (Colombia) put the Library-Park project into effect (Esteves, 2012). These library-parks are at junction points and easily accessible to the public. They provide leisure and cultural activities with study rooms, a library, computer labs and exhibition galleries, etc. The participating citizens from the segregated areas contribute to citizen relations and strengthen communities (Giraldo, 2008). Finally, deprived neighborhood residents can shape their future in a safe environment by having social, physical and educational opportunities of Library Parks (Esteves, 2012).

To sum up, residents from various socioeconomic backgrounds need to access to parks because of a variety of benefits provided by these settings. Nevertheless, low incomers, blacks and minorities have little access to parks (Kelly et al., 2007). They are more dependent on these settings than others because of their lack of car ownership, poor transport facilities, low salaries, etc. Scholars argued that creating segregated areas cause ghettos while curative activities (e.g. libraries, parks, hospitals) lead to create common grounds.

2.3. The Influence of Political and Economic Factors on Provision of Urban Amenities

Any study that investigates the relationship between the location of urban public parks in an urban area needs to discuss the key aspects that affect the site decision of these settings. This requires us to discuss the major factors affecting the production of such large-scale projects in developing countries, which are highly affected by political and

economic forces. The author acknowledges the fact that there are too many forces that shape the production of spaces like social and technological. However, for the purpose of this study, which approaches the problem from an urban equity perspective, the author puts the emphasis only on two factors influencing the provision of urban amenities: political and economic.

Capitalism, particularly neoliberal capitalism, has global effects on development of urban areas (Knox et al., 1995; Luke, 2003; McCarthy and Prudham, 2004; Heynen and Perkins, 2005; Heynen and Robbins, 2005; Heynen et al., 2006). Because of the unequal distribution of the sources, there is a discussion on this question: Why do some residents utilize urban amenities. less than others? In other words, why do minorities suffer from unequal distribution of urban amenities (Dryzek, 2000; Wenz, 1988; Heynen and Perkins, 2005)? The poor one is commonly more unhealthy than the rich one (Haan et al., 1987; Hahn et al., 1996; Ecob and Smith, 1999; Morello-Frosch, 2002). Additionally, less educated groups, laborers and blacks tend to be more unhealthy than others (Robinson, 1989; Kawachi and Marmot, 1998; Navarro, 1990; Morello-Frosch, 2002).

Socio-economic conditions shape people's daily lives and cities (Buyukcivelek, 2017). Many researchers have investigated the relationship between socio-spatial mechanisms and capitalist political economy and they mostly addressed exclusionist character of capitalist political economy (Marks et al., 1954; Rousseau, 1984; Smith, 2010; Buyukcivelek, 2017). Such that, minorities and disadvantaged urban residents do not have enough power to influence the decisions that affect their lives but they pay for other's mistake (Smith and Floyd, 2013). Since the beginning of the 1970's, the world economy has restructured by privatization, and deregulation, and faced with the transformation of national economies to international capital (Enlil, 2011). Various actors have taken part in economy and policy. Technological innovations accelerated the developments in communication and transportation, so new trends created a new global geography of production (Enlil, 2011). Strong competition appeared between cities to draw attention of footloose capital, high-quality labor force, commercial

activity and tourists. Attracting such resources to cities necessitated governments to build large-scale projects from housing and transportation to large-scale parks in "attractive" locations in the city, while consciously creating neighborhoods of poverty to support the functioning of the economic system (Swyngedouw et al., 2002; Neuwirth, 2016).

Financial organizations and governmental agencies have influenced the urbanization processes (Harvey, 1989; Morello-Frosch, 2002). These factors or land-based elites' privileged concern has been to maximize exchange values on intensified land use and orient resources to specific urban locations (Smith and Floyd, 2013). Economic development and urban growth contributed to the atrophy of public spaces (Smith and Floyd, 2013). If a public open space is exposed to marginalization process, that leads to less access to public open spaces by ethnical and racial minorities (Smith and Floyd, 2013).

The priorities of decision makers affect the production of places, and hence accessibility of urban parks (Smith and Floyd, 2013). While the classical planning approach is top down, bottom up approach provides an improved ground for the participation of public stakeholders (Roy and Ganguly, 2009). The parallel path can be seen in the "urban ecosystem" approach (Broto et al., 2012). The first one is the urban development with considering of natural ecosystem and understanding the urbanization process as its own mechanism. The second one is specifically related with economic growth and urbanization resource exhaustion and environmental damage (Daly, 1996; Broto et al., 2012). Urbanization and economic growth considered as negative for environment (Broto et al., 2012). Kent (1989) compared this to a parasite. Because it expands over the area without any production (i.e. its own food), contaminating water, air, etc. (Broto et al., 2012).

To sum up, political and economic factors have a strong influence on shaping urban spaces. Location characteristics of urban public parks and connectivity features inform about urban equity. Some minorities and deprived people live in insufficient

conditions so they can not change their status or can not reach the public amenities easily. Such exclusion is mostly supported by public authorities and politic and economic factors.

CHAPTER 3

METHODS

"This was my first visit to Ankara. There was no Ankara city worthy of being called the capital at that time. It was still Engürü city of Ankara province. There were no new buildings, all buildings were old in behalf of what is building. Even the American Embassy was in a shabby-old wooden building."

Balıkçısı, H. 1971, Mavi Sürgün pg.47

This chapter starts with a brief information about the context of the study: Ankara. Next, it focuses on the site selection: urban parks in this city. The Metropolitan Municipality has defined 18 urban public parks with respect to their facilities, and here, the chapter provides shortly descriptions about each of these parks. Thereafter, data collection, digitizing streets inside the buffer zones for each urban public parks for network analysis and limitations will be discussed. Finally, retrieved from secondary sources, value of rented and sale housing in Ankara will be demonstrated. The author discusses how this data was used for answering the research questions posed by the thesis.

3.1. Planning Context of the Study

Having the idea of "a modern city is the first step of the modern society", the first plans of Ankara put special emphasis on the role of green spaces in modernization of the society (Cengizkan, 2004). After the destruction of the Ottoman Empire, the young Turkish Republic passed through an immediate programme of modernization (Tekeli, 2009; Buyukcivelek, 2017). Ankara, in the middle of Anatolia, selected as a capital in 1923 to serve as a model to other Anatolian cities. The population of the city was

around 25,000 people in 1923. In 1924 and 1925, the first planner of Ankara, Lörcher stated that (Cengizkan; 2004) İncesu and Tabakhane streams are wrapping naturally on the settlement area, creating a natural park in the city. According to him, if this opportunity created by nature is used and applied properly, barren and soulless image of the city will give way to embraced park foliage and Garden City will be formed (Cengizkan, 2004; Alpagut, 2017). Then, Hermann Jansen (Alpagut, 2017) followed the Lörcher Plan and gave priority to parks, gardens and other green spaces in Ankara. He thought that many European cities were inadequately equipped with hygienic, social, architectonic and transportation facilities while they had good fine details (Alpagut, 2017). This led Jansen to build the first urban parks in Ankara. During the republican era, the primary concern was the usage of the green areas for social and economic development (Alpagut, 2017). For example, Atatürk Forest Farm (AOÇ) has a unique place representing the modernization efforts of that era; it is modern, responsible for the public especially the youth and concern the usage of modern technology and its agricultural applications (Alpagut, 2017; Ülkenli, 2017).

The 22-year period of the young Turkish Republic, political economy can be seen a kind of state capitalism with having economic independence, protection and socio cultural concerns that indicates ideas of the young republic (Boratav, 2003; Buyukcivelek, 2017). Outbreak of economic crisis in 1946, the new capitalist government implemented liberalization policies especially in commerce and industrial production. Capitalist classes came out and people disintegrated by socio economic lines (Boratav, 2003; Buyukcivelek, 2017). In 1950, the population of Ankara was 350,000. This was the population Jansen thought for 1980, meaning that, the city had already gone over the capacity. Consequently the city expanded by squatter settlements, new industrial areas and trade zones (Kayasü, 2005; Buyukcivelek, 2017). In addition, high level of urban growth reached such a level that municipalities put little emphasis on securing open spaces in the city for meeting the recreation needs of the residents (Tekeli, 2009; Buyukcivelek, 2017). Afterwards, the core of the city and enclosing neighborhood areas negatively affected by dense urban structure or

densification. Living conditions were getting poor and green spaces per capita decreased in implementation rather than the rate in development suggestions (Buyukcivelek, 2017). Some parks were closed or some of them became smaller. For instance, lots of private owners opened small businesses to make a profit in Gençlik Parkı. In time, Gençlik Parkı transformed to a commodity, shaped by demanders and consumers (Buyukcivelek, 2017) but it was created for the publics. (Here, as discussed by scholars like Ercan and Memlük, 2015, it should also be noted that as a result of the growing demands of consumers accessibility of some inner-city parks like Genlik Parkı, has increased. For example, before the 1990s, fences and walls surrounded Gençlik Parkı, but after the 1990s, the municipality not only removed these barriers but also increased the entrance gates of the park – please see Ercan and Memlük, 2015).

Many of the parks not only in Ankara but also in the countrywide, shared the same fate as Gençlik Parkı. Moreover, shopping malls and trade centers became a remarkable features in Turkish metropolitan cities (Oğuz, 2010). In 1989, the first shopping mall was opened in Ankara and thereafter malls became important public spaces of Turkish urban life, partly replacing what public spaces like streets and parks have been offering to the society – a ground for leisure, socialization and recreation (Erkip, 1997; Oğuz, 2010).

In the early 2000's, the total parks area in Ankara was 41 % but between 1990 and 2000, residential area in Ankara was increased in 11 %, while total green space area remained almost the same (Yeşil, 2006; Oğuz, 2010). From the beginnings of the 2000's, the neoliberal policies have accelerated and started to shape urban planning (Elicin, 2014). The early 1980's was the first years of the liberalization and transferring urban planning powers to local authorities, particularly municipalities (Unsal, 2009; Elicin, 2014). So Islamic Neoliberalism era in Turkey took power from urban poor's (Tuğal, 2006) and formed the government in 2002. Sharing the urban utilities shifted to poorer areas in Ankara (Batuman, 2013). Poor neighborhoods took more urban services and more parks were built but, according to Batuman (2013),

these developments aimed at promoting consumption rather than ensuring urban equity. This aim manifested itself in the design of parks. Lots of parks were occupied by street vendors, cafes, restaurants and wedding saloons (e.g., Gençlik Parkı, Altın Park and Göksu Parkı in Ankara).

Unlike some other countries, in Turkey, recreational facilities and urban parks are supplied by local governments (Erkip, 1997). Metropolitan and district municipalities have a power to supply recreational facilities. The metropolitan municipalities are usually responsible for parks larger than 30.000 m2 area. While smaller ones are generally under the responsibility of district municipalities. But that cause some problematic issues because of the bureaucratic confusion (Erkip, 1997). It is claimed that, fragmented systems may cause insufficient services for poor neighborhoods (Erkip, 1997; Jones, 2017). However, today some parks in Ankara which provided by district municipalities are larger than 30.000 m2 (e.g., Çankaya Zafer Parkı).

3.2. Site Selection

In order to answer the research questions posed in this study, the author selected all the urban public parks in Ankara owned and managed by the Metropolitan Municipality. By the time this study was conducted, there were 18 urban parks in Ankara, named by the city "prestigious parks" (please see: https://www.ankara.bel.tr/cevrekorumavekontrol/peyzaj-uygulama/prestij-parklari/, Last Access: Aug. 19, 2019). The author selected all of these prestigious parks: Altınpark, Mavi Göl, Mogan Parkı, Kuzey Yıldızı, Dikmen Vadisi, Göksu Parkı, Harikalar Diyarı, Öveçler Vadisi, Muhammed Ali Esertepe Parkı, 50. Yıl Parkı, Kurtuluş Parkı, Gençlik Parkı, Gökçek Parkı, Keçiören Evcil Hayvanlar Parkı, Güvenpark, Botanik Parkı, Çankaya Seymenler Parkı and Abdi İpekçi Parkı (see Figure 3.1).

As Figure 3.1 illustrates, most of the urban parks (n=7 out of 18 parks) are concentrated in the inner city, extending from Ulus (Gençlik Park) to the south of the city. As was previously discussed in this chapter, some of these urban parks (e.g.,

Güvenpark, Çankaya Seğmenler Parkı) were designed by Jansen during the early Republican era. Figure 3.1 also shows that 5 out of 18 parks are located in the North of the City, 2 parks are located on the North Western corridor of the city, and 1 park is located on the South East of the city in the urban edge. There are no parks in the South Western corridor of the city, one of the major growth axes of Ankara with many suburban housing developments.

The Çankaya district includes Güvenpark, Abdi İpekçi Parkı, Kurtuluş Parkı, 50. Yil Parkı and valley parks like Dikmen Vadisi, Öveçler Vadisi, Botanik Parkı and Seğmenler Parkı. Mamak and Gölbaşı districts have Mavi Göl and Mogan Parkı respectively. Altındağ district includes Gençlik Parkı and Altınpark. In Keçiören, Evcil Hayvanlar Parkı, Muhammed Ali Esertepe Parkı, Gökçek Parkı and Kuzey Yıldızı which is located nearby the Pursaklar district.

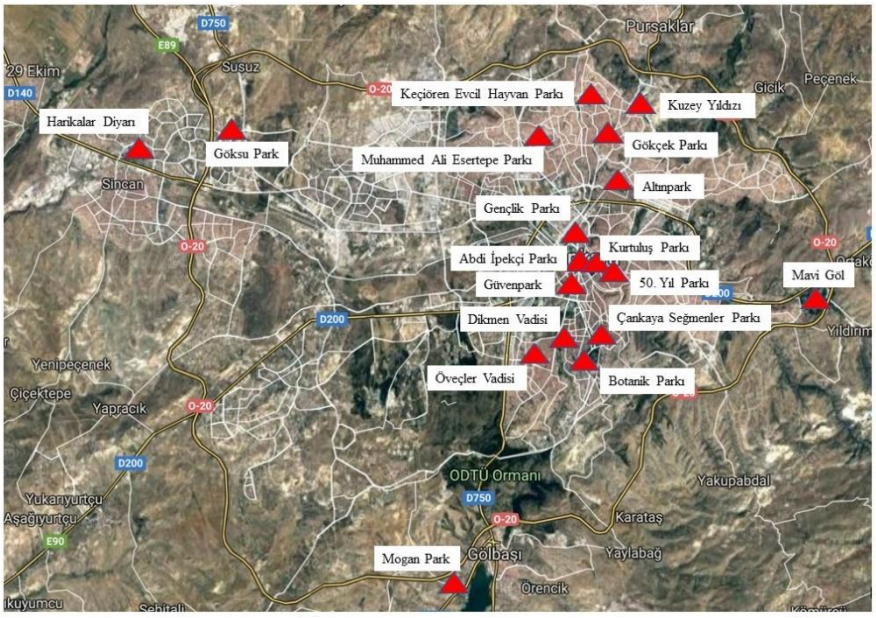


Figure 3.1. Distributions of urban public parks in Ankara.

Figure 3.2 shows the 18 urban public parks in detail and Table 3.1 summarizes the characteristics of the selected urban parks in Ankara. According to table 3.1, the size

of the chosen parks vary from 2,120,694 m^2 (Mavi Göl) to 19,000 m^2 (Keçiören Evcil Hayvanlar Parklı). All parks contain a number of features (like grasslands and playgrounds), some more than the others.

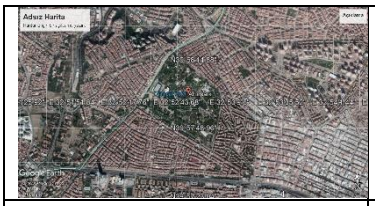
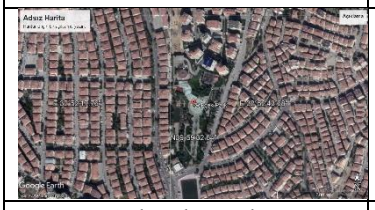
		
Altınpark	Mavi Göl	Mogan Parkı
		
Kuzey Yıldızı	Dikmen Vadisi	Göksu Parkı
		
Harikalar Diyarı	Öveçler Vadisi	Muhammed Ali Esertepe Parkı
		
50. Yıl Parkı	Kurtuluş Parkı	Gençlik Parkı
		
Gökçek Parkı	Keçiören Evcil Hayvanlar Parkı	Güvenpark

Figure 3.2. (cont'd)

Botanik Parkı	Çankaya Seğmenler Parkı	Abdi İpekçi Parkı

Figure 3.2. Urban public parks in Ankara.

