RECLAIMING PEDESTRIAN-ORIENTED PLACES TO INCREASE WALKABILITY IN CITY CENTER
THE CASE OF YÜKSEL STREET, ANKARA

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ABSTRACT

RECLAIMING PEDESTRIAN-ORIENTED PLACES TO INCREASE WALKABILITY IN CITY CENTER THE CASE OF YÜKSEL STREET, ANKARA

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Walking as the basic, cheapest and the most affordable way of transportation, recreation and socialization is a significant means of experiencing a city. Walkability of a city is a measure of how friendly, safe and attractive a city is to walk within it. Walking in a city and the extent to which the built environment supports walking is signifier of civilization and popular walkable spaces particularly in city center are considered as part of collective memory of a city. Accordingly, a well-designed walkable urban space can become where many social, political and many other important urban activities take place. After advent of motorized vehicles, automobiles have occupied urban spaces and the forms of many cities as well as Ankara has changed according to requirements of automobiles rather than pedestrians. Despite of many advantages and convenience that automobiles have brought to people's lives, excessive car usage have brought many social, physical and economic outcomes.

A wide range of literature is reviewed and based on their scopes, these literature are divided to four groups: the first, deal with the relationship between built environment and walking, the second investigate behavioral factors of human and choice of travel mode, the third group study walking as a transportation mode and the fourth group of literature

studied for this thesis deal with walking as a means of socialization. The influential walkability factors suggested by each group are categorized and based on them, four main groups of criteria contributing to walkability of an urban space and being influential in increasing walking rate are identified. These four groups are: **lifestyle factors**, **locational factors**, **urban design factors** and **personal factors**.

Each of these groups have inclusive subcategories by which walkability of a street or an urban space can be evaluated elaborately. This thesis mainly studies the relationship between physical features of built environment and level of walkability of an urban space. Hence, a potentially walkable street is chosen as case study which is Yüksel Street located at CBD of Ankara. This street is considered as one of the signifiers and indicators of republic ideology in the capital city and exists from Jansen Plan (1932) but today it has lost its previous functionality as being a green mixed-use residential district planned by Jansen and later in 1980s being designed as an art street for intellectual activities. The planning history of Ankara, CBD and Yüksel Street is studied to find the main reasons of this decline. Then, walkability level of this street is analyzed by the use of criteria developed via reviewing literature. Yüksel Street is divided to several different segments and based on walkability factors developed through literature the walkability potentials and problems of each segment is analyzed in detail. Additionally, a questionnaire survey is conducted to understand the insufficiencies and requirements of the street, from perspective of users of Yüksel Street.

Findings of this research and recommendations proposed in it, can be helpful in developing plans for Ankara CBD and taking actions to reclaim the primary functionality of Yüksel Street as an important part of capital city. Additionally, the criteria developed in this study and findings of this research can be guiding in designing pedestrian-oriented places and encouraging people to walk.

Keywords: Walkability, Yüksel Street, walking

ÖZ

KENT MERKEZINDE YÜRÜNEBİLİRLİĞİ ARTIRMAK İÇİN YAYA-ODAKLI MEKANLARIN İYİLEŞTİRİLMESİ: YÜKSEL CADDESİ, ANKARA

Farnian, Saeideh
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Yürümek, hem ulaşımın hem rekreatif, hem de sosyalleşme amaçlı aktivitelerin en temel ve ekonomik aracı olmakla beraber bir kenti tecrübe etmenin de en keyifli yoludur. Bir kentsel alanın yürünebilirliği aslında o alanın yürümek için ne kadar güvenli, rahat ve cazip olduğunu gösterir.

Son yıllarda araba kullanımındaki aşırı artış ile beraber araba odaklı kentsel politikalarında artışı sadece büyükşehirlerde değil orta ölçekli şehirlerde de kent merkezinin özgünlüğün, fonksiyonelliğin ve yürünebilirliğinin yok olmasına sebep olmuştur. Ankara kenti 'de bu büyükşehirlerden birisidir.

Bu tezde, kentin ve kentsel mekanın yürünebilirliğini etkileyen önemli etkenler derlemiş ve Ankara, Yüksel Caddesi'nin kapsamlı bir yürünebilirlik analizi için ölçütler gruplanmıştır. Bu etkenler, dört ana grupta toplanmıştır: Yaşam tarzıyla ilgili olan etkenler; Alansal etkenler; Kentsel tasarımla ilgili olan etkenler ve kişisel ya davranışsal etkenlerdir. Bu çalışmada yöntem olarak, örnek alan incelemesi belirlenerek, gruplanan bu etkenler aracılığıyla kent merkezindeki yaya-odaklı bir caddenin yürünebilirlik seviyesi değerlendirilmektedir. Başkentinin kent merkezindeki ana yeşil alan ve yayayolu sisteminin önemli bir parçası olan ve sanatsal aktivitelerin gerçekleştiği mekan olarak tasarlanan Yüksel Caddesi, Cumhuriyet'in imgesi olma özelliğini, eski özgünlüğünü ve

işlevini kısmen kaybetmiştir. Ankara'nın ve Kızılay kent merkezinin planlama tarihi incelenerek caddenin bu özgünlük ve işlev kaybının temelleri araştırılmaktadır. Yüksel Caddesi'nin yürünebilirlik seviyesi, dört ana grupta derlenen etkenler kapsamında bir saha çalışması ile ölçülmekte ve anket çalışması ile de sonuçlar değerlendirilmektedir. Yüksel Caddesinin yürünebilirlik kapasitesi, hem temel etkenler aracılığıyla hem de caddenin kullanıcıları tarafından belirtilen olumlu ve olumsuz görüşler ile belirlenmiştir.

Bu tezin sonuçları, Ankara'nın kent merkezi planlamasına girdi oluşturabilecek ve Yüksel Caddesinin özgünlüğünü ve işlevlerini geri kazandırabilecek önerileri içermektedir. Bu çalışmada geliştirilen ölçütler ve bulgular, insanları yürümeye teşvik eden yeni yaya-odaklı mekânların tasarımında yararlı olabilir.

Anahtar Kelimeler: Yürünebilirlik, Yüksel Caddesi, Yürümek

To my family…

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TABLE OF CONTENTS

LIST OF TABLES

TABLES

LIST OF FIGURES

FIGURES

CHAPTER 1

INTRODUCTION

1.1 Problem definition

Walking is the basic transportation means for human and it has a wide range of benefits for human health and well-being. Walking in an urban space also is an important means of experiencing a city. Walkability -which is a measure for assessing level of friendliness of an area- is considered as one of the most significant aspects of a liveable society and as an imperative means of developing sustainability in an urban space. In contemporary cities particularly in metropolises, car-dependency and car-oriented developments has caused many negative effects.

Although walking is the cheapest, healthiest and efficient means of transportation, after advent of motorized vehicles, automobiles have occupied urban spaces and the form of many cities has changed according to requirements of automobiles rather than pedestrians. Despite of many advantages and convenience that automobiles have brought to people's lives, excessive car usage and excessive dependency of many people on automobiles for any trips have caused many social, physical and economic problems. Additionally, automobiles has changed the form of many cities from compact forms to sprawled suburbs and central parts which are the social and economic heart of cities has lost their previous walkability and vitality. City center of many cities today have changed to places for automobile and traffic rather than a place for walking and spending time with other people.

Ankara, the capital city of Turkey Republic has also faced the problems caused by excessive automobile usage. Ankara as the capital city of Turkey Republic from about one century ago has experienced various modifications in plan and design of CBD from Lörcher's Plan (1924) to the recent years. After advent of automobile and after several decades, the over-use of vehicles in Ankara made the CBD a car-oriented place with priority of fast moving cars. Atatürk Boulevard which was an attractive green spine designed for people's recreational walking, today has turned into motorway due to automobile-oriented transportation policies of Ankara municipality during contemporary decades. Today, the pedestrian-oriented spaces in CBD of Ankara is limited to several streets such as Sakarya Street and its surroundings, İzmir Street, and Yüksel Street. These streets are limited pedestrian islands which have controlled automobiles dominance and have survived from invasion of motorized vehicles and their noise and pollution. Therefore, they have a high potential to satisfy the inevitable requirement and expectations from CBD of Ankara to an extent and become successful pattern of being a pedestrian-orientated place for other parts of CBD and the city. Yüksel Street, the case study of this thesis is one of these pedestrian zones.

The reason for choosing Yüksel Street as the case study of this thesis is that it is a rather old street existing from Jansen Plan up to today and it has experienced a lot of changes. This street has experienced a lot of modifications from being part of a green spine and a residential district to being designed as a pedestrianized art street for intellectual activities but it always has been a place where people have been interested to walk within. This thesis studies physical configuration of this street and association of it with walkability by using possible influential walkability criteria collected from literature.

This street starts from Atatürk Boulevard and continues until Libya Street and is considered as a rather long street. Yüksel Street has potential to be a long mixed-use walkable street but only less than half of it is a vital and preferable place for pedestrians and the street is majorly dedicated to merely official and commercial activities and has lost its previous functionality as a residential district.

Furthermore the second part of Yüksel Street after Mithatpaşa despite of its high potentials for being a walkable and vital place for pedestrian activities due to many problems and shortages has low level of walkability. Therefore, there are very rare pedestrian activity in this part. Since pedestrian-oriented areas of Ankara's CBD are limited to several pedestrian districts around Kızılay, these districts should be expanded and better designed to provide more connected and continuous and attractive walking routes for pedestrians. Since pedestrianization of whole Kızılay square and Atatürk Boulevard crossing it does not seem possible in short term, at least, expanding and improving the existing pedestrian districts can partly fulfil requirements of pedestrians in CBD.