Table 3.1. Characteristics of the urban public parks in Ankara.

List of parks	Area	Features	Location	Year
Altınpark	Total 640,000 m^2 250,000 m^2 for grass area 2,070 m^2 for children playground	Olympic pool, international exhibition center, science and culture centers, indoor and outdoor sports halls, performance halls, restaurants, pond and gardens, greenhouses, horse barn.	Inner city, 5 km to Kızılay (city center)	1985

Table 3.1. (cont'd)

Mavi Göl	Total 2,120,694 m^2 , 85,000 m^2 for grass area, 1,254,271 m^2 for picnic area, 601,473m^2 for water area	Kiosques, children's playgrounds, basketball and football courts, mini golf course, condition implements, security huts, rest rooms, ferforje pergola, shady spots, gazepos, picnic tables.	Urban periphery, 12 km to city center	2005
Mogan Parkı	663,000 m^2 total area, 3,774 m^2 for children playgrounds, 13,245 m^2 for sports area, 1,115 m^2 for running paths	Picnic areas, suspension bridge and an island, wooden coastal path, running and walking paths, playgrounds for disabled children, tennis courts, tennis, golf and mini football and basketball courts, riding center, a research center for Mogan Lake, a light house, boathouse, water tank, restaurants, information centers, skateboarding and bicycle clubs, an amphitheater, sitting benchs, an observation terrace	Urban periphery, 14 km to city center	2004

Table 3.1. (cont'd)

Kuzey Yıldızı	441,696 m^2 total area, 173,530 m^2 for grass area, 2,365 m^2 for children playground, 1,624 m^2, for running paths, 74,940 m^2 for pond and fountains	musical waterworks, a mosque, tea gardens, women's and elders' centers, cafeterias, a reception room, an amphitheater, a fitness saloon, a wedding hall, a guest house, restrooms, a youth center, restaurants and car parking area	Urban periphery, 9 km to city center	2014
Dikmen Vadisi	378,695 m^2 total area with two stages, 249,769 m^2 for grass area, 1,050 m^2 for children playground. The third stage contains 160,039 m^2 for grass area, 613 m^2 for children playground and 1,369 m^2 for sports area within 240,381 m^2 whole area	ponds, an amphitheather, an amusement park, an amusement park, bike riding areas, gardens, playgrounds	Inner city, 3 km to city center	Has 3 stages; 1994, 2002, 2009

Table 3.1. (cont'd)

Göksu Parkı	510,000 m^2 total area, 11,657 m^2 for picnic area, 1,46 m2 for sports area, 2,828 m^2 for children playground, 2,201 m^2 for running paths, 123,591 m^2 with water surface and 185,006 m^2 for grass area	Barbeque and camelias, sitting benches, taps, sculptures, floating piers, wooden path	Urban periphery, 19 km to city center	2003
Harikalar Diyarı	One of the largest parks in Ankara with 1,320,000 m^2 total area, 92,000 m^2 for artificial lakes, 650,000 m^2 total green spaces, 330,000 m^2 for walking areas, 41,000 m^2 for car parking area, 3,507 m^2 for children playground, 5,415 m^2 for picnic area	Boats and paddle boats, firm grounds, a toy city, sitting benches, picnic tables, pergola with barbecues, go-kart, skateboard, model ship floating zone, model plane and car field, astroturfs, basketball fields, mini golf courses, table tennis and tennis courts, an amphitheater, trip by train	Urban periphery, 23 km to city center	2004

Table 3.1. (cont'd)

Öveçler Vadisi	149,629 m^2 total area, 102,877 m^2 for grass area, 1,730 m^2 for pond, 812 m^2 for children playground, 909 m^2 for running paths, 3,787 m^2 for sports area	Grass area for football, basketball and tennis courts	Inner city, 3 km to city center	2012
Muhammed Ali Esertepe Parkı	Total 141,149 m^2 area, 54,146 m^2 for grass area, 15,600 m^2 for pond, 1,488 m^2 for children playground, 170 m^2 for condition activity	Picnic and sports area, pergolas, a mini football ground, a basketball court and tribunes, running paths, car parking area, family wellness centers, public education and youth centers, cafés and restaurants, boutiques, an amphitheater and sport centers.	Inner city, 7 km to city center	2015

Table 3.1. (cont'd)

50. Yıl Parkı	Total 135,000 m² area, 3,788 m² for pond, 51,612 m² for grass area, 1,140 m^2 for children playgrounds, 400 m^2 for ice skating, 10,500 m^2 for amusement park, 2,242 m^2 for sports and playfield, 25,500 m^2 for picnic area	An astroturf, basketball courts, a car parking area, camelias, pergolas for bird's eye view, cafés, a flagstaff	Inner city, 2 km to city center	1970
Kurtuluş Parkı	86,200 m^2 total area, 49,000 m^2 for grass area, 2,000 m^2 for pool, 10,000 m^2 for picnic area, 3,000 m^2 for children playground, 200 m^2 for sports and playfield	Ponds, sculptures, picnic and sports area, running paths, artificial ice rink	Inner city, 0,80 km to city center	1963

Table 3.1. (cont'd)

Gençlik Parkı	275,000 m^2 total area, 44,296 m² for pool, 70,422 m² for grass area, 1,029 m² for children playground, 25,000 m² for amusement park, 10,000 m² for an opera house, 8,000 m^2 for The Theatre of Ankara Metropolitan Municipality	Restaurants, tea gardens, an opera building, amusement park, an artificial logoon and sport centers, a youth center, culture centers	Inner city, 2 km to city center	1935
Gökçek Parkı	53,746 m^2 total area, 15,000 m^2 for grass area, 4,997 m^2 pool with fountains, 1,039 m^2 for playground, 500m^2 for children playground	Tennis tables, a spider playground, indoor sitting sets, a football ground, pergolas, sitting benches, tea gardens and restaurants, a café used for wedding hall	Inner city, 8 km to city center	2000
Keçiören Evcil Hayvanlar Parkı	19,000 m^2 total area, 8,000 m^2 for grass area, 500 m^2 for children playfield	Poultry, pheasants, Cameroon sheeps, hair goats, parrots, ostriches, cranes, dogs, Sivas kangal dog, Belgian wolf, ponies, Angora goat, roe deer, black crowned crane, aquarium fish	Inner city, 10 km to city center	1997

Table 3.1. (cont'd)

Güvenpark	19,100 m^2 total area, 8,000 m^2 for grass area, 500 m^2 for pond, 500 m^2 for children playfield	Ponds, sculptures, sitting benches	Inner city, 0.03 km to city center	1930
Botanik Parkı	56,400 m^2 total area, 15,000 m^2 for grass area, 1,000 m^2 for pool area, 100 m^2 for children playfield, 200 m^2 for sporting activity	World peace gong monument, Angora goat sculptures, ponds and an artificial lake, a serum, a rose garden, gardens, sculptures and playgrounds	Inner city, 4 km to city center	1970
Çankaya Seğmenler Parkı	57,250 m^2 total area, 40,000 m^2 for grass field, 250 m^2 for children playground	Ponds, playgrounds, walking paths, an open air theatre, a folk monument for Seğmens	Inner city, 4 km to city center	1983
Abdi İpekçi Parkı	33,120 m^2 total area, 8,295 m^2 for grass area, 6,376 m^2 for pool, 250 m^2 for children playground	Grass areas, a bigger sculpture tea gardens, ponds and playgrounds, sitting benches	Inner city, 0,70 km to city center	1981

3.3. Data Analysis

3.3.1. GIS analysis for measuring street connectivity

The data was provided Ankara Metropolitan Municipality upon request. It was the most up-to-date data available in the municipality. The data has .ncz extension that can run by Netcad program but geometric features of the data can be used in ArcMap 10.6.1 by running CAD Reader software extension. So, "connect to folder" operation

can be possible for .ncz data (Figure 3.3). Add data command brings districts in Ankara. Each districts has 8 features (Figure 3.4), but only one or two features are operable. DISTRICTNAME_Çokgen (Polygon) includes blocks, streets. DISTRICTNAME_Çizgi (Line) shows streets and initial state of the blocks. Both of them have problematic lines as extra lines or no lines (Figure 3.5).

ArcMap can display DISRICTNAME_Polygon and DISTRICTNAME_Line data while DISTRICTNAME_Line used when the DISTRICTNAME_Polygon has missing features. (i.e., KECIOREN_Line and KECIOREN_Polygon used together). That problem sourced from metropolitan sub-provincial municipalities because of the lack of data implementation.

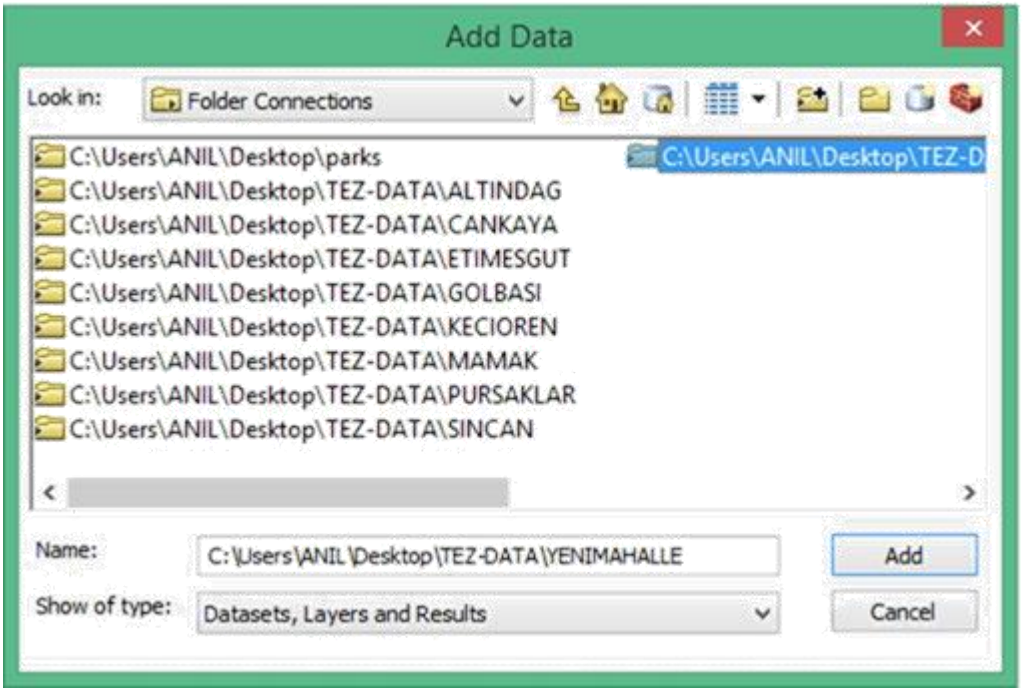


Figure 3.3. The connect to folder operation.

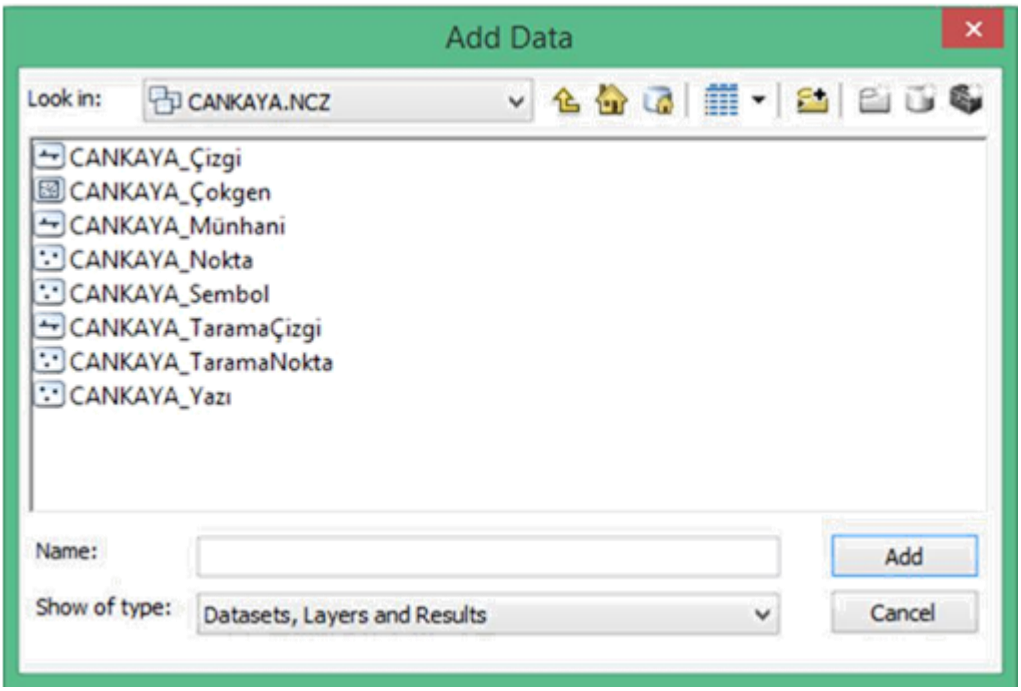


Figure 3.4. The 8 attributes of Çankaya district.

Figure 3.5. The screenshot shows that there are no lines (in the circle) and there are some extra lines (in the dotted line circle) in the data.

For example, CANKAYA_Çokgen, shapefile, brings the all of the urban geometric features of Çankaya district (Figure 3.6). Then, Güvenpark polygon was digitalized by following the basemap lines (Figure 3.7). Next the author created buffer polygon around the input feature (border line of parks) by buffer tool in geoprocessing. 800m is the specified buffer distance for each park (Figure 3.8). Research shows that people tend to walk no more than 800m (10 minutes) to access to an urban park (Moudon et al., 1997). Thus, most urban designers and urban planners evaluated connectivity within 800m buffer zone (De Chiara et al., 1995; Duncan et al., 2011; Manaugh and El-Geneidy, 2011). Then, streets were digitized as polyline for connectivity analysis (Figure 3.9).

Figure 3.6. The geometric features of Çankaya district.

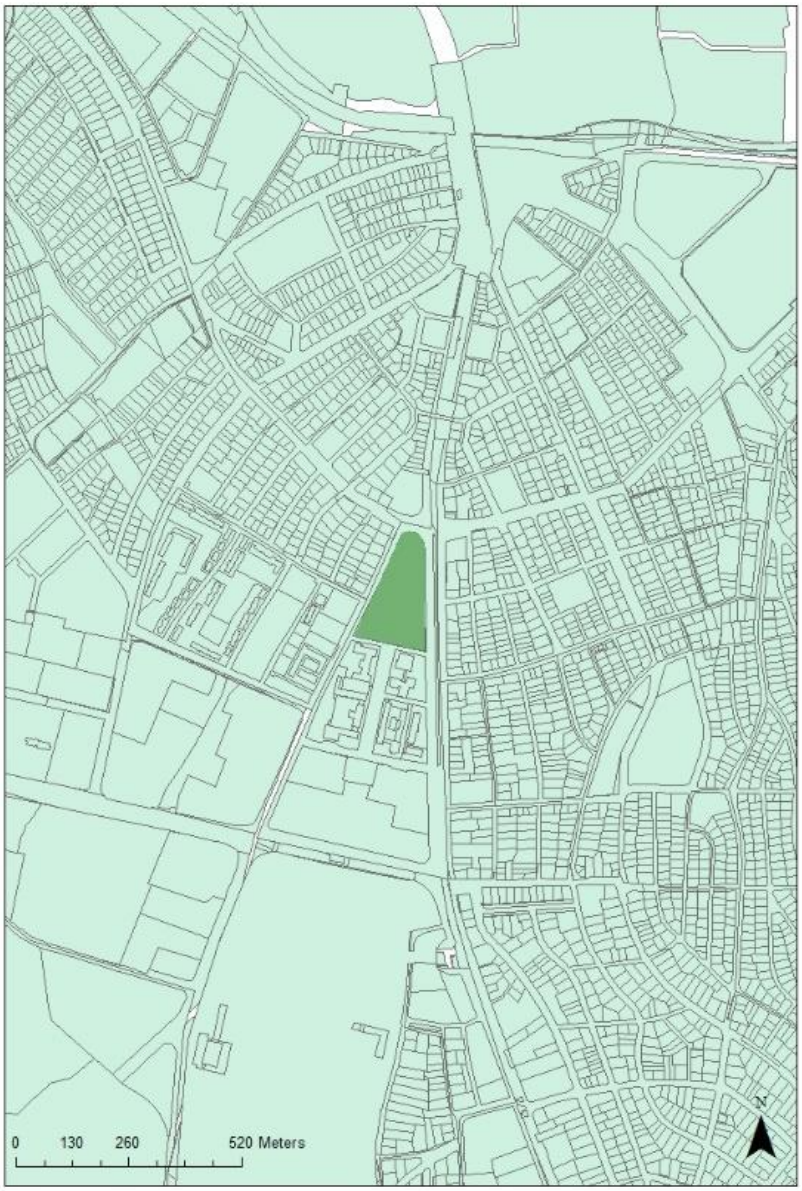


Figure 3.7. The digitization as a polygon by following base map.

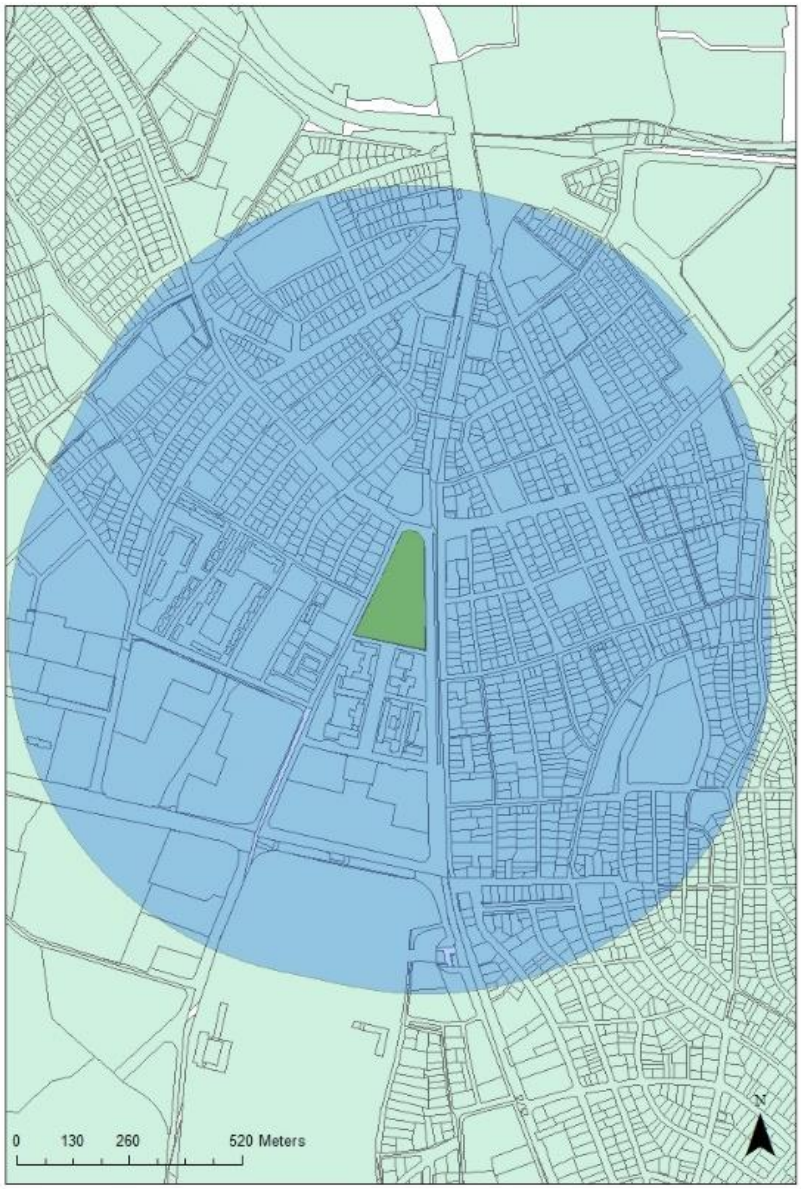


Figure 3.8. The 800 m-buffer around polygon.

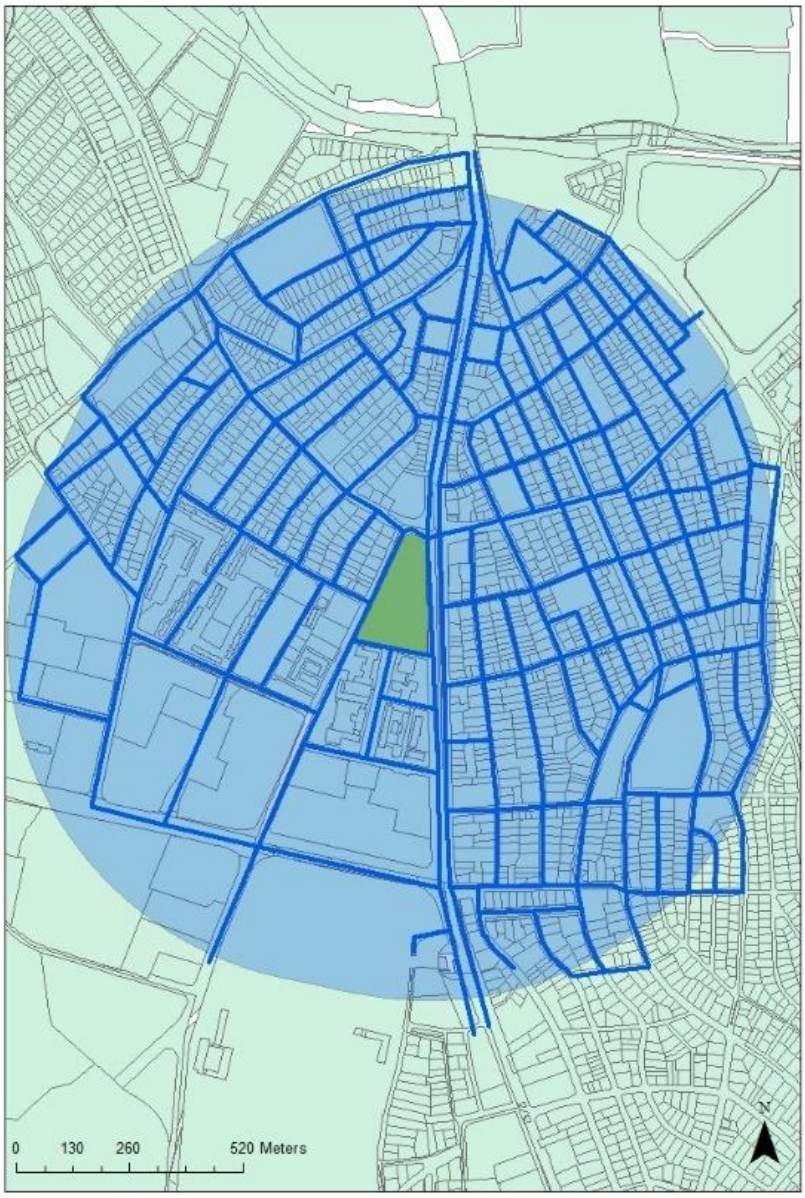


Figure 3.9. The digitized streets as polyline for connectivity analysis.

Before using the network analysis tool, errors (pseudo nodes and dangles) were checked by using topology tool. Figure 3.12 shows the pseudo and dangle nodes errors and real nodes.. To this end, firstly, in the table of contents, a new data layer was exported from polyline layer. In the catalog, the new personal geodatabase was created

and new exported data layer (Export_Output) was added to the geodatabase. A new feature dataset was created under the new personal geodatabase, this was named as error_check. After the choosing the same coordinate system for “error_check”, the new personal geodatabase has two attributes. Now, a new feature class (multiple) under the error_check was created and Export_Output features inserted into error_check and automatically named as Export_Output_1. Left click on error_check and topology features were selected. During the process, Export_Output_1 was selected and added rules to apply on Export_Output_1. Selected rules are “must not have dangles” and “must not have pseudo nodes”. So the new topology can be created under the error_check and can be seen on the base map if the feature wafted to table of contents (Figure 3.10). The author chose the “start editing” on Export_Output_1, then topology on ArcMap toolbar were selected. When the topology toolbar appeared on the screen, error inspector was selected to observe the errors. Figure 3.11 shows the dangles error in the list.

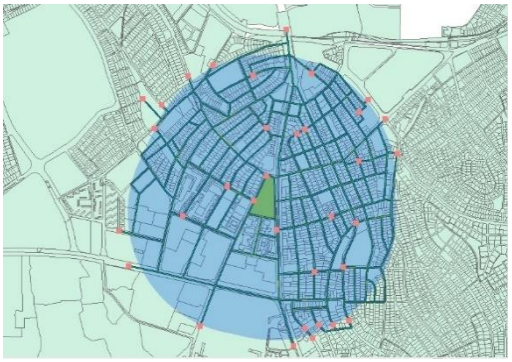


Figure 3.10. The error points after error check operation.

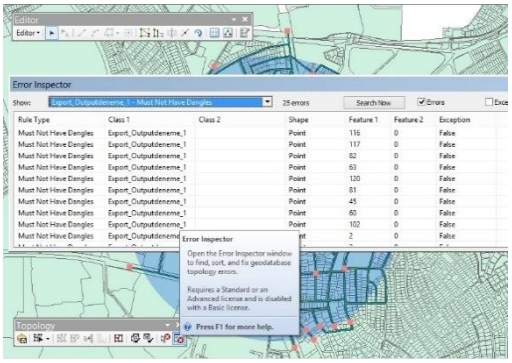


Figure 3.11. The error list.

In ArcToolbox, extend line and trip line tools can repair the dangle nodes in Export_Output_1. After using the tools, validate section clean all dangle nodes. Now the remaining ones were the only pseudo nodes. The 10 pseudo nodes can be seen on the list and on the map (Figure 3.13). Pseudo nodes can be repaired after selecting the “merge to largest” operation. Figure 3.14 shows the errorless map after validate

topology operation. Apart from these, pseudo and dangle nodes can also clear by using snapping command.

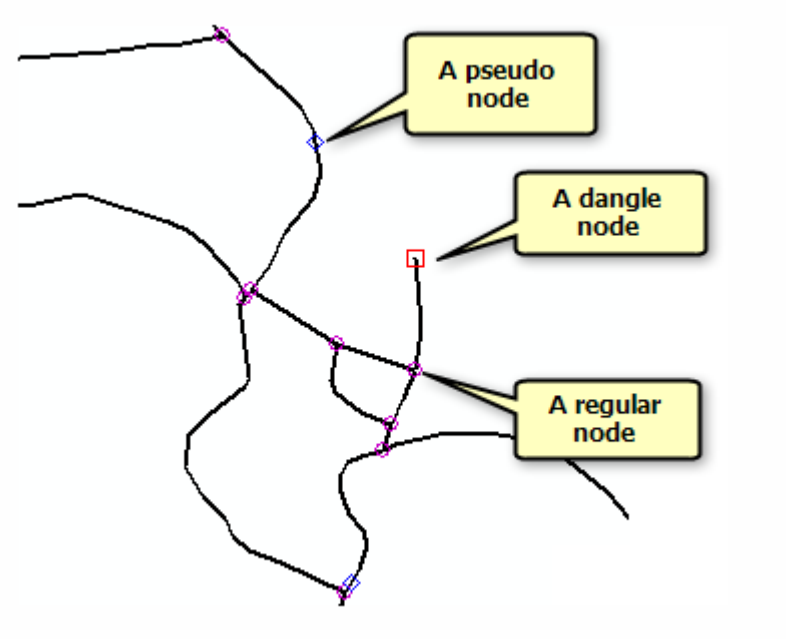


Figure 3.12. Dangle, pseudo and real (regular) nodes (Source: https://desktop.arcgis.com/).

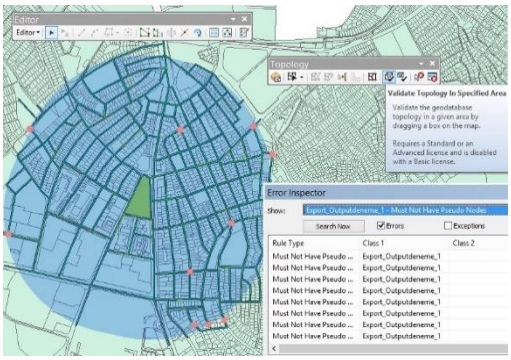


Figure 3.13. The ten pseudo nodes on the map and the list.

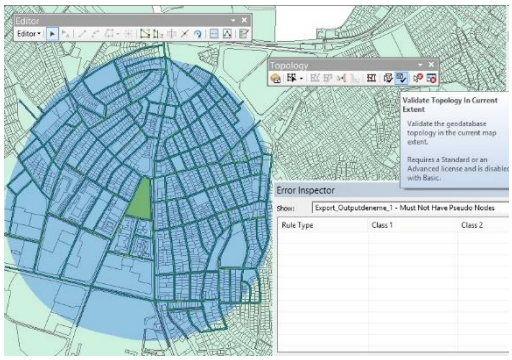


Figure 3.14. There is no error on the map and the list.

To calculate the connectivity index of the streets inside buffer, intersection points must be detected by network analysis. For this purpose, firstly, a new file geodatabase was

needed. It was created and named as network analysis. A new feature dataset must be added in the new file geodatabase, named as streets1. That streets1 must have a feature data to operate network analysis. For that, Export_Output_1 was used because it had no errors. But, export data operation from Export_Output_1 could be useful to avoid any confusion because of the name similarity. That exported data was named as Export_Output_2 and later imported in streets1 featured data set. Then, new network dataset section was selected on streets1 dataset. That was named as streets1_ND. Next, the feature class of Export_Output_2 was selected to participate in the new network dataset. Figure 3.15 shows the build network dataset.

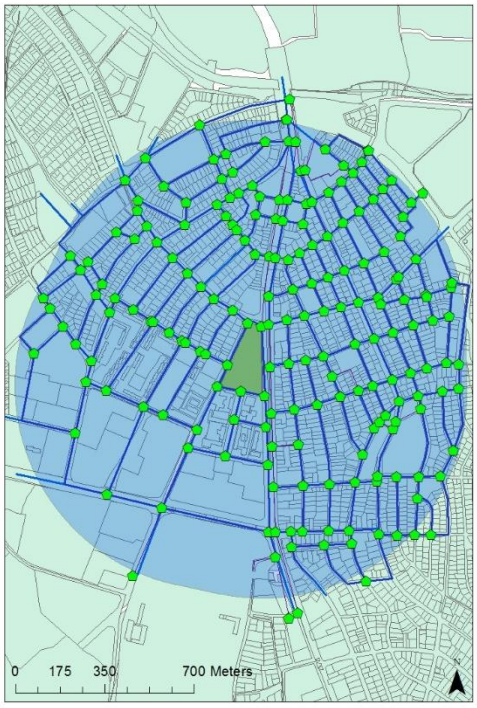


Figure 3.15. The build network dataset

The geoprocessing tool of "intersect" was used to eliminate junction points out of the buffer zone. In the table of contents, streets1_ND_Junctions features were spontaneously created after new network dataset operation. In the intersect tool,

streets1_ND_Junctions and Parkname_buffer were used as input variables and "output type" selected as point type. Figure 3.17 shows the black points that exist in buffer zone. These black points show intersection points within the buffer zone. Sum of the points in buffer zone was used for the street connectivity with the area of the buffer zone. As already mentioned, intersection density (Figure 3.16) is used to calculate the connectivity index.

$$intersection\ density = \frac{\#\ of\ nodes\ within\ the\ buffer\ area}{size\ of\ the\ buffer\ zone}$$

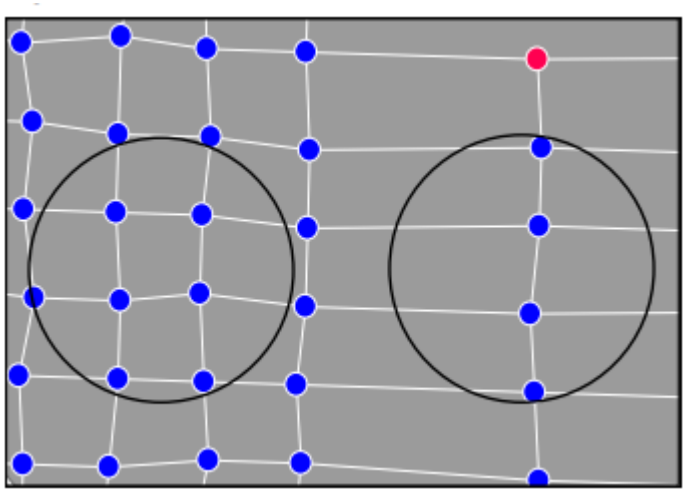


Figure 3.16. The intersection densities (Source: https://ibis.geog.ubc.ca/).