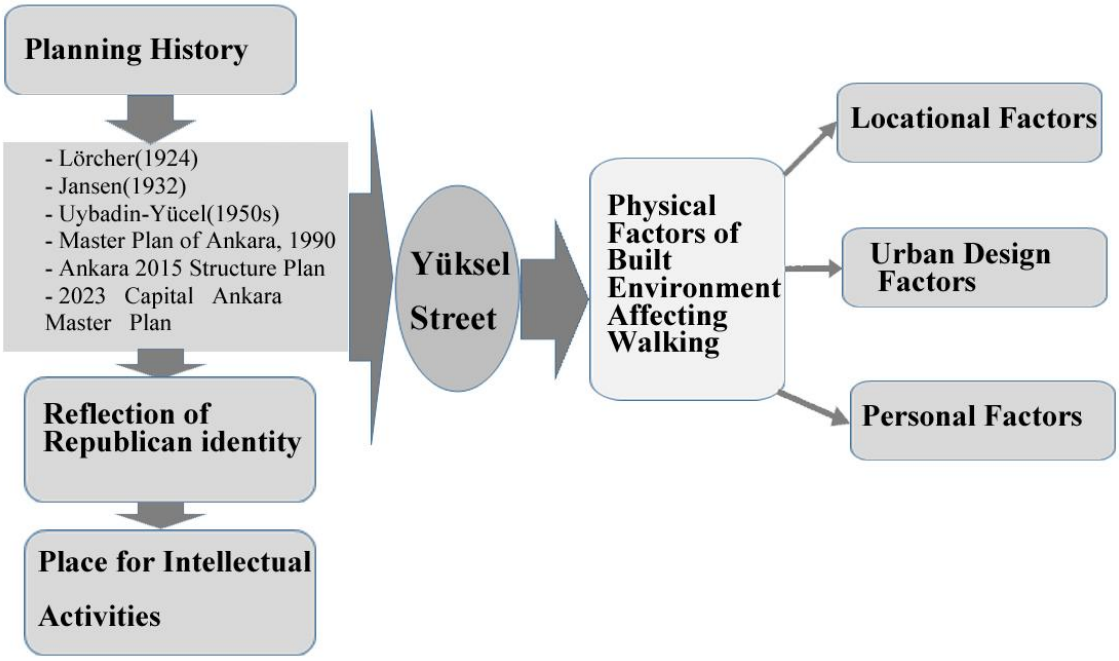


Figure 1-1. The scope of this thesis.

1.2 Research questions and aims of the study

The first purpose of this thesis is establishing a theoretical frame concerning the concept of walking and walkability and investigating practical features of them in urban space. For this purpose a theoretical framework for walking and its role as an efficient transportation mode and as a way of socialization is formed. Negative impact of excessive

automobile usage from social, economic and environmental aspects are studied and the advantages of walking is argued to contrast it with disadvantages of automobiles. A wide range of literature concerning walkability and walking are reviewed. Each of the related researches have handled the issue from a particular perspective. The first group of researchers being studied for this thesis, investigate diverse features of built environment influencing walkability. The second group of researchers have studied the correlation between human behavior and walking searching for the factors which cause human to choose to walk.

According to Yazıcıoğlu Halu and Yürekli (2011) investigating the Human-Environment-Behavioral studies can be helpful in walkability analysis due to its convenience for inter-disciplinary investigations. Because walking and walkability encompasses many disciplines such as psychology, city planning, anthropology, sociology, etc. (Yazıcıoğlu Halu & Yürekli , 2011).

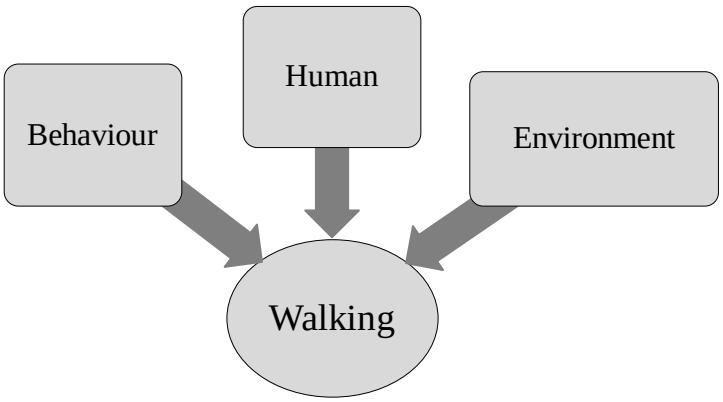


Figure 1-2. Human-Environment-Behavioral relations, influential factors in walking.

Walking as a mode of non-motorized transportation is issue of the third group of researches being studied for this thesis. Walking for community and the link between walking and socialization of people, on the other hand, is another perspective for those investigating walkability. Based on criteria proposed by various groups of researchers, this thesis introduces four general groups of factors affecting walking and walkability of public spaces. These factors are demonstrated in the Figure 1-3.

The second aim of this thesis is regaining originality and functionality of Yüksel Street as a street encompassing republican ideology. Because Yüksel Street still has a potential to be a long, well-connected, mixed-used and pedestrian-oriented street and also has potential to regain its functionality as an ideal residential street rather than merely a commercial street. Yüksel Street is a continuous rather long street located between Atatürk Boulevard and Libya Street but today, the only functional and appropriate part for pedestrian activities is the part from entrance of Atatürk Boulevard until Mimar Kemal School.

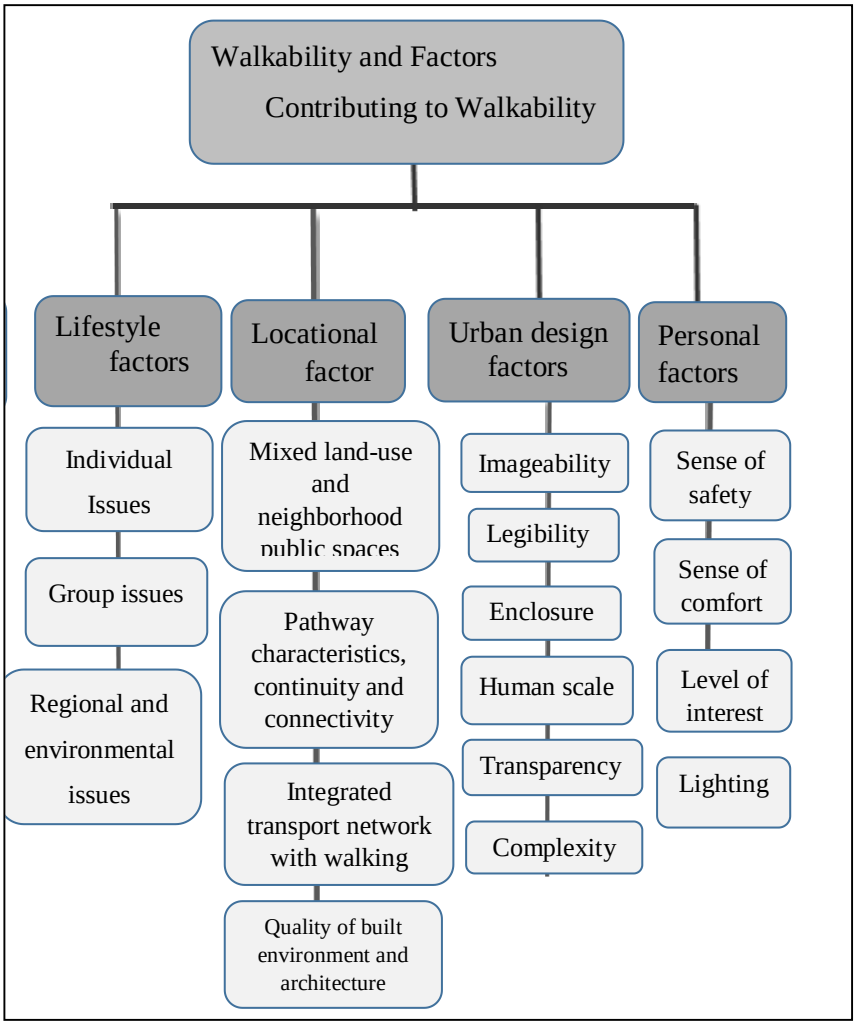


Figure 1-3. The factors influencing people's choice of walking and walkability of an urban space.

How this potential can be better revealed to revitalize this street in all its segments as a significant part of Ankara's city center, is the second important challenge of this thesis. After overall physical survey and analysis, this thesis divides Yüksel Street to various parts and evaluates each part separately to identify problems and potentials of them.

This thesis also investigates what kind of modifications has taken place in functionality and design of Yüksel Street along one century, when it was designed and how it changed. For this purpose, the planning history of Ankara, CBD and Yüksel Street is studied to better analyze modifications of this street which has happened in various periods. In fact, Yüksel Street has a high potential to partially satisfy expectations of citizens from CBD and deep urban design investigation on this street can become a successful pattern of a pedestrian-orientated street for other parts of CBD of Ankara and other streets in various districts of the city.

Via the findings of this thesis, it is aimed to give practical recommendations which can be helpful in improving walkability of the case study area or other similar public spaces in Ankara or other cities.

1.3 The importance of this study

This study is important since there is almost no academic study investigating significance of physical configuration of Yüksel Street from view of walkability. This street is chosen for this analysis since it includes a mix-use of diverse activities. It is located at central business district of Ankara and in addition to its accessibility aspects, it is also restricted for automobiles in approximately half of the street. Therefore it has a high potential for being an attraction center for people to spend a great time with other people in a safe, attractive and ideally designed space. Beside many incentives, Yüksel Street also has several disincentives and shortages in its design and functionality which will inclusively be handled in this thesis.

Yüksel Street as one of the most significant pedestrianized streets of Ankara's CBD is a valuable part of Kızılay being survived from invasion of motorized vehicles and their noise and pollution. Accordingly, Yüksel Street has a high potential to partially satisfy

expectations of citizens from CBD and deep urban design investigation on this street can become a successful pattern of designing pedestrian-orientated streets for other parts of CBD of Ankara and in various districts of the city.

1.4 Method of the study

This thesis chooses a case study method and tries to evaluate the walkability level and potentials of this case from perspective of urban design criteria. Yüksel Street as one of the most significant pedestrian-oriented streets of Ankara is chosen as the case study. This street is very important because it can be considered as a street which carries significant historical and social background.