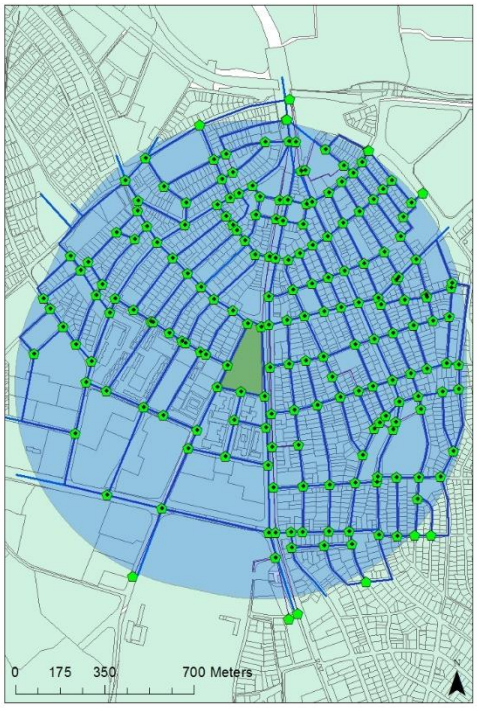


Figure 3.17. The intersection points within the buffer zone.

There were instances where the author observed that the data received from the municipality did not match with the image from Google Earth 2019. To increase the accuracy of the data, the author matched all the files received from the municipality with Google Earth satellite images, and then cleaned the geo data to reflect the current status (what is seen in Google Earth satellite images). For example, in the northwestern part of the Göksu Parkı, according to the satellite images, there was an undeveloped area, but in the data received from the municipality, one can see streets and buildings in this undeveloped land (Figure 3.18). These were the data coming from the approved plans; since such developments have not been realized yet, to increase the accuracy of the findings, the author cleaned such data before starting the analysis process.

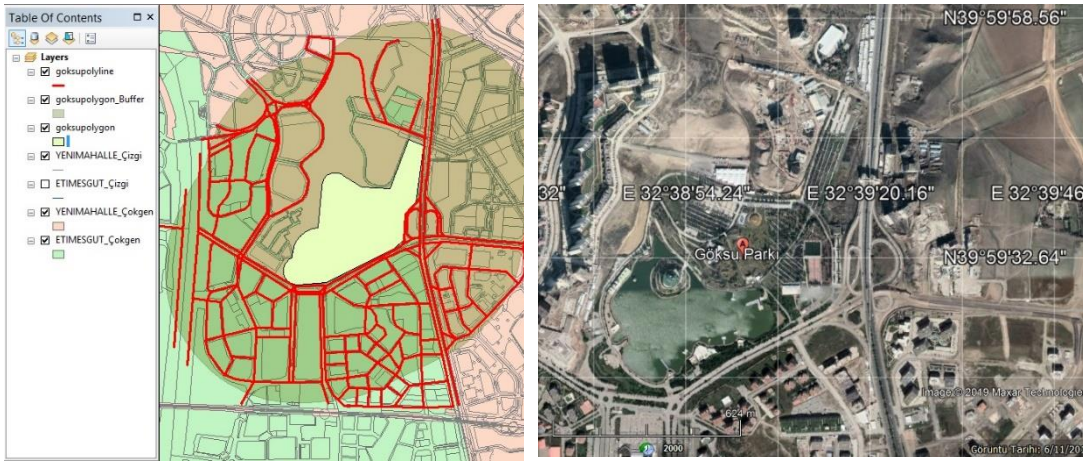


Figure 3.18. The difference between the data obtained from Ankara Metropolitan Municipality and the image from Google Earth 2019.

To calculate each buffer area, the author opened the attribute table of relevant buffer layer in the table of contents. In the attribute table, a new field was added to the table to show the area of each urban park. Next, Add Field window is opened to fill the features of the new table. In this study, name field is typed as “buffernamesqkm” like Guvenpark_Buffer_sqkm and type selected as double (Figure 19). This step was followed with the process where the author calculated the geometry.

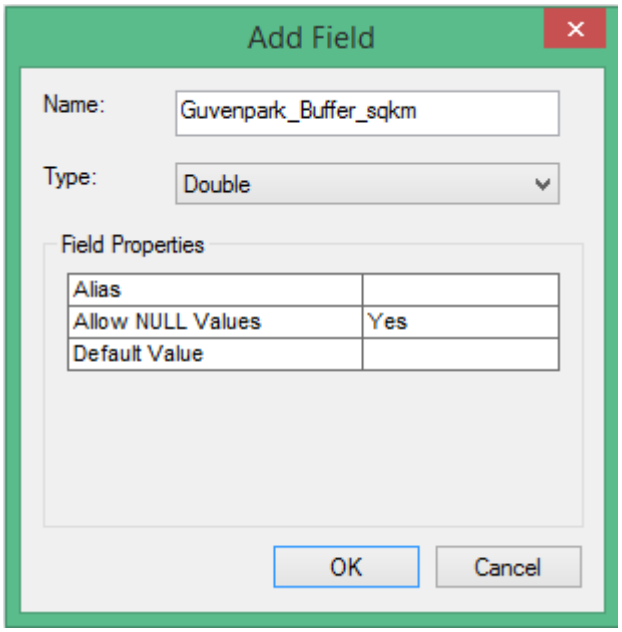


Figure 3.19. The add field table.

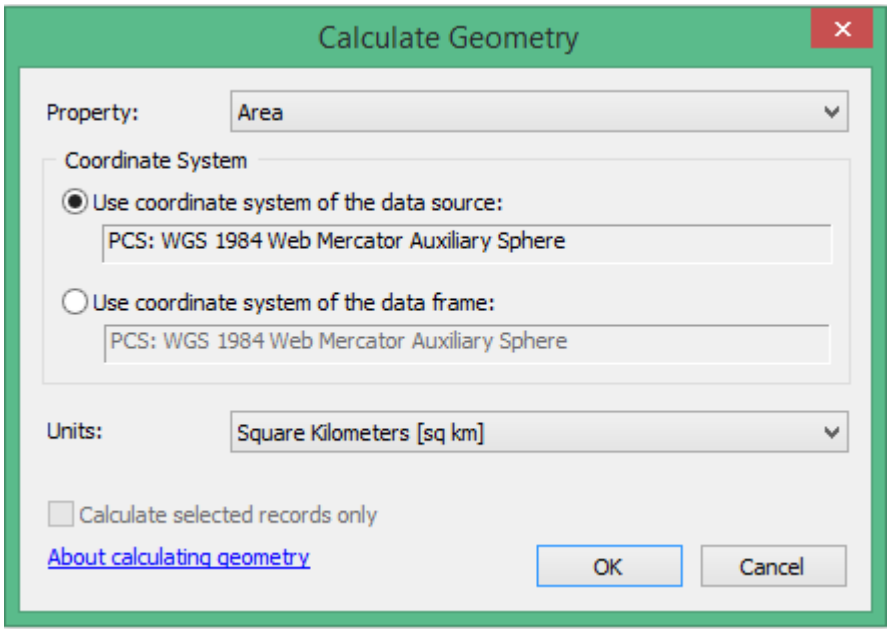


Figure 3.20. The table of calculate geometry.

To calculate geometry, right click on Guvenpark_Buffer_sqkm and calculate geometry command is selected. In the Calculate Geometry window, the Units section selected as Square Kilometers. After selecting confirmation, the field of Guvenpark_Buffer_sqkm is filled with a value in kilometrical unit (Figur 3.20).

3.3.2. Understanding the relationship between the buffer street connectivity index of urban parks in Ankara, park size and the economic characteristics of the residents

Once the buffer connectivity index of each of the 18 chosen urban parks in Ankara was calculated, the thesis aimed to understand the relationship between the connectivity of urban parks (or size of the urban parks) neighborhood income and park size.

As a first step, to obtain the neighborhood income data, the author checked the database of the Turkish Statistical Institute (TUIK). Seeing that no up-to-date data was available at the neighborhood (or district) level in the TUIK's website, the author contacted with TUIK. The officials in this institution informed the author that after 2000s, the are no any official data showing the income of the residents in Ankara. Furthermore, the available data represent the income of the residents at the district level rather than neighborhood level. This problem in accessing to neighborhood income was mentioned by various scholars in planning literature in Turkey, which led some researchers like Uğurlar and Eceral (2014) to rely on other sources (such as land value data from real estate agencies) to represent neighborhood income. The main assumption is that the value of rented or sale housing in a neighborhood reflect the income of the residents in a neighborhood; if the rents are very low in a neighborhood, the assumption is that less affluent people live in that neighborhood compared to neighborhoods where the rent values are higher.

The data was obtained from Uğurlar and Eceral (2014)'s article. They used real estate search engines to reach current housing market. Totally, 237103 for sale and 14225 rented housing prices were obtained. These data were dated as 3-4 October 2012.

Ankara was divided into five subregions according to economic features and housing prices were listed under the subregions as minimum rental value, maximum rental value, minimum sales value and maximum sales value. After all, they produced four thematic maps based on these four values. For this thesis these four map were used to get mean rental and mean sales values. In the thematic maps of rental values, color of each neighborhoods were detected and their number ranges averaged. For exact results ColorPix programme was used. The same process was made for sales values. For instance, Çiğdem Mahallesi: The rental values of the neighborhood in the minimum rental value map is between 601 and 800 TL, in the maximum rental value is between 801 and 1000 TL. For the new produced map, minimum and maximum values were averaged and the new value (701-900) is written on the attribute table.

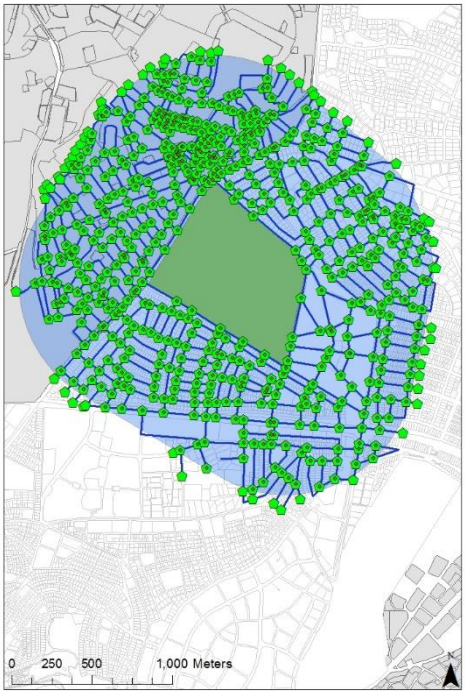
Each neighborhood was calculated and their rental and sales values were saved in attribute table. According to new values, new thematic maps were produced and eighteen urban public parks were overlapped the general map of Ankara.

CHAPTER 4

RESULTS

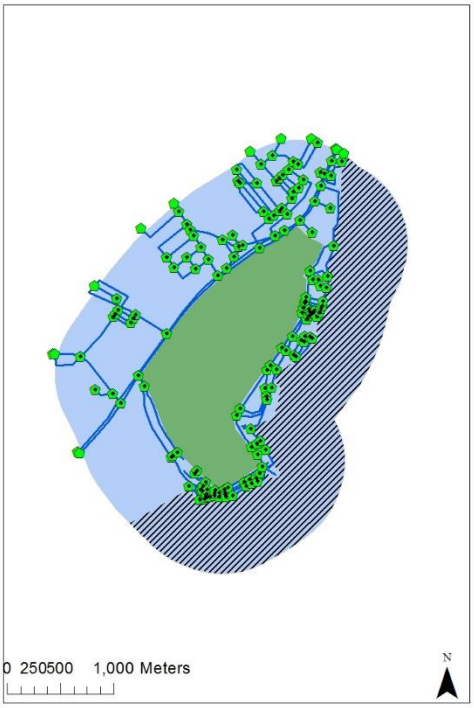
4.1. Connectivity Index of the Urban Parks in Ankara

Figure 4.1. shows the street layout of the developments that lie inside an 800 meter-buffer around each park boundary (in the figures shown below (Figure 4.2), blue shaded areas represent the 800 meter buffer, and green dots and black linear lines inside this buffer represent street intersections and streets respectively). Table 4.1. shows the number of nodes and area (in km^2) of each of the selected buffer area. The ratio of these two features inside the buffer areas provided the author the connectivity index of each park. The connectivity index of each urban park in Ankara is shown in Figure 4.2.



Altınpark

Mavi Göl

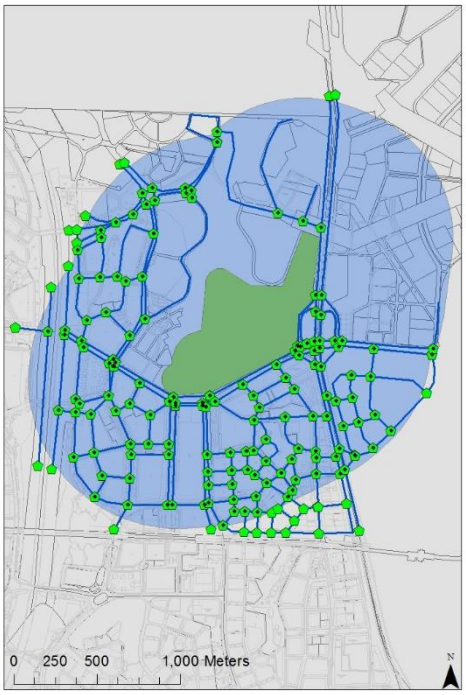


Mogan Parkı

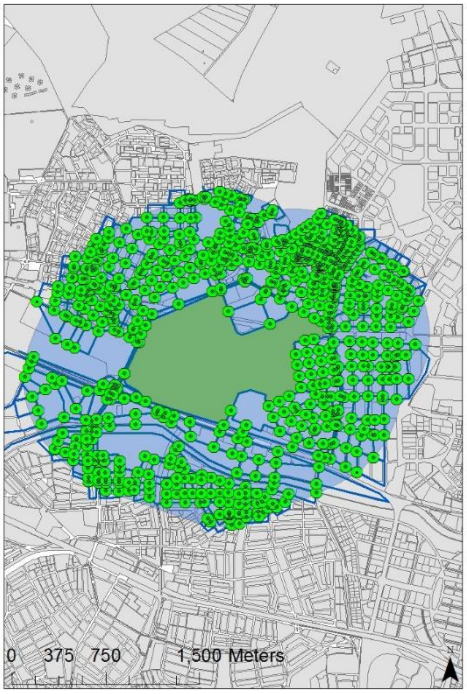
Kuzey Yıldızı

Figure 4.1. (cont'd)