Firstly, the thesis studies the historical development of Ankara within recent century and the evolution of city center of Ankara in order to put Yüksel Street in the context of Ankara and CBD's historic development and investigate the evolution of this street as part of one of the significant green spines of Ankara designed by Hermann Jansen. Yüksel Street emerged as part of a continuous green spine from Tandoğan to Güven Park and proceeding by Yüksel Street in Jansen 1932 plan. Tandoğan - Güven park green spine and Yüksel Street as continuation of it, is preserved in Uybadin-Yücel (1957) plan and later in 1970 and 1990 plan and despite of many different modifications Yüksel Street today still exists as a potential green and walkable street in CBD. The spatial analysis of Yüksel Street is carried out through various walkability factors developed through reviewing a street is done by means of the below resources.

- Various maps and photographs demonstrating the current land-use activities and existing situation of the street
- Direct observations from the perspective of an urban designer to evaluate the routine pedestrian flow, potentials and problems of street concerning pedestrians
- Utilizing questionnaires and interviews with users of the Yüksel Street.

CHAPTER 2

LITERATURE REVIEW ABOUT WALKING AND WALKABILITY

This chapter encompasses definitions and diverse purposes of walking in human society and studies a wide range of literature concerning walking and its various aspects and impacts in urban space.

2.1 Definition and aims of walking

Walking is actually one of natural and basic features of human. We walk for transportation, recreation, or even exercise. A society with people mostly walking rather than using cars would be more sustainable in terms of both natural resources and economy. Walking also leads people to experience more social interactions and thereby, maintains physical and mental health of people. Health advocates and medical doctors continuously claim that walking can have positive contributions to human health. Diminishing crime and other social problems and improving social cohesion are other advantages of walking (Duffy, 2009).

Litman (2004) defines walking as “an important form of access, both by itself and in conjunction with other modes of travel”. He also states that “walking is one of the first things that people learn to do and one of the last things that people want to give up”. Therefore, “being able to drive, although useful, is less essential than the ability to walk”.

Walking and a walkable society can have various benefits. For instance, basic mobility, improved fitness and public health, efficient land use, consumer cost savings, external cost savings (road and parking facilities, traffic congestion, crash risk, and environmental

damages), community liveability, economic development and support for equity objectives. The advantages of increased walking in a society are also imperative for vulnerable groups including people with disabilities, the elderly, children and people with low income (Litman, 2011). Considering the significance of walking for people, this kind of activity can have various types according to the purpose of the walkers. Walking can be done for transportation, recreation or exercise.

2.1.1 Walking as a non-motorized transportation mode

Walking in fact is the most fundamental basis of transportation whether we are going from one room to another or to a far destination. Even for those with cars, walking carries importance. Whatever form of transportation we use walking is still a component of our transportation. Since every trip begins and finishes with walking. Whether to walk the majority of our destinations, walk to a public transportation station or walk to our car, we still rely on our two feet (or walkers, wheels or other assistance for those with disabilities) to move us where we want to go (Duffy, 2009). Walking is also the cheapest way of transportation. Therefore constructing a walkable community can provide an affordable transportation system. Since 5-10% of automobile trips are unnecessary, they can be replaced by non-motorized transportation including walking as the most important non-motorized travel mode (Mackett, 2000). Driving beside its various advantages has many disincentives in today cities. Parking problem, traffic congestion, air pollution, negative land-use impacts and environmental damages are some of disadvantages of excessive usage of automobiles.

Studies demonstrate that designing pedestrian-friendly environment and improving non-motorized transportation system play an important role in decreasing vehicle usage and increases walking (NBPC, 1995). Cervero and Radisch (1995) carry out a study which reveals that in a pedestrian-friendly community, the residents prefer to walk, cycle, or use public transit for 49% of their work trips and 15% of their non-work trips. The findings of another research demonstrate that in comparison to the less walkable communities, pedestrian-friendly and walkable streets have three times more walkers and people are

more willing to walk in those streets. Table 2-1 indicates that non-motorized travel in some cities has very high portions.

Table 2-1. Percentages of various modes of transportation in selected European cities (Litman, 2012)

City	Walking and Biking	Public Transport	Personal Cars	Inhabitants
Amsterdam (NL)	47 %	16 %	34 %	718,000
Groningen (NL)	58 %	6 %	36 %	170,000
Delf (NL)	49 %	7 %	40 %	93,000
Copenhague (DK)	47 %	20 %	33 %	562,000
Arhus (DK)	32 %	15 %	51 %	280,000
Odense (DK)	34 %	8 %	57 %	1,983,000
Barcelona (Spain)	32 %	39 %	29 %	1,643,000
L'Hospitalet (Spain)	35 %	36 %	28 %	273,000
Mataro (Spain)	48 %	8 %	43 %	102,000
Vitoria (Spain)	66 %	16 %	17 %	215,000
Brussels (BE)	10 %	26 %	54 %	952,000
Gent (BE)	17 %	17 %	56 %	226,000
Brujas (BE)	27 %	11 %	53 %	116,000

Cities listed in Table 2-1 have no special physical or geographical characteristics when they are compared with the cities that have high motorized transportation levels. Therefore, high non-motorized levels in such geographically diverse cities show that transportation policies and community attitudes are more significant than geography or climate in determining non-motorized transportation (Litman, 2012).

Diverse studies have proved that people would prefer non-motorized transportation systems more, if appropriate and sufficient facilities and resources are accessible for them. Approximately 38% of respondents in an American survey responded that they would prefer to walk to their work place and about 80% of them told that they would like to walk more for exercise (STPP, 2003). The Table 2-3 summarizes a Canadian public survey indicating high levels of interest in cycling and walking and the Table 2-4 shows the various benefits and costs of non-motorized transport (NMT).

Table 2-2. Percentages of various modes of Transportation in selected developed countries (Litman, 2012).

	Car	Transit	Cycling	Walking	Other
Austria	39%	13%	9%	31%	8%
Canada	74%	14%	1%	10%	1%
Denmark	42%	14%	20%	21%	3%
France	54%	12%	4%	30%	0%
Germany	52%	11%	10%	27%	0%
Netherlands	44%	8%	27%	19%	1%
Sweden	36%	11%	10%	39%	4%
Switzerland	38%	20%	10%	29%	3%
UK	62%	14%	8%	12%	4%
USA	84%	3%	1%	9%	2%

Table 2-3. Active Transportation Survey Findings (Environics,1998,cited in Litman 2014)

	Cycle	Walk
Currently use this mode for leisure and recreation.	48%	85%
Currently use this mode for transportation.	24%	58%
Would like to use this mode more frequently.	66%	80%
Would cycle to work if there "were a dedicated bike lane which would take me to my workplace in less than 30 minutes at a comfortable pace."	70%	NA
Support for additional government spending on bicycling facilities.	82%	NA

Table 2-4. Non-Motorized Transportation (NMT) Benefits and Costs (Litman, 2014)

	Improved NMT Conditions	Increased NMT Transport Activity	Reduced Automobile Travel	More compact Communities
Potential Benefits	- Improved user convenience and comfort - Improved accessibility for non-drivers, which supports equity objectives - Option value - Higher property values	- User enjoyment - Improved public fitness and health - Increased community cohesion (positive interactions among neighbors due to more people walking on local streets) which tends to increase local security	- Reduced traffic congestion - Road and parking facility cost savings - Consumer savings - Reduced chauffeuring burdens - Increased traffic safety - Energy conservation - Pollution reductions - Economic development	- Improved accessibility, particularly for non-drivers - Transport cost savings -Reduced sprawl costs - Open space preservation - More livable communities - Higher property values
Potential Costs	- Facility costs - Lower traffic speeds	- Equipment costs (shoes, bikes, etc.) - Increased crash risk	- Slower travel	- Increases in some development costs

2.1.2 Social role of walking

Recreational walking or walking for community is not a new phenomenon. About 19th century in cities such as London, Paris and New York walking started to get a favorite activity among people. Walking was considered as a mean to experience the city.

Additionally walking and communicating with other people were important social activities (Amato, 2004). As walking is the main keystone of the community, the most significant way to enhance livability of a society is to increase walkable streets. In fact street is the main place providing people with opportunity to meet each other and socialize. Litman (2011) states that "environments that are conducive to walking are conducive to people" and explains the connection between walking and community liveability as below:

Walking improves community liveability, including safety, security and public health, local environmental quality, social cohesion, opportunities for recreation and entertainment and the maintenance of unique cultural and environmental resources. In this way, streets are the major portion of the public realm. They are places where people interact with their community. Therefore, more attractive, safe and walkable streets increase community liveability (Litman, 2010).

Today there are serious dissatisfactions, rising from modern city planning and architecture. Considerable erosion has happened in urban fabric due to excessive use of cars and modern car-oriented city planning. Furthermore, in modern cities there is loss of landmarks and nodes that Kevin Lynch had introduced in his book, "The Image of the City", as the main factors of a legible city. It is worth to note that loss of legibility can lead to poor walkable streets as it will be discussed in detail in the following paragraphs of this chapter. Accordingly loss of social niches can be considered as another significant problem of modernism (Lennard, & Lennard, , 1995).

According to urban planners, one of the most crucial benefits of walking and walkability is increased social interactions among people. Walking in a city's streets provides people with opportunity to know their neighborhood and build closer relationship with other people on street. Jane Jacobs explains this with the expression of 'eyes on the street'. She believes that the more people on the streets, the more neighborhood well-being and safety (Jacobs, 1961).

People walking in the streets regardless of their reason (whether transportation or recreation) maintain an active and lively street and it generates a positive public

perception of the society. Due to significant social impacts of walking, many urban designers in recent decades have been attracted to designing compact and walkable neighborhoods. New transport and land use policies focus on pedestrians, claiming that walkable societies increase spontaneous meetings in streets and provide better and more enjoyable travels within high quality areas (Duffy, 2009).

Recreational walking

Recreational walking is another type of walking which can be categorized into two groups: leisure walking and walking for exercise. Leisure walking is done with a low speed and generally by another person (Duffy, 2009). In this type of walking people aim to relax their mind and enjoy their walking. Accordingly, a particular place is required for leisure walking. Aesthetically pleasing, active streetscape, attractive store fronts, ornamented buildings and view of nature are some of examples for a leisure walking environment. Since more social interactions are expected in this kind of walking, streets including places such as restaurants and cafes have especial importance for leisure walking.