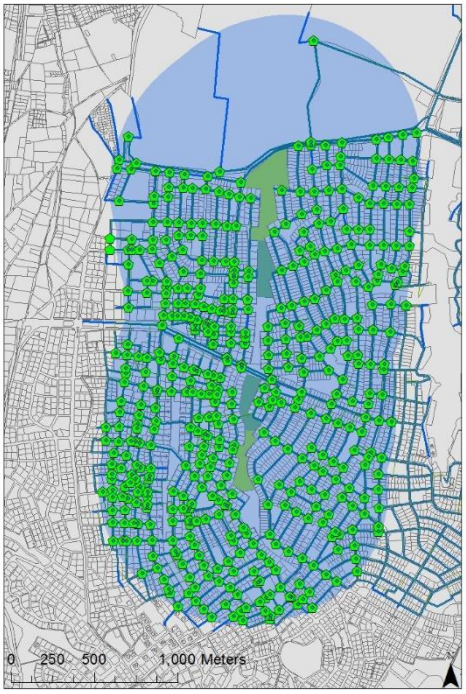
Dikmen Vadisi



Göksu Parkı

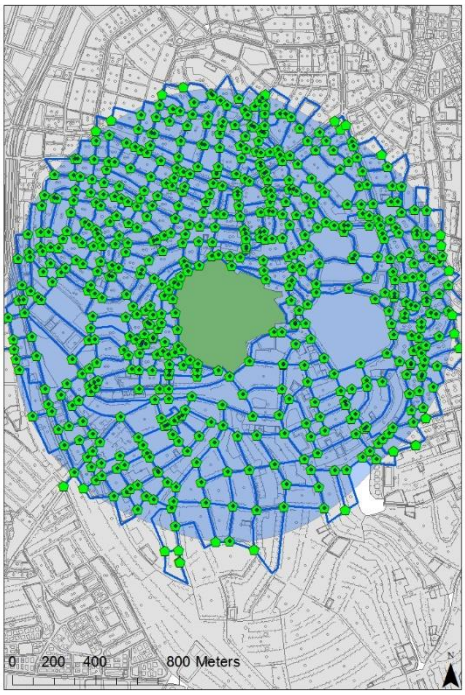


Harikalar Diyarı

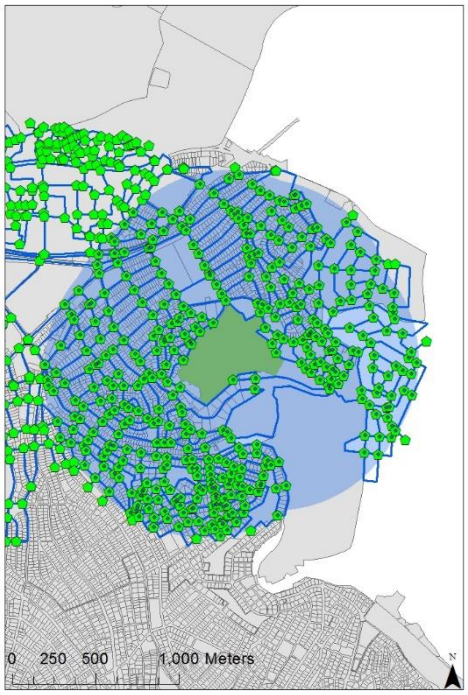


Öveçler Vadisi

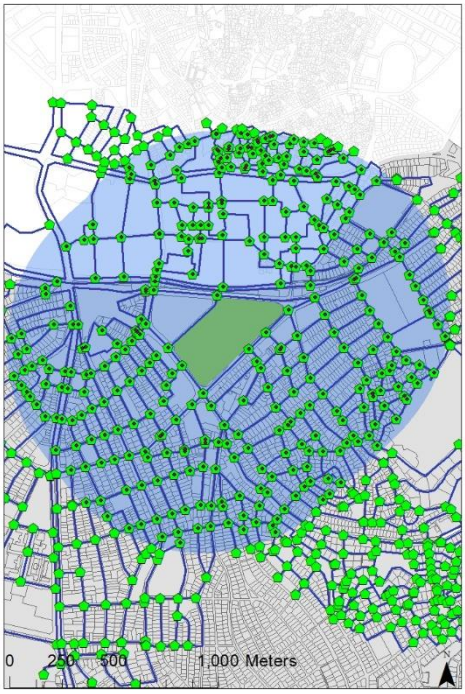
Figure 4.1. (cont'd)



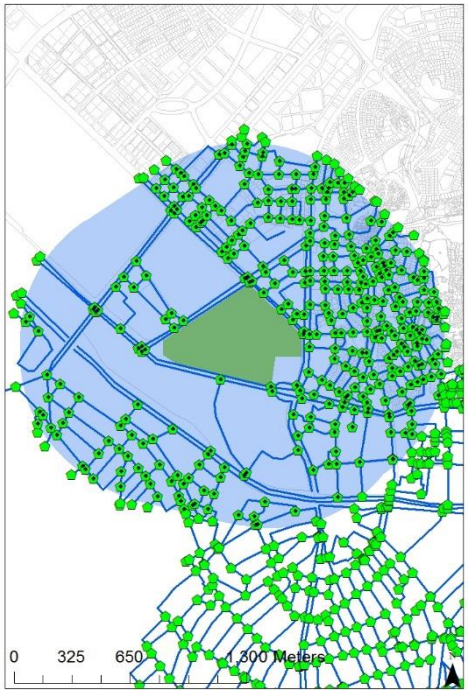
Muhammed Ali Esertepe Parkı



50. Yıl Parkı

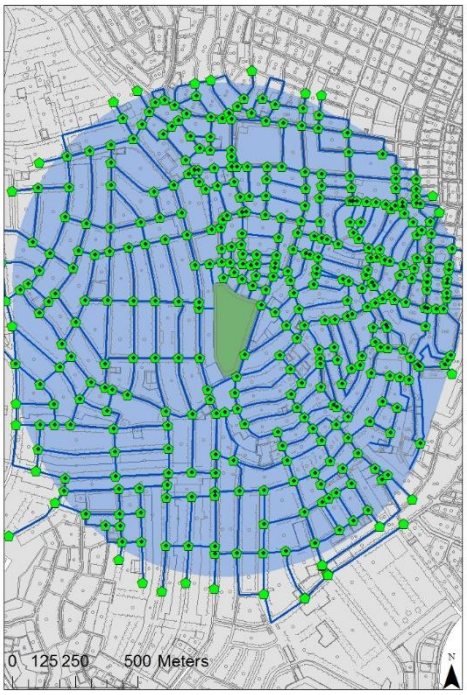


Kurtuluş Parkı

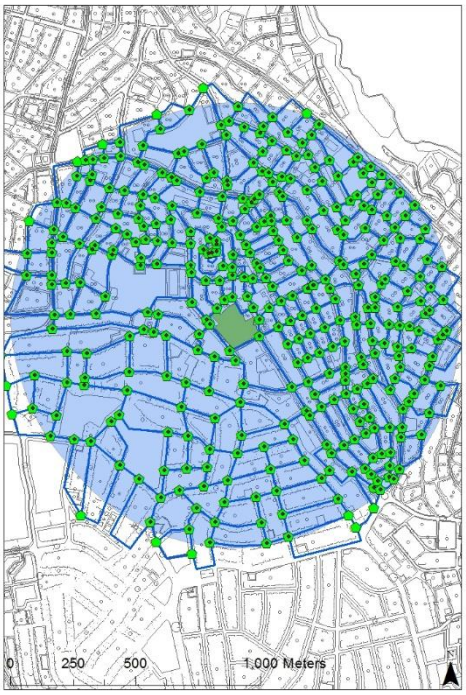


Gençlik Parkı

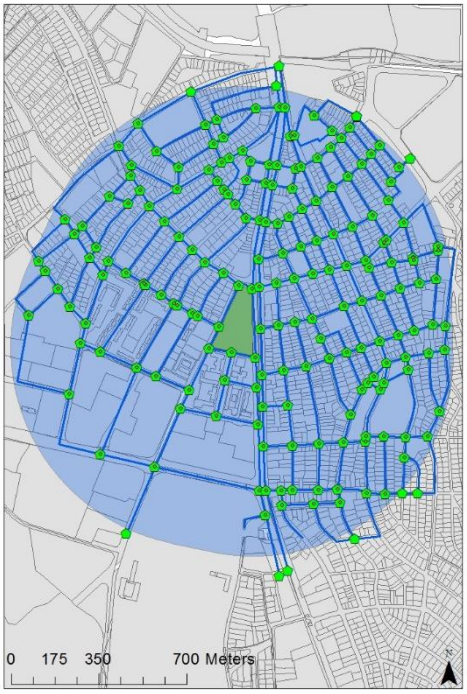
Figure 4.1. (cont'd)



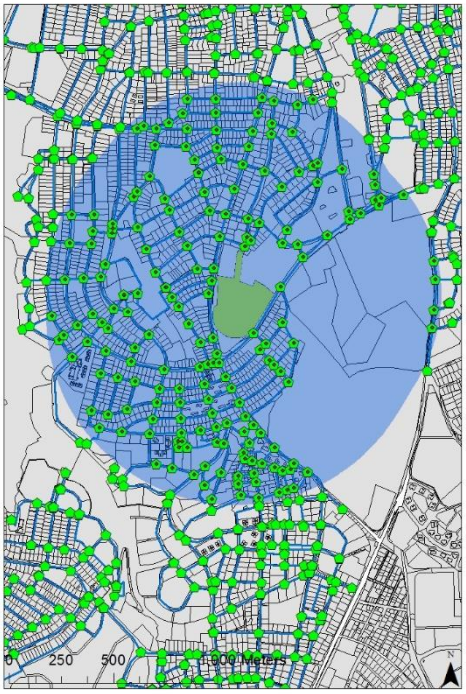
Gökçek Parkı



Keçiören Evcil Hayvanlar Parkı

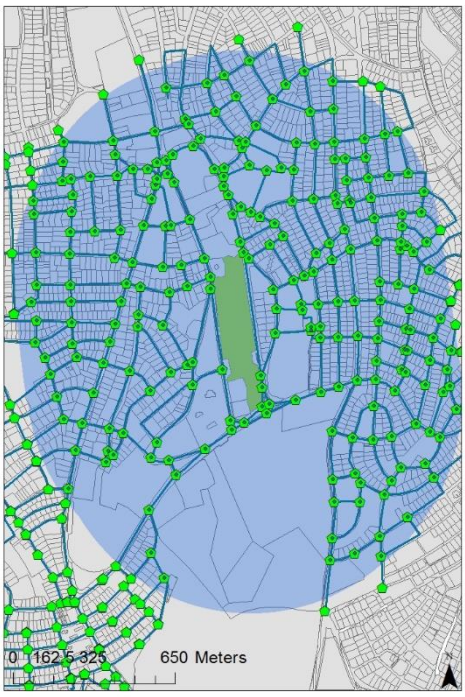


Güvenpark

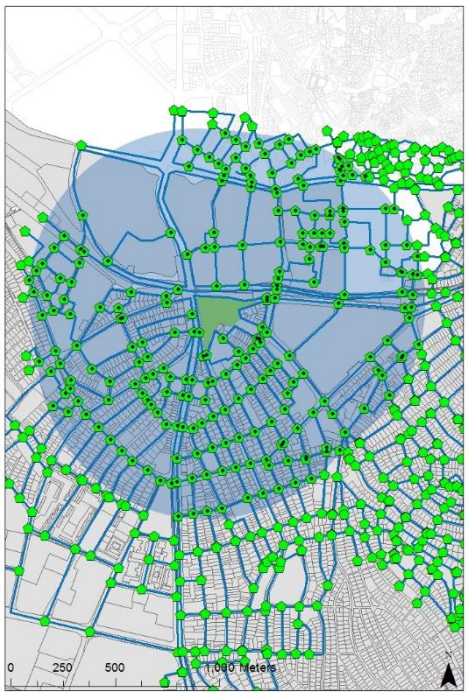


Botanik Parkı

Figure 4.1. (cont'd)



Çankaya Seğmenler Parkı



Abdi İpekçi Parkı

Figure 4.1. The street layout of the developments that lie inside an 800 meter-buffer around each park boundary.

Table 4.1. Connectivity ratio of the urban public parks in Ankara.

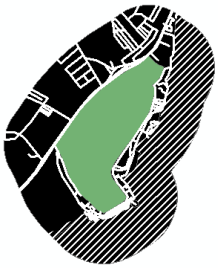
List of the parks	**Connectivity Index (# Node/Area(km^2) Ratio)**
Altınpark and its near environment	607/4521=0,134
Mavi Göl Park and its near environment	136/7611=0,018
Mogan Parkı and its near environment	152/4161=0,037
Kuzey Yıldızı and its near environment	241/6466=0,037

Table 4.1. (cont'd)

Dikmen Vadisi and its near environment	554/6909=0,080
Göksu Parkı and its near environment	159/4519=0,035
Harikalar Diyarı and its near environment	727/5523=0,132
Öveçler Vadisi and its near environment	802/3675=0,218
Muhammed Ali Esertepe Parkı and its near environment	578/3381=0,171
50. Yıl Parkı and its near environment	418/3541=0,118
Kurtuluş Parkı and its near environment	362/3151=0,115
Gençlik Parkı and its near environment	374/3658=0,102
Gökçek Parkı and its near environment	366/2764=0,132
Keçiören Evcil Hayvanlar Parkı and its near environment	372/2457=0,151
Güvenpark and its near environment	187/2606=0,072
Botanik Parkı and its near environment	193/2909=0,066
Çankaya Seğmenler Parkı and its near environment	243/3151=0,077
Abdi İpekçi Parkı and its near environment	243/2761=0,088

Altınpark **0,134**

Mavi Göl **0,018**

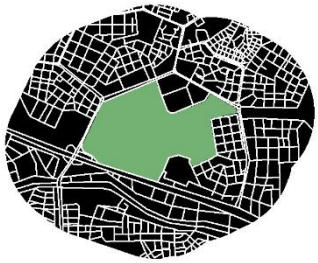


Mogan Parkı **0,037**

Kuzey Yıldızı **0,037**

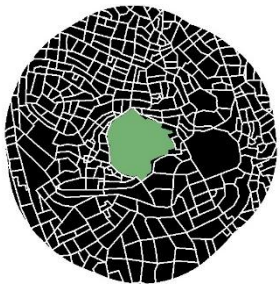
Dikmen Vadisi **0,080**

Göksu Parkı **0,035**



Harikalar Diyarı **0,132**

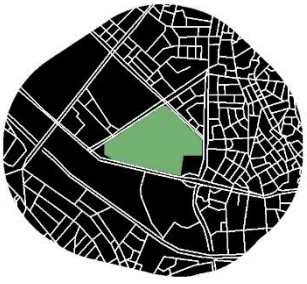
Öveçler Vadisi **0,218**



Muhammed Ali Esertepe Parkı **0,171**

50. Yıl Parkı **0,118**

Kurtuluş Parkı **0,115**

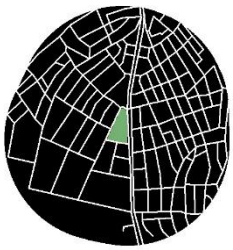


Gençlik Parkı **0,102**

Figure 4.2. (cont'd)

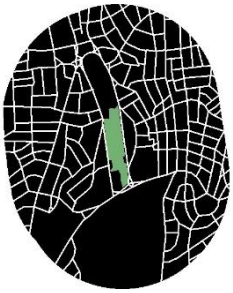
Gökçek Parkı **0,132**

Keçiören Evcil Hayvanlar Parkı **0,151**



Güvenpark **0,072**

Botanik Parkı **0,066**



Çankaya Seğmenler Parkı **0,077**

Abdi İpekçi Parkı **0,088**

Figure 4.2. Figure-ground relations and intersection density of each urban public parks in Ankara.

As Figure 4.2 illustrates, Öveçler Vadisi has the highest connectivity index (0,218) while Mavi Göl has the lowest one (0,018). Results also show that developments with grid street pattern do not always receive the highest connectivity index as opposed to developments that include windy street patterns. For example, the connectivity index of 50. Yıl Parkı, a park surrounded by windy streets, is larger than the connectivity index of Güvenpark, a park surrounded by grid streets. Mavi Göl, Mogan Parkı, Göksu Parkı and Kuzey Yıldızı are located in the periphery of Ankara where new developments are taking place. These parks received low connectivity indexes. Contrarily, the parks which received the highest connectivity index are all located in

inner-city areas. The top 4 urban parks which received the highest connectivity from highest to lowest are Öveçler Vadisi, Mehmet Ali Esertepe Parkı, Keçiören Evcil Hayvan Parkı and Altınpark. Compared to many other inner-city parks surrounded by grid street pattern developments in Ankara (like Seğmenler Parkı and Güvenpark), Keçiören Evcil Hayvan Parkı, Gökçek Parkı and Mehmet Ali Esertepe Parkı have high connectivity rates but the areas surrounding these places are characterized by and large, non-linear and windy street patterns which according to the literature mentioned previously (Tresidder, 2005; Chin et al., 2008).

4.2. The Relationship Between Connectivity Index of Public Parks and the Economic Characteristics of the Residents Living Near These Settings

Figure 4.3 and 4.4 show the relationship between the location of the selected parks regarding the rent and sale values of housing in the neighborhoods of Ankara respectively. In summary, these figures reveal that parks, which have high buffer-connectivity index like Altınpark, Harikalar Diyarı Gökçek Parkı, Keçiören Evcil Hayvan Parkı and Mehmet Ali Esertepe Parkı are generally located in neighborhoods where arguably, less affluent residents are living. A detailed examination of these figures shows that the average rental values of the housing near Altınpark is maximum 500 TL (approximately US $90). In average, houses around this park is usually sold between 82.000 and 150.000 TL. The average rental value of the houses near Harikalar Diyarı is maximum 500 TL. The houses near this park are sold to a price between 82.000 and 113.000 TL The average rental value of a housing located near Gökçek Parkı is typically between 400 and 700 TL. In average, houses around this park is usually sold to a price between 126.000 and 136.000 TL. In average, houses around Keçiören Evcil Hayvan Parkı is rented for a price between 401 and 600 TL. The sales price of the houses around this park is between 113.000 and 138.000 TL. Generally, dwellings around Mehmet Ali Esertepe Parkı are rented to a price between 401 and 700 TL. In average, houses around this park is sold to a price between 126.000 and 175.000 TL.