Walking for exercise, on the other hand, is somehow different. It is done in higher pace than leisure walking. Because health advocates claim that vigorous walking is more effective in improving cardiovascular health (Office of the Surgeon General (US), 2010). Since the purpose of this type of walking is reaching to a healthy and fit body, burning more calories takes particular significance. The most essential characteristic of an appropriate space for exercise walking is level paths with standard slope and without any obstruction. Although aesthetic attractions can play important role in exercise walking, this issue comes at the second stage (Duffy, 2009).

Unlike the recreational walking which has root in history, walking for exercise is a new issue which is triggered by new life styles. Since modern lifestyles have brought abundance of unhealthy diets and shortage of physical activity, obesity and many diseases have considerably increased. Therefore, medical scientists prescribe daily walking as an important exercise which can burn extra calories and prevent various health problems (Office of the Surgeon General (US), 2010).

2.1.3 Negative impacts of car-dependency

Advent of automobile after the Second World War in the early 1900s made a revolution in cities and changed the role of walking in human lives. After the widespread use of personal automobiles, cities began to be shaped according to automobile access requirements. Since the World War had completely ruined many cities in Europe, during the reconstruction process the cities -in particular city centers- were designed for automobiles. Torlak (1983) states that automobile has been considered as the most significant and required invention of the 19th century affecting the cities due to various advantages that it presented. First of all, in comparison with the rail system automobile produced less noise and pollution. It also occupied less space than wagons and carriages did. Furthermore, it could carry more load than the carriages and wagons could. Therefore automobile could be considered as an appropriate solution for decreasing chaos in cities of that time.

Automobile provided access from any direction which looked impossible before. Therefore, it was the automobiles that shaped the cities after the Second World War. "For the first time in history houses and business could be located almost anywhere". Ease of access to every place around the city resulted in sprawl of urban spaces (Newman & Kenworthy, 1999). Decentralization of cities was the direct consequence of automobile use in cities. Durning (1996) claims that the car and the city are wonderful but these two do not always mix appropriately. According to Newman and Kenworthy (1999) since the appropriate connection between land use and transportation in cities was broken, automobile dependency has started to get a critical phenomenon in cities.

Although advent of automobiles, particularly the personal cars, provided human with many amenities, excessive usage of them brought major problems and disadvantages for the societies. Okulu (2007) in her thesis "Non-motorized Transport for Mobility Planning in City Centers" defines car dependency as "excessive and inappropriate use of car itself." Due to excessive and inappropriate usage of automobiles, the costs and disadvantages of it exceed its benefits. Various social, economic and environmental costs and problems are imposed as the result of excessive car usage. Table 2-5, demonstrates the effects of car-

dependency. Loss of urban life, loss of public safety, oil vulnerability, urban sprawl, toxic emissions, traffic problems, including noise and pollution, car accidents and their costs, high infrastructure costs and extreme congestion are some of significant disadvantages of excessive automobile use.

Table 2-5. The environmental, economic and social effects of car-dependency (Newman & Kenworthy, 1999).

Environmental	Economic	Social
Oil vulnerability	External costs from accidents and pollution	Loss of street life
Photochemical smog	Congestion costs, despite endless road building	Loss of community
Toxic emissions such as lead and benzene	High infrastructure costs in new sprawling suburbs	Loss of public safety
High greenhouse gas contributions	Loss of productive rural land	Isolation in remote suburbs
Urban sprawl	Loss of urban land to bitumen	Access problems for car-less and those wit disabilities
Greater storm-water problems from extra hard surfaces		
Traffic problems such as noise and severance		

Engwicht (1993) states that cities were mainly established in order to facilitate "exchange of information, friendship, material goods, culture, knowledge, insight and skills". Cities were also established to exchange "emotional, psychological and spiritual support". These facilities of cities are strongly related to each other and constitute the major objective of urban life, however, excessive and inappropriate usage of automobile has considerably caused detriment to this relation. Therefore many cities have become mechanical organisms with low quality of urban life rather than living organisms.

Pedestrian movement in urban area is one of the most significant indicators of socialization and quality of urban life in a city. Mumford (quoted in Torlak, 1983) states that pedestrians should be placed at the center of every urban transportation plan. Because pedestrianization brings vitality and order to the cities and walking and cycling are more convenient, enjoyable and efficient mode of transportation (Torlak, 1983). One of the most important advantages of walking in an urban area is that walking people have more opportunity to interact with each other, feel the atmosphere, and touch the trees and stones

and feel the public safety. Generally walking and cycling (instead of driving) permit people to experience the places that they pass through (Engwicht, 1993). Unfortunately losing the required balance in automobile usage, led many cities to experience a serious decline in these values. Since cities begun to develop according to automobile access, a strong struggle and contrast between pedestrian and motorized vehicles occurred. According to Engwicht (1993), excessive use of automobile have turned the places into destinations or converted them into movement corridors. Additionally, he states "we have forgotten that transportation can be more than just a means of getting to a place, it can be the experience of place itself".

Consequently, in order to protect the cities from more car invasion and diminish its negative economic, social and environmental impacts, a growing interest in walking and creating more walkable city centers and neighborhoods have been initiated during recent decades. Accordingly, various movements have been founded supporting walkability and decreasing car usage in cities.

2.2 The literature focusing on diverse aspects of walking and walkability

During recent decades the issue of increasing walking and walkability of urban space has been addressed by a considerable number of researchers. The literature concerning walkability deal with various aspects of walkability and the factors contributing to it from diverse perspectives. In this part of the study the issue of walkability in literature is grouped according to their scopes to understand what sorts of contributing factors and influential criteria of walkability is suggested by various researches within recent decades. Figure 2-1 demonstrates that environmental and behavioral issues are the most influential factors influencing walking whether as a transportation mode or as a means of socialization and communication. Additionally, increasing walking and promotion of walkability in urban spaces is an issue advocated by many reform-minded social and environmental movements such as Smart Growth, New Urbanism, Sustainability and so forth.

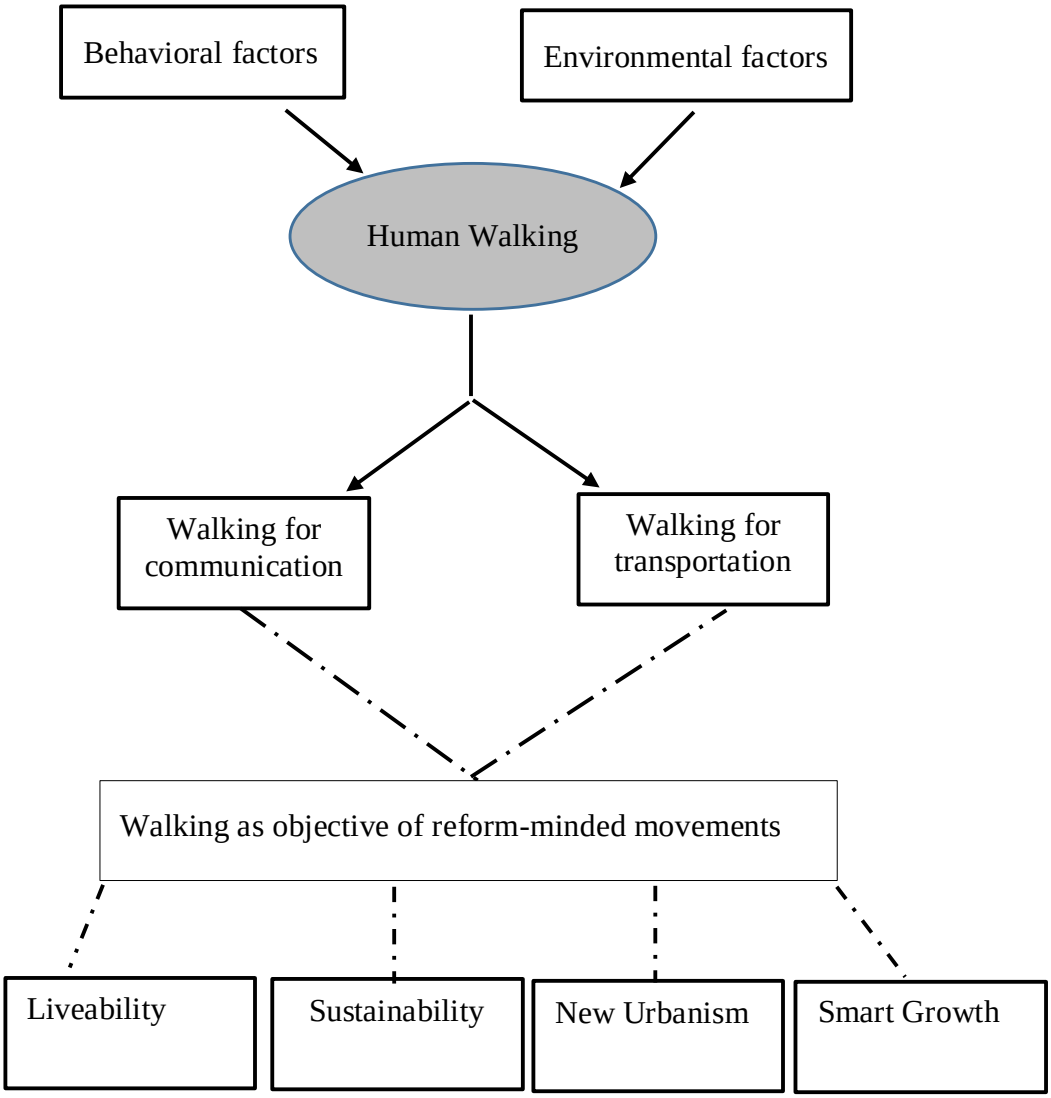


Figure 2-1. Literature concerning walkability from diverse aspects.

2.2.1 Behavioral factors affecting walking

One of the most significant factors that play a great role in choosing walking as a healthy and efficient transportation mode is behavioral causes. Alfonzo (2005) is a researcher in California University who investigates influential social-ecological model of walking and the process of decision-making for walking. Because she believes that decreased walking rate related to quality of modern lifestyles have made many researchers to investigate the factors associated with such a behavior change. Table 2-6 demonstrates the scopes and suggested criteria of various researches focusing on behavioral aspect of walking.

Table 2-6. The scope and proposed walkability factors by literature concerning walking behavior.

Walking Behavior				
References	**Scope**	**Suggested influential factors on walkability**		
M. Alfonzo (2005**)** "To Walk or Not to Walk? The Hierarchy of Walking Needs"	social-ecological model of walking and the factors influencing the decision-making for walking	Individual factors	Psychological or cognitive factors	- Subjective norms - Perceived behavioral control - Level of behavioral intention - Habitual behavior - Self-efficacy - Physical activity enjoyment levels - Attitudes - Awareness
			Demographic factors	Age Gender Education Marital status
			Biological factors	Weight
		Group factors	Sociological factors Levels of social support Social reinforcement Social modeling Membership in sports teams recreational activities, and outdoor clubs	
		Regional factors	Cultural factors	Informal "culture" of neighborhoods
			Climate Topography Geography	 Coastal neighborhoods

Table 2.6. (Continued)

R. Ewing, et.al. (2006**)** Identifying and "Measuring Urban Design Qualities Related to Walkability"	How different Walkability factors affect overall walking behavior	Physical features	Sidewalk width Street width Traffic volume Tree canopy Building height Weather, etc.
			Imageability Legibility Enclosure Human scale
		Urban design qualities	Transparency Linkage Complexity Coherence
		Individual reactions	Sense of safety Sense of comfort Level of interest
N. Humpel, et.al. (2002**)** **"**Environmental factors associated with adults' participation in physical activity"	This review identifies 19 studies, of which 16 described the association between physical environments and physical activity. This review only concentrates on physical activity behaviors as the consequence variables of interest.	The factors associated with physical activity: - accessibility of facilities - opportunities for activity Factors that decrease the possibility of being active: Hills, heavy traffic, low residential facilities density and lack of equipment. Aesthetic factors related with increased physical activity: The perception of a friendly, pleasant and attractive neighborhood. Other factors including safe pavements and low perceived crime rates are also effective factors.	

Table 2.6. (Continued)

Z. Yazıcıoğlu Halu and F. Yürekli (2011) "Walkability and walking in urban space"	This article investigates features of spatial environment and urban space which are influential factors in walking behavior and identifies the hierarchy of walking needs	Spatial features of urban space regarding walking: Perceptual features	-Individual features -Group features -Regional features
		Social features	
		Physical features	hierarchy of walking needs: - feasibility - safety - accessibility, - usefulness - physical comfort and - sociability

Alfonzo (2005) organizes a hierarchy of walking requirements and identifies five levels of needs and introduces these levels as antecedents which affect process of decision-making for walking. Studies demonstrate the influential role of individual, group, regional and physical-environmental factors on walking. Although these factors are very important in decision-making process, some of them have priority to others. Similar hierarchical structure can be true about the factors being considered when a person decides to walk through an urban space. These requirements range from the fundamental one which is feasibility associated with personal limits to more highly effective needs associated with urban form which can be counted respectively as: **accessibility**, **safety**, **comfort** and **pleasurability**. Here by hierarchy of needs, it is meant that if a person do not feel an urban space safe enough to walk through, the convenience or pleasurability level of that place will not get considered by that person (Alfonzo, 2005).

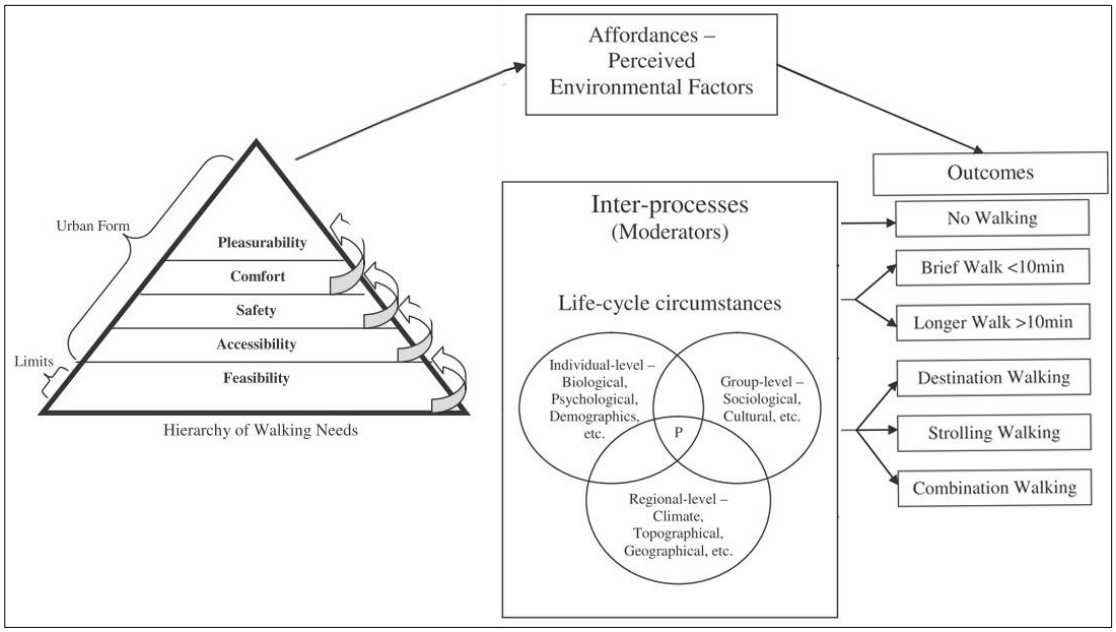


Figure 2-2. Hierarchy of Walking Requirements within a Socio-Ecological Framework (Alfonzo, 2005).

The model of walking needs hierarchy being organized within social-ecological framework can be very guiding in preparing policies and interventions associated with increasing walking.

Yazıcıoğlu Halu and Yürekli (2011) in their article, "walkability and walking in urban space" are inspired by Alfonzo and they also have suggested a conceptual model which questions the walkability of urban public spaces. Although many factors can be effective in level of physical activity and walking in a person, the perception of human is generally affected by four important factors: Individual factors, group, regional and spatial environment are supposed as the most significant variables which influence decision-making process for walking.

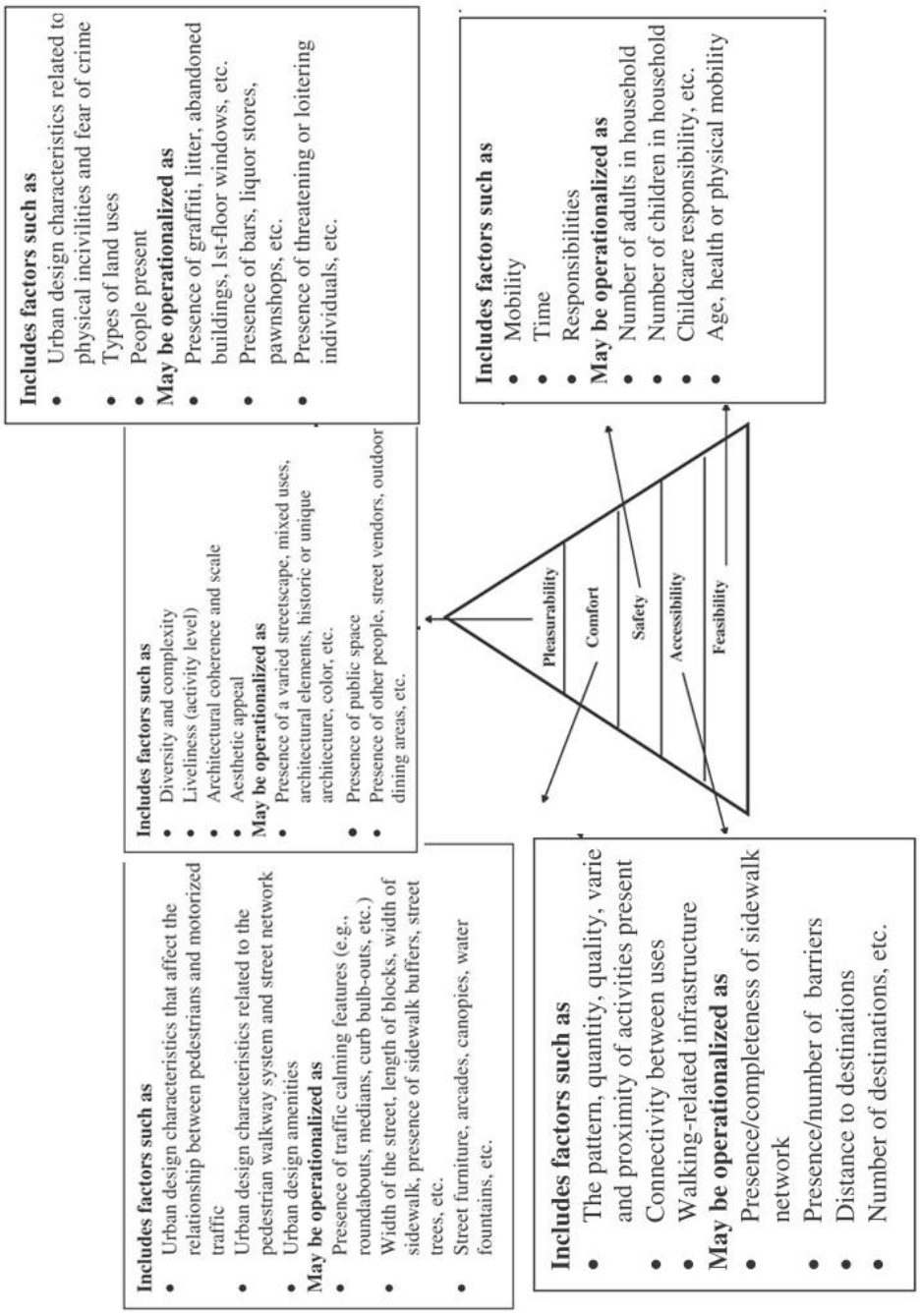


Figure 2-3. Hierarchy of Walking Requirements (Alfonzo, 2005).