These figures also reveal that parks, which have low buffer-connectivity index (like Mavi Göl, Kuzey Yıldızı, Göksu and Mogan Parkı) which received a score between 0,018 and 0,037) are also generally located in neighborhoods where less affluent residents are living. They shows that the average rental value of the dwellings near Mavi Göl is typically between 401 and 500 TL. In average, houses around this park is usually sold to a price between 101.000 and 113.000 TL. In average, houses around Kuzey Yıldızı is rented for somewhat between 401 and 500 TL. The mean sale price of the houses around this park is between 101.000 and 125.000 TL. Average rental values of the housing near Göksu Parkı is typically between 401-600 TL. In average, houses around this park is usually sold between 139.000 and 200.000 TL. Mogan Parkı and its near environment has the rental values between 401 and 500 TL. The sales values around this park is around between 114.000 and 138.000 TL.

Botanik Parkı, Güvenpark, Seğmenler Parkı, Dikmen Vadisi and Abdi İpekçi Parkı are located in the core of the city and these parks and their near environment has high rental and sales values. The average rental values of the housing near Botanik Parkı is typically between 601 and 900 TL. In average, houses around this park is usually sold between 176.000 and 303.000 TL. In average, houses around Güvenpark is rented for somewhat between 701 and 1100 TL/month. The mean sale price of the houses around this park is 164.000 and 303.000 TL. Seğmenler Parkı and its near environment has the average rental values between 701 and 1250 TL. The same park and its near environment has the sales values between 176.000 and 328.000 TL. Dikmen Vadisi and its near environment is between 401 and 1000 TL rental values and 126.000 - 315.000 TL in sales values. Abdi İpekçi Parkı and its near environment has the rental house values between 901 and 1100 TL. In average, houses around this park is usually sold between 189.000 and 225.000 TL. Gençlik Parkı and Kurtuluş Parkı has mid-high connectivity index, and their rental-sales housing values are high but 50. Yıl Parkı which has the similar connectivity index, has average rental and sales values. Gençlik Parkı and its near environment has the rental values between 401 and 1100 TL. The mean sale price of the houses around this park is between 101.000 and 200.000. The

average rental values of the housing near Kurtuluş Parkı is typically between 701 and 1100 TL. In average, houses around this park is usually sold between 164.000 and 225.000 TL. In average, houses around 50. Yıl Parkı is rented for somewhat between 501 and 900 TL/month. The mean sale price of the houses around this park is between 88.000 and 189.000 TL. Finally, Öveçler Vadisi and its near environment has the rental values between 401 and 900 TL/month. The mean sale price of the houses around this park is between 126.000 and 188.000 TL.

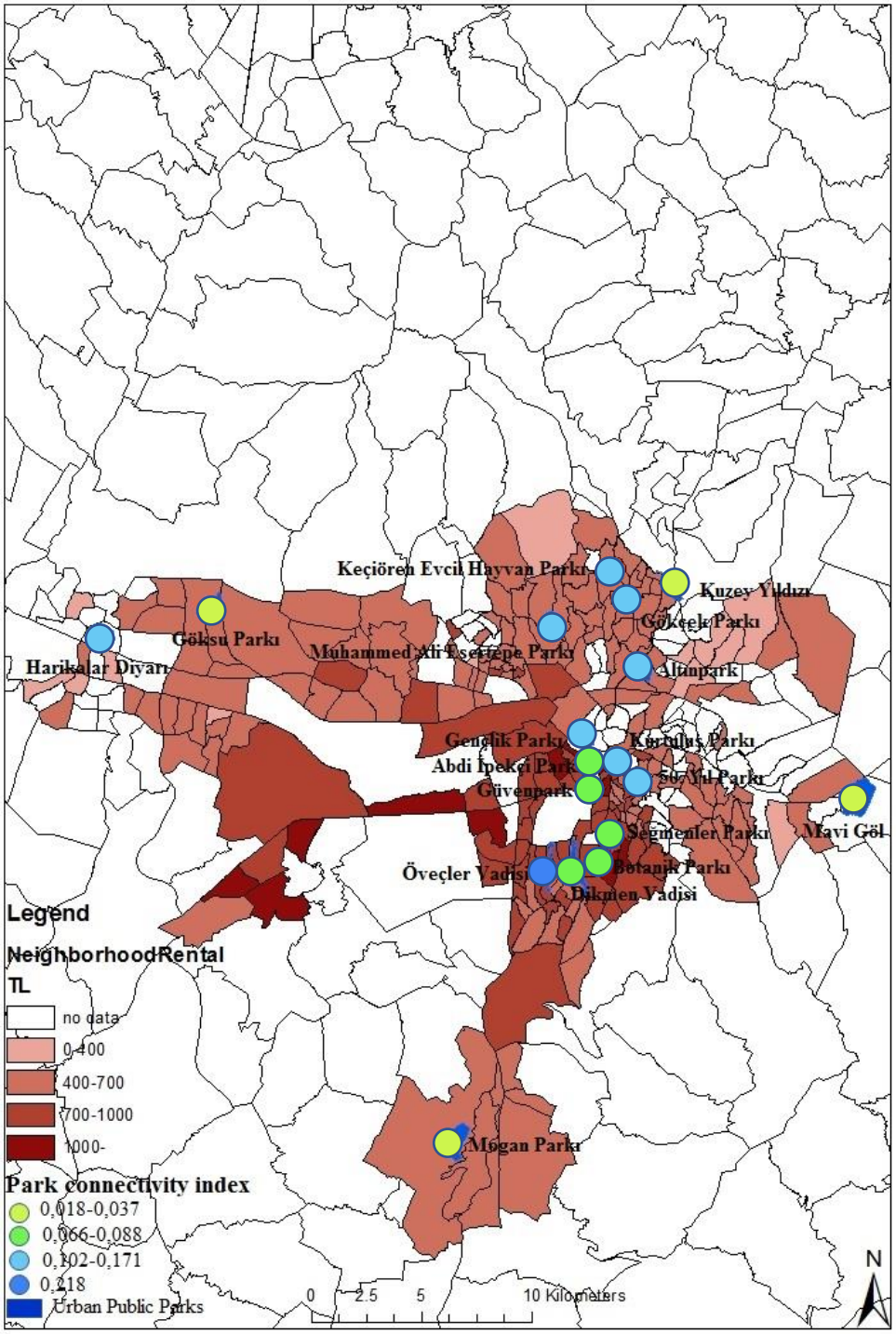


Figure 4.3. Average rental values of neighborhoods and urban public parks.

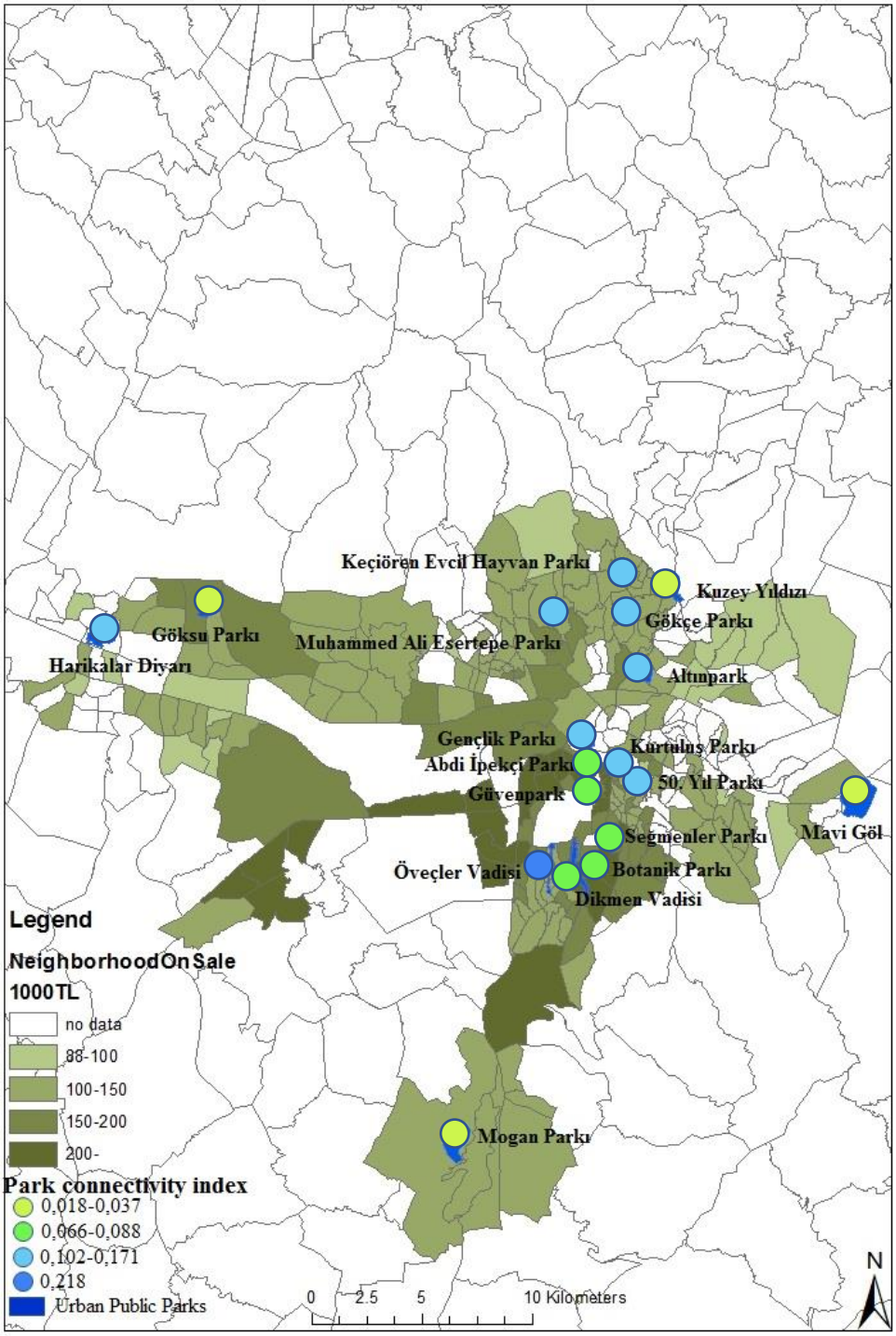


Figure 4.4. Average sale values of neighborhoods and urban public parks.

CHAPTER 5

CONCLUSION

The aim of this thesis was to understand the location characteristics of urban public parks in Ankara. To this end, the author asked two general questions in the thesis: (1) What is the buffer-connectivity index of each urban public park in Ankara? Where are the most problematic urban public parks located in the city regarding their connectivity? And, (2) Is there a relationship between neighborhood income and urban public park connectivity? To answer these questions the author selected all the urban parks in Ankara. 18 urban parks were selected in total. Data were obtained by using secondary sources: Metropolitan Municipality of Ankara (for GIS data) and a research study conducted by Uğurlar and Eceral (2014) (for the rent and sale price of dwellings in different neighborhoods of Ankara to represent neighborhood income). Research questions were answered by using ArcMap 10.6.1 program. To the best of the author's knowledge this is the first study in which the connectivity index and locational characteristics of all urban parks in a city were investigated by using GIS from an urban equity perspective. As previously mentioned, accessibility studies conducted in Turkey used by and large subjective measurement instruments to analyze urban environments. This study contributes to this literature by using an objective measurement tool – GIS. There are lots of accessibility factors related to connectivity. Accessibility is a multilayer urban factor and has various dimensions in different scales of an urban area such as micro, meso and macro. Apart from this, the study highlighted the usage of the specific GIS tools for calculating the connectivity index.

In summary, results show that there are no urban public parks in the southwestern development corridor of the city, where a significant population is currently residing. Urban public parks with a high connectivity index are disposed to be found in the core of the city while low connectivity index-urban public parks are in the periphery of the

city. The high connectivity index does not mean to have a grid street pattern of the neighborhood, windy street patterns also have a high connectivity index. Generally, low connectivity parks are located around low-income neighborhoods. Giles-Corti et al., (2005) and Cutts et al., (2009) stated the urban sprawl areas provide less opportunity to walk for residents, while compact inner-city areas provide the more. Similarly, Güvenpark may provide a more walking opportunity located in the core of the city and surrounded by grid urban form. But, large block size lead to less walkable environment (Sevtsuk et al., 2016).

Table 3.1 shows the characteristics of urban public parks. Services and programs attract peoples from various age groups (Loukaitou-Sideris, 2003). For example, science and culture center or playgrounds in Altınpark may affect young people rather than elders.

These findings are in line with the findings of many other studies like Inostroza (2017) and Guzman Bocarejo (2017), which showed that residents living in the periphery of cities usually have limited access to urban amenities like urban parks. A surprising finding was that unlike what the Transection Theory suggests, this study did not find the highest connectivity index at the parks located in the core of the city (Kızılay and Ulus). For example, Güvenpark, which is located in Kızılay, and Kurtuluş Parkı, which is located in a walking distance to Güvenpark, received 0,115 and 0,072 connectivity index scores respectively. These scores are much lower compared to what some other parks located outside the city center of Ankara received like Öveçler Vadisi (0,218) or Keçiören Evcil Hayvanlar Parkı (0,151).

According to various scholars like Talen (1997) and Alfonzo (2005), accessing to urban settings are closely related to physical and social features like car ownership, a strong public transport system, safety concern, etc. Future scholars can use the outputs from this thesis to have detailed analyses of urban equity.

Compared to the residents living in more affluent neighborhoods, residents living in poor neighborhoods tend to use urban public parks more frequently (Johnston, 1987;

Loukaitou-Sideris and Stieglitz, 2002). Moreover, residents from various socioeconomic backgrounds use urban public parks for different reasons (Kelly et al., 2007). Similarly, the multiple usages of the urban public parks in Ankara can be conducted by further researchers

5.1. Limitations of the Study

In presenting these findings, the author acknowledges the limitation of this study due to the insufficiency of available GIS data. The data of Ankara Metropolitan Municipality did not contain sidewalk data. Pedestrian crossing data for safe walking in highways or street hierarchies are not available in the metropolitan municipality. For instance, Altınpark has a high connectivity index, but the park is located near a high traffic volume highway, connecting the city center to the airport of the city. Safe pedestrian crossings are located just in few places along this highway. However, since the data obtained from the municipality was not showing the location of these crossings, one can argue that the connectivity index of this park received a higher score than what it should have received with all the missing data available. In this thesis, the street data was treated as a sidewalk. Cultural factors partially support this treatment: one can observe heavy pedestrian traffic in streets lacking sidewalks in Turkey. Additionally, pedestrian street crossings occur not only in signalized street intersections but also in places where there are no signals. Despite these facts of the country, the author acknowledges that the missing data might have biased the findings presented in this thesis. Therefore, subjective measurements related to accessibility gain importance. Future studies should investigate where the sidewalks and pedestrian crossings are, sidewalks widths and other barriers to walking/cycling. The land use characteristics were not considered in the study. The status of undeveloped areas is unknown. For example, agricultural lands are not suitable for housing. Such agricultural lands may found around the peripheral side of the city. So they should be clipped from the buffer zones.

5.2. Implications for Further Studies

Finally, these results have a number of implications for planning and research. First, they may guide urban planners and designers in urban (re)development processes. Increasing the connectivity index of urban public parks would contribute the production of healthy urban environments in terms of physical activity. Living near highly accessible urban public parks is especially important for people who have limited mobility such as elderly, pregnant women and children. Study results may guide the planning and design of new urban development projects, especially those that are located near the parks in the periphery of Ankara, where urban development processes have been initiated (e.g., Mavi Göl and Mogan Parkı in Ankara). They may also guide planners and designers in the regeneration of inner-city neighborhoods. This study could be a basis for future safety studies. These parks may use for muster points in case of emergency. Based on each of the urban public parks, their accessibility features can be researched in detail by future researchers (For example: detailed in micro, meso or macro urban scale)

The location of the urban parks provides inputs to planners on where the new urban public parks should be proposed. It may also guide transportation planners in public transportation routes and service decisions. For example, knowing that there are no urban public parks in the southwestern corridor of Ankara, to ensure equity in accessibility to urban public parks, transportation planners may now provide transportation solutions for the disadvantaged populations (like children and low-income people) living in this region of the city. Solutions may include increasing the number of busses, making public transportation more affordable for disadvantaged groups and providing direct route options between this part of the city and the public parks located in different parts of Ankara.