Yazıcıoğlu Halu and Yürekli (2011) in their article, "walkability and walking in urban space" are inspired by Alfonzo and they also have suggested a conceptual model which questions the walkability of urban public spaces. Although many factors can be effective in level of physical activity and walking in a person, the perception of human is generally affected by four important factors: Individual factors, group, regional and spatial environment are supposed as the most significant variables which influence decision-making process for walking.

Yazıcıoğlu Halu and Yürekli (2011) argue that the features of spatial environment and urban space are influential factors in walking and these features are identified as hierarchy of walking needs including **feasibility**, **safety**, **accessibility**, **usefulness**, **physical comfort** and **sociability**. The success of urban spaces depends on the extent to which they facilitate walking and encourage human-environment and human-human interactions. The model which demonstrates the factors affecting the intention of people to walk through urban spaces is shown in Figure 2-4.

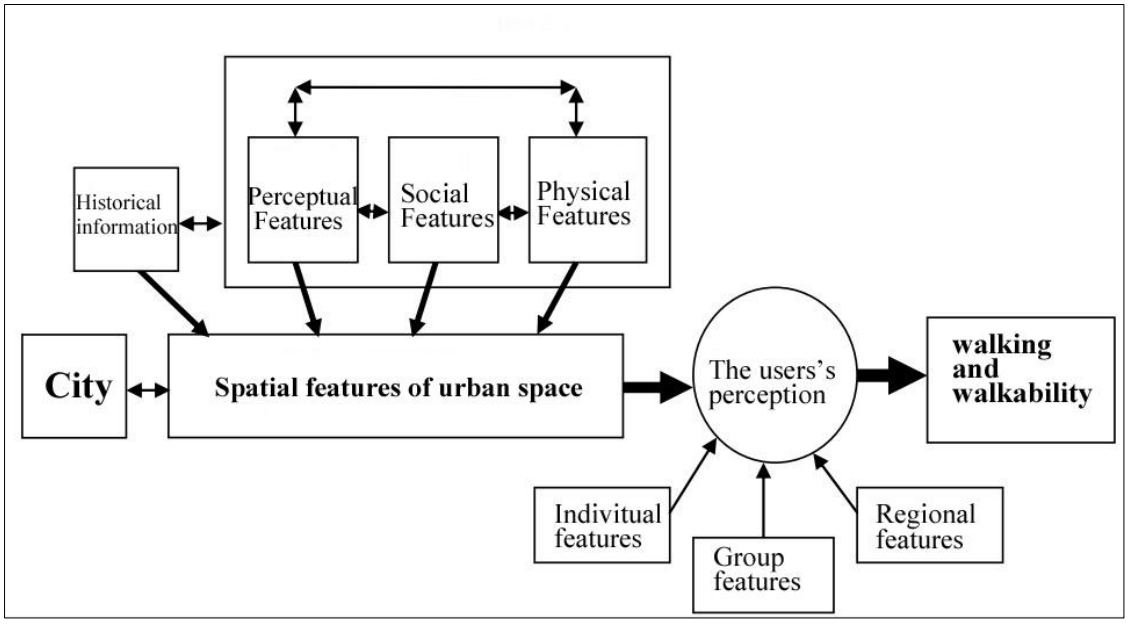


Figure 2-4. Spatial characteristics of urban space translated from (Yazıcıoğlu Halu & Yürekli , 2011)

Humpel, et.al. (2002) are other group of researchers dealing with walking behavior. They have reviewed a wide range of studies majorly about the relationship between built environment and physical activity. They try to identify the environmental factors influencing physical activity behavior including choice of walking and biking as modes of transport and ways of being physically active. The factors encouraging general physical activity in a neighborhood are:

- accessibility of facilities
- Opportunities for activity, for instance having access to home equipment, local clubs that provide opportunities to be active and residing in coastal areas.

Factors that decrease the possibility of being active are:

- Unpleasant geomorphologic conditions such as sloppy paths and hills
- High volume of traffic
- residential regions with low density
- no facilities in the short distance and
- Lack of equipment.

Moreover, some aesthetic factors are related to increased physical activity such as the perception of a friendly, pleasant and attractive neighborhood. Some other factors including safe pavements and low perceived crime rates also encourage people to be more active.

The behavioral criteria influencing walking proposed by reviewed literature are summarized in Figure 2-5 and the required criteria for analyzing the case study of this thesis are chosen and grouped in four main categories including lifestyle factors, urban design and personal factors.

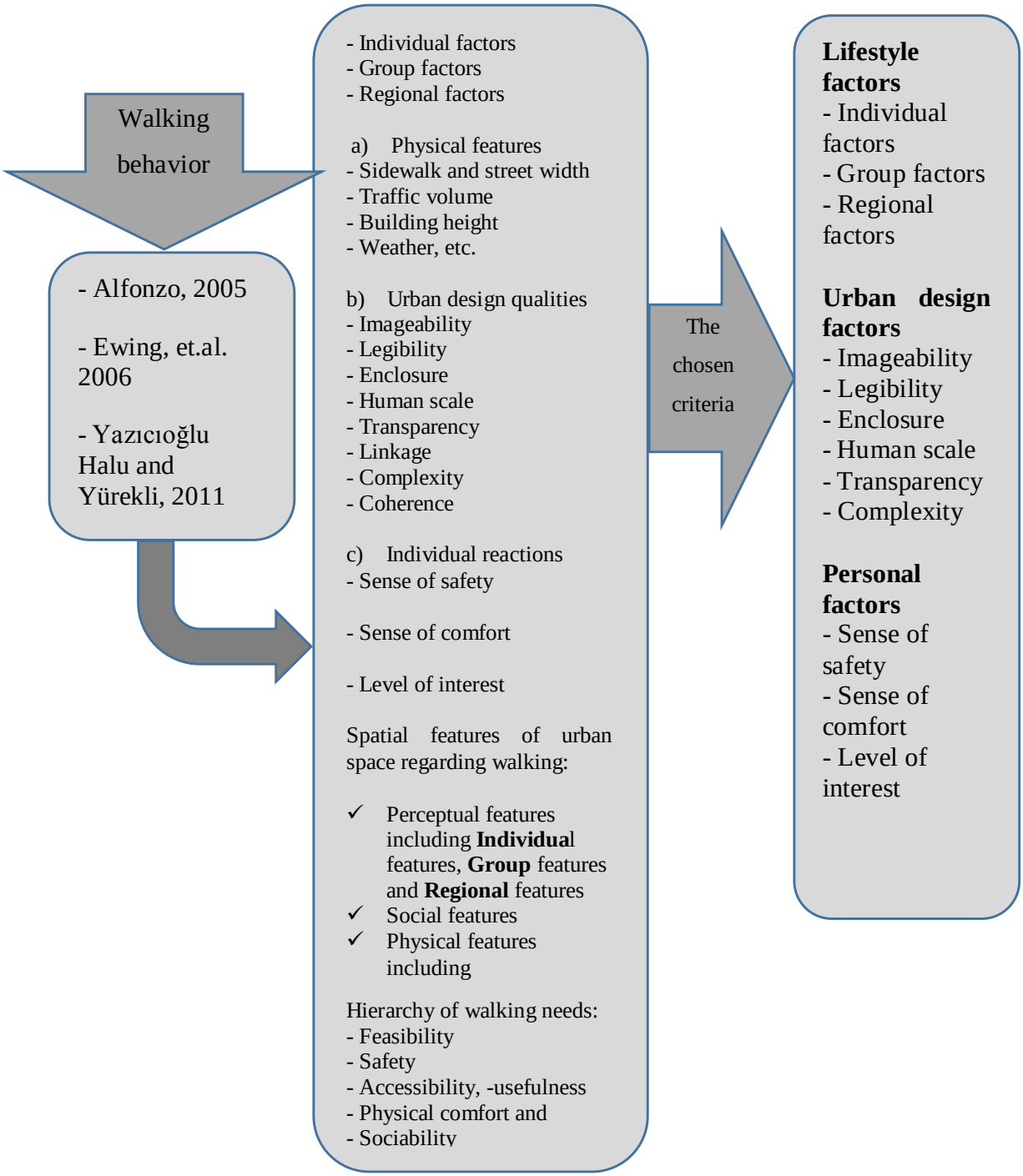


Figure 2-5. Proposed factors in the literature associated with walking behavior.

2.2.2 Connection between built environment and walking

The influential characteristics of built environment increasing walking in urban space is another issue being concerned in literature. Some of these researches are summarized in Table 2-7.

Table 2-7. The scope and proposed walkability factors by literature concerning association between built environment and walking.

Built Environment and Walkability		
References	**Scope**	**Suggested influential factors on walkability**
B. E. Saelens and S. L. Handy (2008**)** "Built Environment Correlates of Walking: A Review"	This paper reviews the characteristics of the built environment correlated with walking and discusses related policy implications.	Prior reviews and newer studies document consistent positive relationships between walking for transportation and below mentioned features: - Density - Distance to non-residential destinations - Land use mix - Network connectivity - Parks and open spaces - personal safety
Ch. Lee and A.V. Moudon (2006**)** "The 3Ds + R: Quantifying land use and urban form correlates of walking"	Objectively measured and individually observable micro-scale environmental variables concerning walking	-Density -Diversity -Distance to routine daily destinations -Land use mix -Street connectivity

Table 2.7. (Continued)

B. E. Saelens, (2003**)** "Environmental Correlates of Walking and Cycling: Findings From the Transportation, Urban Design, and Planning Literatures"	associations between physical environment variables and individuals' walking and cycling for transport, recreation or exercise	The factors influencing walking for transportation are: **At first stage:** -Car ownership -Density -Connectivity -Mixed land-use The factors influencing walking for recreation and exercise are: **At first stage:** -Neighbourhood aesthetic -Topography -Safety (traffic, crime, etc.) -Psychological correlates of physical activity	**At second stage:** - Income - Age, gender - Safety (traffic, crime, etc.) - Presence of biking\walking trails - Neighborhood aesthetic - Topography **At second stage:** - Presence of biking\walking trails - Parks, community recreation centers, other physical activity facilities
H. Bahrainy and H. Khosravi, (2013**)** "The impact of urban design features and qualities on walkability and health in under-construction environments: The case of Hashtgerd New Town in Iran"	The association between the urban design and walkability quality of the built environment and health of the residents in a neighborhood	urban design factors of built environment affecting walking: - accessibility - Proximity - Complexity - Human scale - Continuity	

Table 2.7. (Continued)

P. Ghadimkhani, (2011**)** "Increasing Walkability in Public Spaces of City Centers: The Case of Tunali Hilmi Street, Ankara"	Researching liveability and walkability in urban public space	Safety	- Street Pattern - Traffic Calming - Lightening and visibility - Continuous pavement - Pedestrian enclosure - Separation - Floor quality - Street crossing - Vehicle mix
		orientation	- Legibility of street pattern and urban components - Landmarks - Continuity - Built form and its location - Architectural and environmental elements
		attractiveness	
		comfort	
		diversity	
		local destinations	

Table 2.7. (Continued)

E. Cerin, et.al. (2005**)** "Neighborhood Environment Walkability Scale: Validity and Development of a Short Form"	The aim of this study was to examine the factorial and criterion validity of the Neighborhood Environment Walkability Scale (NEWS) and to develop an abbreviated version.	Influential factors in enhancing walking for transportation: - presence of diversity of destinations - residential density - walking infrastructure - aesthetics - traffic safety and crime	Influential factors in enhancing walking for recreation: - Aesthetics - mixed land-use - diversity of destinations - residential density
S.L. Handy,et.al (2002**)** "How the Built Environment Affects Physical Activity Views from Urban Planning"	Association between the built environment and travel behavior	- Density and intensity - Land use mix - Aesthetic qualities - Regional structure	
		-Street scale	Three-dimensional space along a street as bounded by buildings
		-Street connectivity	Directness and availability of alternative routes through the network

The association between built environment and human's travel behavior (in particular, walking and biking) has been an interesting and challenging issue for planners. The built environment encompasses the below mentioned fields:

- The design of a city and the appearance and arrangement of its physical elements (urban design)
- Distribution of various sorts of activities in an urban space(land use)
- The transportation system including streets, sidewalks, bicycle paths, etc.
- Built environment also encompasses the pattern of diverse human activities within physical environment (Handy, et al., 2002).

Jacobs (1961) argues that the cities require "a most intricate and close-grained diversity of uses that give each other constant mutual support, both economically and socially". As well as Jacobs and many other researchers in field of urban planning and also reform-minded movements including New Urbanism and Smart Growth, all emphasize on developing walkable public spaces and reducing car usage. The measure of the built environment are generally discussed by categorizing the measure to two groups: regional features, local neighborhood features. Since walkability is majorly discussed in neighborhood scale, five general interrelated dimensions of built environment is concerned in many researches as well as Handy's study (2002). These interrelated and correlated factors are summarized in the Table 2-8.

Table 2-8. The correlates of built environment affecting walking (Handy, et al., 2002).

Dimension	Definition	Examples of measures
Density and intensity	Amount of activity in a given area	Persons per acre or jobs per square mile Ratio of commercial floor space to land area
Land use mix	Promixity of different land uses	Distance from house to nearest store Share of total land area for different uses Dissimilarity index
Street connectivity	Directness and availability of alternative routes through the network	Intersections per square mile of area Ratio of straight-line distance of network distance Average block length
Street scale	Three-dimensional space along a street as bounded by buildings	Ratio of building heights to street width Average distance from street to buildings
Aesthetic qualities	Attractiveness and appeal of a place	Percent of ground in shade at noon Number of locations with graffiti per square mile
Regional structure	Distribution of activities and transportation facilities across the region	Rate of decline in density with distance from downtown Classification based on concentrations of activity and transportation network

Travel, in transport planning field is referred as trip which is moving from one place to another. In a trip, destinations, the length of trip and the mode of travel (walking, biking or automobile, etc.) are concerned. Moreover, the aim of travel also has particular

significance which is majorly based on the sort of activity taking place in destination. For instance, travel to work place, shopping, recreation and so forth.

The analysis of travel behavior can be done at “aggregate” level of the zone of traffic analysis or at the “disaggregate” level of the individuals or households. In general, in order to study the link between built environment and travel behavior, disaggregate data are majorly preferred. Because disaggregate data provide more sophisticated behavioral modeling which better suit for this objective.

It worth to note that the association between the built environment and walking is completely different from the association of it with automobile usage. The significant results taken by Susan Handy, et.al. (2002) about relationship between built environment and walking are:

Firstly, any changes in the physical environment affects the travel cost and utility. The design features and physical element of a walkable urban space proposed by New Urbanists and many other urban researchers such as mixed land-uses with high density, well-connected streets and improved sidewalks for pedestrians all aim to decrease the distance and time of trips and reduce the travel cost. Additionally, for increasing walking and biking, the travel experience should get improved by enhancing perceptions of convenience, aesthetics quality and safety (Handy & Clifton , 2001).

Secondly, geographic scale is very important in studying travel behavior. For instance, car trips are majorly affected by the region structure rather than the neighborhood characteristics, whereas the trips done on foot are more associated with neighborhood characteristics. Moreover, psychological and social factors are influential in walking than driving. Because peer groups and friends, personal safety and aesthetic attraction of streetscape are certain affective factors of walking behavior than driving behavior (Handy, et al., 2002).

Chanam Lee and Anne Vernez Moudon (2006) prioritize variables about micro level land-use and urban form which are associated with walking. They concentrate on measurable and observable criteria of environment and aim to prepare interpretable results for

preparing planning policies and appropriate interventions which can increase walkability of urban environment (Lee & Moudon, 2006). They have used Behavioral Model of Environment (BME) method for studying their case study. This method includes three significant factors related to walking behavior:

1. The origin and destination of trips
2. The 'area' characteristics around the origin and destination
3. The features of the route connecting the origin and destination

Lee and Moudon (2006) classify land uses associated with walking in their case study in three groups:

a) Generalized land-uses

b) Individual destinations

c) Groups of destinations

Finally they have achieved several significant conclusions. Firstly, the data in parcel level suggests valid ways for evaluating built environment. Secondly, the way the variables are grouped, chosen and prioritized indicate a manageable range of variables which are influential in increasing walking. Thirdly, the significance of particular destination land-uses, being measured as distance from home, demonstrate that such a variable serve as an influential measure of mixed land-use for walkability of a neighborhood. The street connectivity as influential factor of neighborhood walkability, also is assessed by measuring distance from home to especial activities rather than variables such as density of intersections and average size of the blocks in neighborhoods. Finally, Lee and Moudon's study identify an upper percentage of walkers in comparison to those of other surveys investigating walkability of neighborhoods with similar population.

Bahrainy and Khosravi (2013) are other researchers who have studied the association between the urban design and walkability quality of the built environment and health of the residents in a neighborhood. They have conducted a survey in Hashtgerd, a newly constructed town near Tehran, located in Iran. This study also includes the gender factor

to find out how the built environment influences the walkability and consequently the health of each group. Firstly, by use of a cross-sectional investigation Body-Mass Index BMI and required data about physical activities of the residents are collected. Secondly, a survey was conducted to search for barriers of walking in the environment. Then the barriers found through the survey were studied as potential urban design characteristics regarding walkability. Additionally, a regression analysis was carried out to find out how each of urban design qualities affect walkability of the neighborhoods and health of its residents. The case study of this article consists of several 'residential clusters'. Accessibility is the first factor which is extremely dependent on scale and it should be studied on both micro (local) and macro (regional) scales (Bahrainy & Khosravi, 2013). Moreover, local accessibility is closely associated with having proximity with local activity centers. Regional accessibility on the other hand, is dependent on an appropriate transport connection with large regional activity concentrations (Handy, 1993).

For instance, accessibility to daily needs by walking or biking is related to local scale **accessibility** and retaining an appropriate public transport system which provides access to important activity centers including workplaces, educational centers and necessary stores. Previous studies generally have focused on macro-scale characteristics of built environment regarding walkability. The built environment was quantified through independent variables of regional level including street connectivity and land-use patterns. **Proximity** is another significant urban design factor which is influential in walkability. **Complexity** is the spatial richness of environment and is related to "the number of distinctive differences to which viewer is exhibited per unit of time". Complexity is associated with factors such as diversity building type, color and age of buildings, layering at the edge of the street furniture (Ewing & Handy, 2009). **Human scale** is another urban design factor suggested by Bahrainy and Khosravi (2013) and also by Ewing and Handy (2009) as significant criteria of walkability. "Human scale refers to a size, texture, and articulation of physical elements that match the size and proportions of humans and, equally important, correspond to the speed at which humans walk". Besides factors such as details of buildings, street furniture, texture of pavement, distance to destinations also are extremely influential factors, especially in work trips and for men.

Human scale also includes requirements such as standard sidewalk or path width for pedestrian and standard slope. Fast-moving cars require less details and fewer environmental information while passing through a path and it means lower human scale. In a path with poor quality of sidewalk and without appropriate buffer zone protecting pedestrians in which automobiles move with high speed, indicates that this street is not designed for human usage but for automobiles. The following criteria are considered as noteworthy signifiers of human scale:

- ✓ Short distance to destinations, predominantly distance to work, education, shopping and recreation centers.
- ✓ Low-speed of automobiles
- ✓ The width and quality of sidewalks
- ✓ Climatic conditions and geo-morphological features such as slope
- ✓ details of the environment and decorations of the buildings
- ✓ Quality of urban facilities and street furniture.

Continuity, is offered as the most influential attribute of walkability. Complexity of space majorly is important in non-work travels and human scale is an attribute of work travels. Furthermore, the researches of Bahrainy and Khosravi demonstrated that environment had a strong impact on encouraging women to walk rather than men. Similarly, safety was the most significant walkability factor from perspective of women while for men, the distance to destinations had more importance. Visual richness of the space is another effective factor of walkability. Monotonous and stereotype environments are proved to discourage walking. Unpleasant climatic and environmental conditions are also demonstrated to have adverse effect on walkability of an urban space. Standard slope, sufficient protection from rain, snow and sunlight also should be provided through a successful urban design process to encourage pedestrians to walk instead of using cars (Bahrainy & Khosravi, 2013).