One of the most important contributions of this study to the existing literature is the calculation of the connectivity index each of the urban public park in Ankara. Future studies may use this information as a base to ask a number of additional research

questions. Some of these questions are: Do all urban public parks that have high buffer connectivity index encourage people to walk to these settings? In other words, is the buffer index connectivity of an urban public park correlated with the intensity of use of these settings? Do the results vary from one social group to another? If so, for which groups and how and why? Moreover, the method used in this thesis can be applied for other urban amenities in Ankara. This thesis can provide a guidance for researchers to help them understand how to conduct a connectivity analysis step by step in developing country like Turkey having poor available GIS data. Such studies would help us to better understand how to promote healthy neighborhoods for all social groups regardless of their age, gender, income or other individual characteristics.

REFERENCES

Adams, J. S. (1965). Inequity in social exchange. In Advances in experimental social psychology (Vol. 2, pp. 267-299). Academic Press.

Akkar Ercan, M., & Belge, Z. S. (2017). A MICRO-SCALE ASSESSMENT MODEL OF WALKABILITY FOR MORE LIVEABLE CITIES. METU JOURNAL OF THE FACULTY OF ARCHITECTURE, 34(1), 231-265.

Alfonzo, M. A. (2005). To walk or not to walk? The hierarchy of walking needs. Environment and behavior, 37(6), 808-836.

Alpagut, L. (2017). Hermann Jansen İçin Ankara'da Yeni Bir Görev: Gazi Orman Çiftliği Planlaması. Ankara Araştırmaları Dergisi, 5(1), 1-26.

Aytur, S. A., Rodriguez, D. A., Evenson, K. R., Catellier, D. J., & Rosamond, W. D. (2008). The sociodemographics of land use planning: relationships to physical activity, accessibility, and equity. Health & place, 14(3), 367-385.

Barceló, J., Casas, J., García, D., & Perarnau, J. (2005, September). Methodological notes on combining macro, meso and micro models for transportation analysis. In Workshop on Modeling and Simulation.

Batuman, B. (2013). City profile: Ankara. Cities, 31, 578-590.

Beaulac, J., Kristjansson, E., & Cummins, S. (2009). Peer reviewed: A systematic review of food deserts, 1966-2007. Preventing chronic disease, 6(3).

Beyazit, E. (2013). Transport and socio-spatial inequalities: The case of the Istanbul Metro (Doctoral dissertation, Oxford University, UK).

Blumenberg, E. (1998). Gender equity planning: inserting women into local economic development. Journal of Planning Literature, 13(2), 131-146.

Bookout, L. W. (1992). Neotraditional town planning: Cars, pedestrians, and transit. Urban Land, 51(2).

Boratav, K. (2003). Economic History of Turkey: 1908-2002. Ankara: Imge Kitabevi.

Borden, I. (1998). An affirmation of urban life: Socio-spatial censorship in the late twentieth century city. Archis, (5), 46-51.

Bosselmann, P. (1987). Redesigning residential streets. Institute of Urban and Regional Development, University of California, Berkeley.

Brambilla, M., Michelangeli, A., & Peluso, E. (2013). Equity in the city: On measuring urban (ine) quality of life. Urban Studies, 50(16), 3205-3224.

Broto, V. C., Allen, A., & Rapoport, E. (2012). Interdisciplinary perspectives on urban metabolism. Journal of Industrial Ecology, 16(6), 851-861.

Burgess, J., Harrison, C. M., & Limb, M. (1988). People, parks and the urban green: a study of popular meanings and values for open spaces in the city. Urban studies, 25(6), 455-473.

Buss, S. D. (1996). Children and the urban spatial environment: Meaning and action from young people's angle of vision.

Butler, E. N., Ambs, A. M., Reedy, J., & Bowles, H. R. (2011). Identifying GIS measures of the physical activity built environment through a review of the literature. Journal of Physical Activity and Health, 8(s1), S91-S97.

Buyukcivelek, A. B. (2017). The Capitalist Political Economy and Transformation of Public Spaces: The Case of Gençlik Parkı, Ankara. Built Environment, 43(2), 173-192.

Carr, S., Stephen, C., Francis, M., Rivlin, L. G., & Stone, A. M. (1992). Public space. Cambridge University Press.

Cengizkan, A. (2004). Ankara'nın ilk planı: 1924-25 Lörcher Planı: kentsel mekan özellikleri, 1932 Jansen Planı'na ve bugüne katkıları, etki ve kalıntıları. Ankara Enstitüsü Vakfı.

CEVHER, Ö. Ö. (2014). THE LINK BETWEEN STATION AREA DESIGN AND TRANSIT USAGE: THE CASE OF ANKARA (Doctoral dissertation, MIDDLE EAST TECHNICAL UNIVERSITY).

Chin, G. K., Van Niel, K. P., Giles-Corti, B., & Knuiman, M. (2008). Accessibility and connectivity in physical activity studies: The impact of missing pedestrian data. Preventive medicine, 46(1), 41-45.

Choi, E. (2014). Walkability and the complexity of walking behavior. A/Z ITU Journal of the Faculty of Architecture, 11(2), 87-99.

Council, S. C. (2000). Site Categorisation Strategy: A Guide for Adopting a More Strategic Approach to the Management. Maintenance and Development of Sheffield's Leisure and Recreational Green Spaces.

Corkindale, J. (2004). The land use planning system: evaluating options for reform. Institute of Economic Affairs.

Cunningham, C. J., & Jones, M. A. (1999). The playground: a confession of failure?. Built Environment, 25(1), 11.

Cutts, B. B., Darby, K. J., Boone, C. G., & Brewis, A. (2009). City structure, obesity, and environmental justice: an integrated analysis of physical and social barriers to walkable streets and park access. Social science & medicine, 69(9), 1314-1322.

Daly, H. E. (1996). Beyond growth: the economics of sustainable development. Beacon Press.

Day, K. (2018). Physical environment correlates of physical activity in developing countries: a review. Journal of physical activity and health, 15(4), 303-314.

De Chiara, J., Panero, J., & Zelnik, M. (Eds.). (1995). Time-saver standards for housing and residential development. McGraw-Hill Companies.

Demir, Z. (2004). Düzce'nin yeni kentleşme sürecinde açık ve yeşil alanlara yeni fonksiyonlar kazandırılması. İÜ Fen Bilimleri Enstitüsü Peyzaj Mimarlığı Ana Bilim Dalı Doktora Tezi (Yayınlanmamış) İstanbul.

DEMİR, Z , Erhan ACAR, E , TAVUKOĞLU, E . (2007). Kentsel Kimliğin Yesil Alanlar Açısından İrdelenmesi. Düzce Üniversitesi Ormancılık Dergisi, 3 (1), 18-34. Retrieved from http://dergipark.org.tr/duzceod/issue/4831/290722

Dill, J. (2004, January). Measuring network connectivity for bicycling and walking. In 83rd Annual Meeting of the Transportation Research Board, Washington, DC (pp. 11-15).

Dryzek, J. S. (2000). Justice and the Environment: Conceptions of Environmental Sustainability and Dimensions of Social Justice. By Andrew Dobson. Oxford: Oxford University Press, 1999. 280p. $55.00 cloth, $29.95 paper.-Capitalism, Democracy, and Ecology: Departing from Marx. By Timothy W. Luke. Champaign: University of Illinois Press, 1999. 254p. $49.95 cloth, $19.95 paper.-Environmentalism for a New Millennium: The Challenge of Coevolution. By Leslie Paul Thiele. New York: Oxford University Press, 1999. 302p. $35.00. American Political Science Review, 94(1), 169-170.

Duany, A., & Talen, E. (2002). Transect planning. American Planning Association. Journal of the American Planning Association, 68(3), 245.

Dumbaugh, E., & Rae, R. (2009). Safe urban form: revisiting the relationship between community design and traffic safety. Journal of the American Planning Association, 75(3), 309-329.

Duncan, D. T., Aldstadt, J., Whalen, J., Melly, S. J., & Gortmaker, S. L. (2011). Validation of Walk Score® for estimating neighborhood walkability: an analysis of

four US metropolitan areas. International journal of environmental research and public health, 8(11), 4160-4179.

Durmaz, S. B. (2015). Analyzing the quality of place: Creative clusters in Soho and Beyoğlu. Journal of Urban Design, 20(1), 93-124.

Ecob, R., & Smith, G. D. (1999). Income and health: what is the nature of the relationship?. Social science & medicine, 48(5), 693-705.

Ekinci, Z., & Sağlam, H. (2016). Meanings and social roles of the republic period urban parks in Ankara. Procedia-Social and Behavioral Sciences, 216, 610-621.

Elicin, Y. (2014). Neoliberal transformation of the Turkish city through the Urban Transformation Act. Habitat International, 41, 150-155.

Ellis, J. (2004). Researching children's place and space. JCT, 20(1), 83.

Enlil, Z. M. (2011). The neoliberal agenda and the changing urban form of Istanbul. International Planning Studies, 16(1), 5-25.

Ercan, M. A., & Memlük, N. O. (2015). More inclusive than before?: The tale of a historic urban park in Ankara, Turkey. Urban Design International, 20(3), 195-221.

Erdoğan, B. D., & Ayataç, H. (2015). Assessment of urban identity characteristics in public places: A case study of Ortaköy Square. A| Z ITU Journal of the Faculty of Architecture, 12(1), 115-125.

Erkip, F. B. (1997). The distribution of urban public services: the case of parks and recreational services in Ankara. Cities, 14(6), 353-361.

Esteves, M. (2012). SHAPING NEW URBAN ENVIRONMENTS IN LATIN AMERICA: THE CASE OF MEDELLIN, COLOMBIA.

Evered, K. T. (2008). Symbolizing a modern Anatolia: Ankara as capital in Turkey's early republican landscape. Comparative Studies of South Asia, Africa and the Middle East, 28(2), 326-341.

Ewing, R. (1996). Best development practices: doing the right thing and making money at the same time. Chicago, IL: American Planning Association.

Eyüboğlu, E., Sema Kubat, A., & Ertekin, Ö. (2007). A New Urban Planning Approach for the Regeneration of an Historical Area within Istanbul's Central Business District: Practice Note. Journal of Urban Design, 12(2), 295-312.

Faber Taylor, A., & Kuo, F. E. (2009). Children with attention deficits concentrate better after walk in the park. Journal of attention disorders, 12(5), 402-409.

Fırat, S. A. R. I. (2011). "EVACUATION AND ACCESS" BASED CASUALTY REDUCTION PROPOSAL FOR HIGH DENSE SETTLEMENTS IN EARTHQUAKE–VULNERABLE AREAS (Doctoral dissertation, ISTANBUL TECHNICAL UNIVERSITY).

Fisher, K. J., Li, F., Michael, Y., & Cleveland, M. (2004). Neighborhood-level influences on physical activity among older adults: a multilevel analysis. Journal of aging and physical activity, 12(1), 45-63.

Forsyth, A. (2015). What is a walkable place? The walkability debate in urban design. Urban design international, 20(4), 274-292.

Forsyth, A., & Southworth, M. (2008). Cities afoot—Pedestrians, walkability and urban design.

Frank, L. D., & Engelke, P. O. (2001). The built environment and human activity patterns: exploring the impacts of urban form on public health. Journal of planning literature, 16(2), 202-218.

Frank, L. D., Andresen, M. A., & Schmid, T. L. (2004). Obesity relationships with community design, physical activity, and time spent in cars. American journal of preventive medicine, 27(2), 87-96.

Garbarino, J., Dubrow, N., Kostelny, K., & Pardo, C. (1992). Children in danger: Coping with the consequences of community violence. Jossey-Bass.

Gehl, J. (1986). Life between buildings. Copenhagen.

Geurs, K. T., & Van Wee, B. (2004). Accessibility evaluation of land-use and transport strategies: review and research directions. Journal of Transport geography, 12(2), 127-140.

Ghadimkhani, P. (2011). Increasing walkability in public spaces of city centres (Master's thesis).

Gifford, R. (2007). The consequences of living in high-rise buildings. Architectural science review, 50(1), 2-17.

Giles-Corti, B., Broomhall, M. H., Knuiman, M., Collins, C., Douglas, K., Ng, K., ...& Donovan, R. J. (2005). Increasing walking: how important is distance to, attractiveness, and size of public open space?. American journal of preventive medicine, 28(2), 169-176.

Giraldo, H. G. (2008). Parques biblioteca de Medellín-Colombia: Un ejemplo de rehabilitación urbana y recuperación de tejido social. In Ciudad Viva: Monográfico: Regeneración Urbana. Barrios.

Goffman, E. (1963). Behavior in Public Relation: Notes on the Social Organization of Gatherings. Macmillan.

Gómez, L. F., Parra, D. C., Buchner, D., Brownson, R. C., Sarmiento, O. L., Pinzón, J. D., ... & Lobelo, F. (2010). Built environment attributes and walking patterns among the elderly population in Bogotá. American journal of preventive medicine, 38(6), 592-599.

Gong, Y., Gallacher, J., Palmer, S., & Fone, D. (2014). Neighbourhood green space, physical function and participation in physical activities among elderly men: the Caerphilly Prospective study. International Journal of Behavioral Nutrition and Physical Activity, 11(1), 40.

Grammenos, F., Pogharian, S., & Tasker-Brown, J. (2002). Residential street pattern design. Socio-economic Series, 75, 22.

Grengs, J. (2015). Nonwork accessibility as a social equity indicator. International Journal of Sustainable Transportation, 9(1), 1-14.

Gürer, N., & Uğurlar, A. (2017). User Satisfaction in Urban Parks: Ankara Kugulu Park Case//Kent Parklarında Kullanıcı Memnuniyeti: Ankara Kuğulu Park Örneği. Megaron, 12(3), 443.

Guzman, L. A., & Bocarejo, J. P. (2017). Urban form and spatial urban equity in Bogota, Colombia. Transportation research procedia, 25, 4491-4506.

Haan, M., Kaplan, G. A., & Camacho, T. (1987). Poverty and health prospective evidence from the alameda county study. American journal of epidemiology, 125(6), 989-998.

Harris, C. D., & Ullman, E. L. (1945). The nature of cities. The Annals of the American Academy of Political and Social Science, 242(1), 7-17.

Hahn, R. A., Eaker, E. D., Barker, N. D., Teutsch, S. M., Sosniak, W. A., & Krieger, N. (1996). Poverty and death in the United States. International Journal of Health Services, 26(4), 673-690.

Handy, S. L. (1996). Urban form and pedestrian choices: study of Austin neighborhoods. Transportation research record, 1552(1), 135-144.

Hansen, W. G. (1959). How accessibility shapes land use. Journal of the American Institute of planners, 25(2), 73-76.

Hansmann, R., Hug, S. M., & Seeland, K. (2007). Restoration and stress relief through physical activities in forests and parks. Urban forestry & urban greening, 6(4), 213-225.

Harvey, D. (1989). The condition of postmodernity (Vol. 14). Oxford: Blackwell.

Hay, A. M. (1995). Concepts of equity, fairness and justice in geographical studies. Transactions of the Institute of British Geographers, 500-508.

Heynen, N., & Perkins, H. A. (2005). Scalar dialectics in green: urban private property and the contradictions of the neoliberalization of nature. Capitalism Nature Socialism, 16(1), 99-113.

Heynen, N., Perkins, H. A., & Roy, P. (2006). The political ecology of uneven urban green space: The impact of political economy on race and ethnicity in producing environmental inequality in Milwaukee. Urban Affairs Review, 42(1), 3-25.

Heynen, N., & Robbins, P. (2005). The neoliberalization of nature: Governance, privatization, enclosure and valuation. Capitalism Nature Socialism, 16(1), 5-8.

Hine, J., & Mitchell, F. (2001). Better for everyone? Travel experiences and transport exclusion. Urban studies, 38(2), 319-332.

Horst, M., McClintock, N., & Hoey, L. (2017). The intersection of planning, urban agriculture, and food justice: a review of the literature. Journal of the American Planning Association, 83(3), 277-295.

Hughey, S. M., Walsemann, K. M., Child, S., Powers, A., Reed, J. A., & Kaczynski, A. T. (2016). Using an environmental justice approach to examine the relationships between park availability and quality indicators, neighborhood disadvantage, and racial/ethnic composition. Landscape and Urban Planning, 148, 159-169

Ince Kompil, E. (2017). Analysis of urban growth in developing countries and strategies for sprawl management: The case of Izmir.

Inostroza, L. (2017). Informal urban development in Latin American urban peripheries. Spatial assessment in Bogotá, Lima and Santiago de Chile. Landscape and Urban Planning, 165, 267-279.

Jiao, J., & Dillivan, M. (2013). Transit deserts: The gap between demand and supply. Journal of Public Transportation, 16(3), 2

Johnston, D. (1987). The soccer gap'. Los Angeles Times, Part VI, 11.

Jones, B. D. (2017). Political decision-making and the distribution of public benefits: a political science perspective. In Public Service Provision and Urban Development (pp. 363-387). Routledge.

Jones, E. J. (2001).Liveable Neighbourhoods Evan Jones. 'GRAPHICS-FREE'VERSION.

Kahraman, E., & Kubat, A. (2015). In the effects of accessibility factors on land values in the CBD of Izmir. In Proceedings of the 10th international space syntax symposium (pp. 92-1).

Kaneko, Y., Nakagawa, T., Phun, V. K., & Kato, H. (2019). Impacts of Urban Railway Investment on Regional Economies: Evidence from Tokyo using Spatial Difference-in-Differences Analysis. Transportation Research Record, 0361198119846098.

Karner, A., & Niemeier, D. (2013). Civil rights guidance and equity analysis methods for regional transportation plans: a critical review of literature and practice. Journal of Transport Geography, 33, 126-134.

Kawachi, I., & Marmot, M. G. (1998). Commentary: what can we learn from studies of occupational class and cardiovascular disease?. American journal of epidemiology, 148(2), 160-163.

Kayasü, S. (2005). Ankara İmar Planlarının Açık ve Yeşil Alan Yaklaşımları. Tansı Şenyapılı (der.),'Cumhuriyet'in 'Ankara'sı içinde, ODTÜ Yayıncılık, Ankara.

Kayden, J. (2005). Using and misusing law to design the public realm. Regulating place: Standards and the shaping of urban America, 115-140.

Kelly, C. M., Schootman, M., Baker, E. A., Barnidge, E. K., & Lemes, A. (2007). The association of sidewalk walkability and physical disorder with area-level race and poverty. Journal of Epidemiology & Community Health, 61(11), 978-983.

Kent, M. (1990). Odum, EP Ecology and our endangered life-support systems: Sunderland, Mass.: Sinauer Associates, 1989. 283 pp.£ 10.95 paperback.

Knapp, M., Gustat, J., Darensbourg, R., Myers, L., & Johnson, C. (2019). The relationships between park quality, park usage, and levels of physical activity in low-income, African American neighborhoods. International journal of environmental research and public health, 16(1), 85.

Knox, P. L., Knox, P. L., & Taylor, P. J. (Eds.). (1995). World cities in a world-system. Cambridge University Press.

Krizek, K. J., & Johnson, P. J. (2006). Proximity to trails and retail: effects on urban cycling and walking. Journal of the American Planning Association, 72(1), 33-42.

Kulkarni, V. S., & Subramanian, S. V. (2010). Social perspectives on health inequalities. A companion to health and medical geography, 375-398.

Lee, C., & Moudon, A. V. (2006). Correlates of walking for transportation or recreation purposes. Journal of Physical Activity and health, 3(s1), S77-S98.

Litman, T. (1999). Evaluating transportation equity. Victoria, BC, Canada: Victoria Transport Policy Institute.

Litman, T. (2002). Evaluating transportation equity. World Transport Policy & Practice, 8(2), 50-65.

Litman, T. (2014). Evaluating Transportation Equity: Guidance for Incorporating Distributional Impacts in Transportation. Victoria Transport Policy Institute. Victoria.

Lucy, W. (1981). Equity and planning for local services. Journal of the American Planning Association, 47(4), 447-457.

Luke, T. W. (2003). Global cities vs."global cities:" rethinking contemporary urbanism as public ecology. Studies in Political Economy, 70(1), 11-33.

Loukaitou-Sideris, A. (2003). Children's common grounds: a study of intergroup relations among children in public settings. Journal of the American Planning Association, 69(2), 130-143.

Loukaitou-Sideris, A., & Stieglitz, O. (2002). Children in Los Angeles parks: a study of equity, quality and children's satisfaction with neighbourhood parks. Town planning review, 73(4), 467-488.

Louv, R. (2008). Last child in the woods: Saving our children from nature-deficit disorder. Algonquin books.

Manaugh, K., & El-Geneidy, A. (2011). Validating walkability indices: How do different households respond to the walkability of their neighborhood?. Transportation research part D: transport and environment, 16(4), 309-315.

Marshall, S. (2004). From streets to patterns. In Streets and Patterns (pp. 235-258). Routledge.

Marx, K., Bonner, G. A., & Burns, E. (1954). Theories of surplus value.

Metzger, J. T. (1996). The theory and practice of equity planning: An annotated bibliography. Journal of Planning Literature, 11(1), 112-126.

McCarthy, J., & Prudham, S. (2004). Neoliberal nature and the nature of neoliberalism. Geoforum, 35(3), 275-283.

McConnachie, M. M., & Shackleton, C. M. (2010). Public green space inequality in small towns in South Africa. Habitat International, 34(2), 244-248.

Morello-Frosch, R. A. (2002). Discrimination and the political economy of environmental inequality. Environment and Planning C: Government and Policy, 20(4), 477-496.

Moudon, A. V., Hess, P. M., Snyder, M. C., & Stanilov, K. (1997). Effects of site design on pedestrian travel in mixed-use, medium-density environments. Transportation Research Record, 1578(1), 48-55.

Murphy, M., Koohsari, M. J., Badland, H., & Giles-Corti, B. (2017). Supermarket access, transport mode and BMI: the potential for urban design and planning policy across socio-economic areas. Public health nutrition, 20(18), 3304-3315.

Nal, S. (2008). Sustainable Transport In City-Regions: The Case Of Izmir City Region. Unpublished Master Thesis. METU The Graduate School of Natural and Applied Sciences.

Navarro, V. (1990). Race or class versus race and class: mortality differentials in the United States. Lancet, 336(8725), 1238-40.

Nemeth, J. (2006). Conflict, exclusion, relocation: Skateboarding and public space. Journal of urban design, 11(3), 297-318.

Neuwirth, R. (2016). Shadow cities: a billion squatters, a new urban world. Routledge.

Oğuz, D. (2010). Changes in leisure and recreational preferences: A case study of Ankara. Scientific Research and Essays, 5(8), 721-729.

Oxley, M. J. (1975). Economic theory and urban planning. Environment and Planning A, 7(5), 497-508.

Owens, P. M. (1993). Neighborhood form and pedestrian life: Taking a closer look. Landscape and urban planning, 26(1-4), 115-135.

Ozbil, A., Argin, G., & Yesiltepe, D. (2016). Pedestrian route choice by elementary school students: The role of street network configuration and pedestrian quality attributes in walking to school. International Journal of Design Creativity and Innovation, 4(2), 67-84.

Ozkan, M. O., & Ozer, D. G. (2014). Spatial integration and accessibility considering urban sustainability patterns: historical islands of Istanbul. WIT Transactions on Ecology and the Environment, 191, 1649-1660.

ÖZDEN, M. A. (2013). PLANNING FOR SUSTAINABLE COMMUNITIES IN SUBURBAN RESIDENTIAL NEIGHBOURHOODS: THE CASE OF ÜMİTKÖY, ANKARA (Doctoral dissertation, MIDDLE EAST TECHNICAL UNIVERSITY).

Özkır, A. (2007). Kent Parkları yönetim modelinin geliştirilmesi (Doctoral dissertation, Ankara University).

Pan, S. Y., Cameron, C., DesMeules, M., Morrison, H., Craig, C. L., & Jiang, X. (2009). Individual, social, environmental, and physical environmental correlates with physical activity among Canadians: a cross-sectional study. BMC public health, 9(1), 21.

Pareto, V., Politique, M. D. E., & Press, A. (1927). Paris.

Park, K. (2017). Psychological park accessibility: a systematic literature review of perceptual components affecting park use. Landscape research, 42(5), 508-520.

Peterson, R. D., Krivo, L. J., & Harris, M. A. (2000). Disadvantage and neighborhood violent crime: Do local institutions matter? Journal of research in crime and delinquency, 37(1), 31-63.

Rigolon, A. (2016). A complex landscape of inequity in access to urban parks: A literature review. Landscape and Urban Planning, 153, 160-169.

Robinson, J. C. (1989). Trends in racial inequality and exposure to work-related hazards, 1968–1986. AAOHN journal, 37(2), 56-63.

Rousseau, J. J. (1984). A discourse on inequality. Penguin.

Roy, U., & Ganguly, M. (2009). Integration of top down & bottom up approach in urban and regional planning: West Bengal experience of draft development plans (DDP) and beyond. Goa: india.

Saegert, S., & Hart, R. (1978). The development of sex differences in the environmental competence of girls and boys' in P. Stevens, Jr. Studies in the Anthropology of Play.

Saelens, B. E., Sallis, J. F., Black, J. B., & Chen, D. (2003). Neighborhood-based differences in physical activity: an environment scale evaluation. American journal of public health, 93(9), 1552-1558.

Schroeder, H. W., & Anderson, L. M. (1984). Perception of personal safety in urban recreation sites. Journal of leisure research, 16(2), 178-194.

Severcan, Y. C. (2019). Predictors of children's satisfaction with mass housing. Children's Geographies, 1-14.

Sevtsuk, A., Kalvo, R., & Ekmekci, O. (2016). Pedestrian accessibility in grid layouts: the role of block, plot and street dimensions. Urban Morphology, 20(2), 89-106.

Small, M. L., & McDermott, M. (2006). The presence of organizational resources in poor urban neighborhoods: An analysis of average and contextual effects. Social Forces, 84(3), 1697-1724.

Smith, A. (2010). The theory of moral sentiments. Penguin.

Smith, J. W., & Floyd, M. F. (2013). The urban growth machine, central place theory and access to open space. City, Culture and Society, 4(2), 87-98.

Sorensen, A., & Okata, J. (Eds.). (2010). Megacities: Urban form, governance, and sustainability (Vol. 10). Springer Science & Business Media.

Southworth, M. (2005). Designing the walkable city. Journal of urban planning and development, 131(4), 246-257.

Speck, J. (2015). Walkable City: How Downtown Can Save America, One Step at a Time Nova York: North Point Press, 312 p. ISBN 978-0865477728. Documents d'Anàlisi Geogràfica, 61(2), 437.

Swanwick, C., Dunnett, N., & Woolley, H. (2003). Nature, role and value of green space in towns and cities: An overview. Built Environment (1978-), 94-106.

Swyngedouw, E., Moulaert, F., & Rodriguez, A. (2002). Neoliberal urbanization in Europe: large–scale urban development projects and the new urban policy. Antipode, 34(3), 542-577.

Şahin Ş., Bekişoğlu Ü. (2009) Landscape planning and management strategies for the Zir Valley , near Ankara , Turkey

Talen, E. (1997). The social equity of urban service distribution: An exploration of park access in Pueblo, Colorado, and Macon, Georgia. Urban geography, 18(6), 521-541.

Talen, E. (1998). Visualizing fairness: Equity maps for planners. Journal of the American Planning Association, 64(1), 22-38.

Taylor, W. C., Poston, W. S. C., Jones, L., & Kraft, M. K. (2006). Environmental justice: obesity, physical activity, and healthy eating. Journal of Physical Activity and Health, 3(s1), S30-S54.

Tekeli, İ. (2009). Modernizm, modernite ve Türkiye'nin kent planlama tarihi (Vol. 8). Tarih Vakfı Yurt Yayınları.

Tinsley, H. E., Tinsley, D. J., & Croskeys, C. E. (2002). Park usage, social milieu, and psychosocial benefits of park use reported by older urban park users from four ethnic groups. Leisure sciences, 24(2), 199-218.

Trapp, G. S., Giles-Corti, B., Christian, H. E., Bulsara, M., Timperio, A. F., McCormack, G. R., & Villaneuva, K. P. (2012). Increasing children's physical activity: Individual, social, and environmental factors associated with walking to and from school. Health Education & Behavior, 39(2), 172-182.

Tresidder, M. (2005). Using GIS to measure connectivity: An exploration of issues. Portland State University: Field Area Paper.

Tuğal, C. Z. (2006). The appeal of Islamic politics: ritual and dialogue in a poor district of Turkey. The Sociological Quarterly, 47(2), 245-273.

Uğurlar, A., & Eceral, T. Ö. (2014). Ankara'da mevcut konut (mülk ve kiralık) piyasasına ilişkin bir değerlendirme. İdealkent, 5(12), 132-159.

Unsal, F. (2009). Critical evaluation of legal and institutional context of urban planning in Turkey: The case of Istanbul. International Academic Association on Planning, Law and Property Rights. Aalborg, Denmark, 11-13.

Untermann, R. K. (1987). Can we pedestrianize the suburbs. Public Streets for Public Use, 123-131.

Uzun, C. N. (2005). Residential transformation of squatter settlements: Urban redevelopment projects in Ankara. Journal of Housing and the Built Environment, 20(2), 183-199.

Ülkenli, Z. K. (2017). İç içe iki genç cumhuriyet ütopyası ve dönüşümleri: Ankara ve Atatürk Orman Çiftliği. Ankara Araştırmaları Dergisi, 5(1), 27-72.

Walker, R. E., Keane, C. R., & Burke, J. G. (2010). Disparities and access to healthy food in the United States: A review of food deserts literature. Health & place, 16(5), 876-884.

Wendel, H. E. W., Zarger, R. K., & Mihelcic, J. R. (2012). Accessibility and usability: Green space preferences, perceptions, and barriers in a rapidly urbanizing city in Latin America. Landscape and urban planning, 107(3), 272-282.

Weinberg, Z. (1995). No Place to Shop: The Lack of Supermarkets in Low-income Neighborhoods: Analysis of a University of Connecticut Study on Low-income Communitites and Households Receiving Public Assistance in 21 Metropolitan Areas. Public Voice for Food and Health Policy.

Wen, M., Zhang, X., Harris, C. D., Holt, J. B., & Croft, J. B. (2013). Spatial disparities in the distribution of parks and green spaces in the USA. Annals of Behavioral Medicine, 45(suppl_1), S18-S27.

Wenz, P. S. (1988). Environmental justice. Suny Press.

Winch, D. M. (1971). Analytical welfare economics (p. 17). Harmondsworth: Penguin Books

Vale, D. S., Saraiva, M., & Pereira, M. (2015). Active accessibility: A review of operational measures of walking and cycling accessibility. Journal of transport and land use, 9(1).

Valentine, G., & McKendrck, J. (1997). Children's outdoor play: Exploring parental concerns about children's safety and the changing nature of childhood. Geoforum, 28(2), 219-235.

Van Nes, A., & López, M. J. (2007). Micro scale spatial relationships in urban studies: the relationship between private and public space and its impact on street life. In Proceedings of the 6th Space Syntax Symposium (6SSS), Istanbul, Turkiye, June 12-15, 2007.

Victoria Transport Policy Institute. Roadway Connectivity: Creating More Connected Roadway and Pathway Networks. Online TDM Encyclopedia, 2017. Viewed on 11/5/19 at http://www.vtpi.org/tdm/tdm116.htm

YAVUZ, A., & KULOĞLU, N. (2016). Evaluation of Spatial Permeability Concepts: A Case Study of the Trabzon Forum Shopping Centre. Environmental Sustainability and Landscape Management, 239.

Yenice, M. S. (2015). A Method for Evaluation of the Efficiency of Urban Green Spaces; Aksaray, Turkey. Artium, 3(2).

Yeşil, A. (2006). Ankara metropoliten alanının yeşil alan sisteminin analizi. Yıldız Teknik Üniversitesi Fen Bilimleri. İstanbul, 81s.

Yin, H., & Xu, J. (2009, August). Measuring the accessibility of parks: A case study in Shanghai, China. In 2009 Sixth International Conference on Fuzzy Systems and Knowledge Discovery (Vol. 1, pp. 232-236). IEEE.

Young, T. (1995). Modern urban parks. Geographical Review, 535-551.

Zhang, X., Lu, H., & Holt, J. B. (2011). Modeling spatial accessibility to parks: a national study. International Journal of Health Geographics, 10(1), 31.

Zhou, H., & Gao, H. (2018). The impact of urban morphology on urban transportation mode: A case study of Tokyo. Case Studies on Transport Policy.

Zünd, D. (2016). A meso-scale framework to support urban planning (Doctoral dissertation, ETH Zurich).

Zünd, D., Woodbury, R., & Schmit, G. (2016). Meso-scale modeling of residential and business locations. Simulation, 92(3), 295-306.