Finally the required criteria for analyzing the case study of this thesis being mentioned in the reviewed researches about connection between built environment and walking are selected and grouped in these categories: locational, urban design and personal factors.

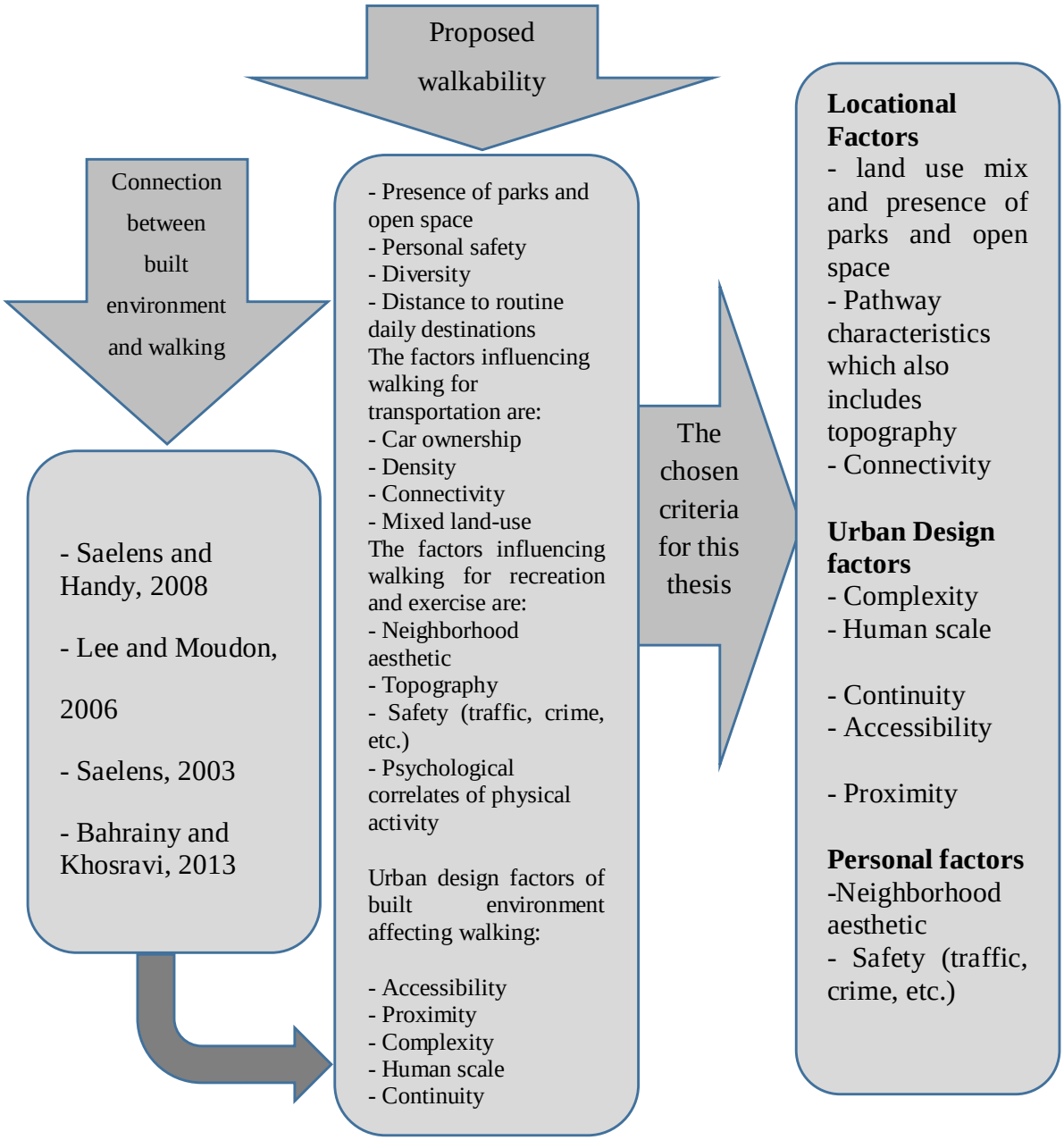


Figure 2-6. Proposed walkability factors in the literature associated with built environment.

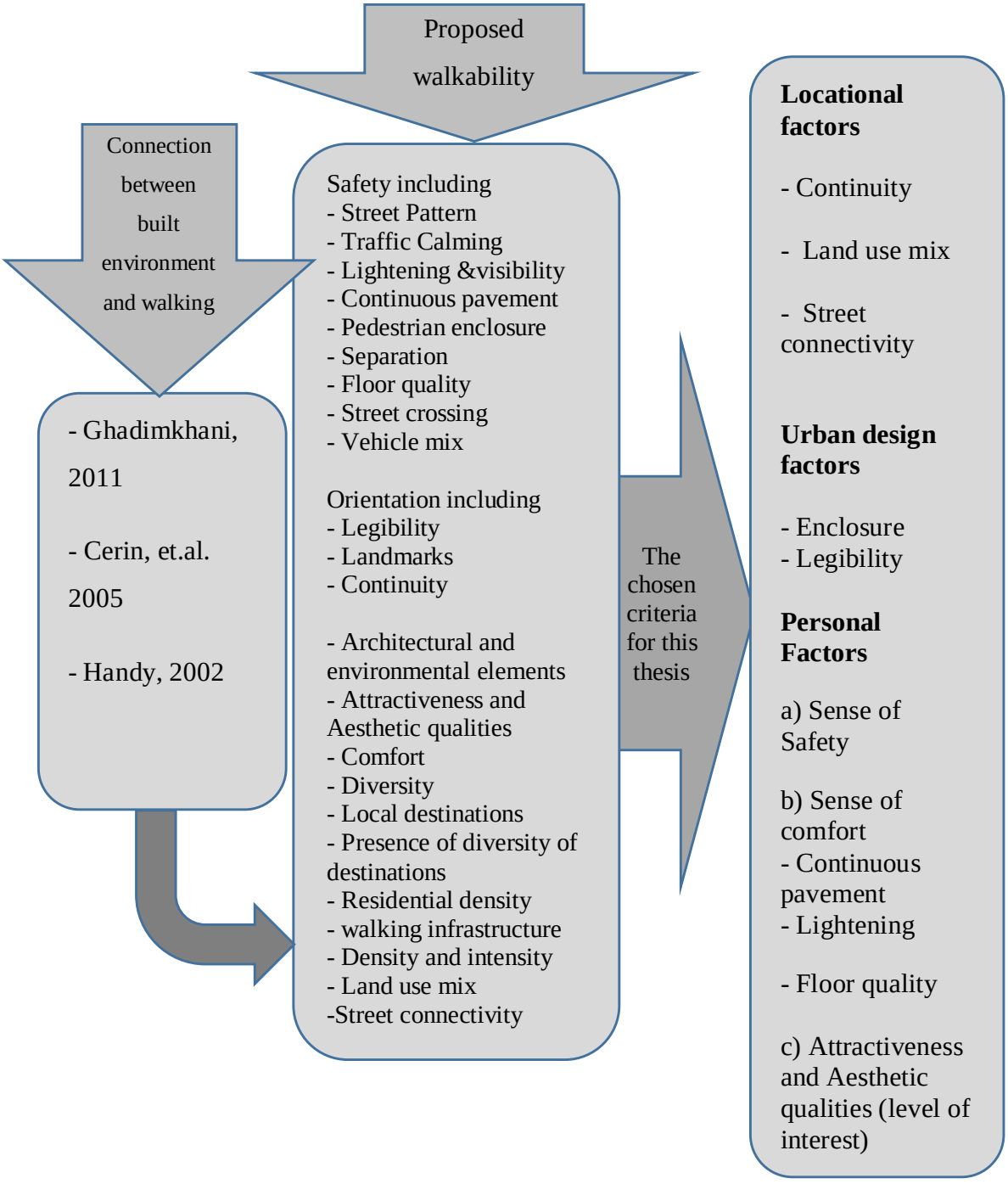


Figure 2-7. Proposed walkability factors in the literature associated with built environment.

2.2.3 Walking for transport

Walking as an efficient mode of transportation has been argued by many researchers and is advocated by a wide range of reform-minded designs such as "smart growth" and "new urbanism". Table 2-9 summarizes the scope and proposed environmental criteria affecting choice of walking as a means of transportation.

Table 2-9. The scope and proposed walkability factors by literature concerning walking behavior.

Walking for Transportation			
References	**Scope**	**Suggested influential factors on walkability**	
R.Cervero and K.Kockelman, (1997) "Travel Demand and the 3Ds: Density, Diversity and Design"	The role of neighborhood design and physical form of cities in people's choice of travel mode.	- Density - Land-use Diversity - Pedestrian-oriented design of the built environment - Well integrated public transport system with walking	- Presence of convenience stores close to the residential units - Presence of pedestrian-friendly urban environment - Presence of attractive and walkable paths with diverse retail shops in a compact neighborhood
M. Southworth, (2005**)** "Designing the Walkable City"	Walking as a mean of transportation and designing walkable cities	- connectivity; - linkage with other modes - being fine grained - safety - quality of path And path context	

Table 2-9. (Continued)

R. Rezazadeh, (2012**)** "Identifying Measures and Indicators Affecting the Walkability of Neighborhoods with a Sustainable Neighborhood Development Approach Case Study: Chizar Neighborhood, Tehran, Iran"	Sustainable transportation	- access to daily and weekly needs	Availability of facilities in the neighborhood and access to them	
		- safety	Traffic safety and sense of security	-Vehicles street -signs and traffic equipment -Lighting -Safety from crime
		- environmental aesthetics	Landscape and views	Trees, attractive landscape, variety of buildings, lack of noise and pollution, cleanness, parks
		- Neighborhood characteristics	- Traffic volume	
			-Permeability	-Number of dead-end routes -Intersection density -Availability of alternative routes -Pavement surface

Urban planners have argued about the connection between transportation and land-use (Ewing, & Cervero, 2002). Cervero and Kockelman (1997) directed a landmark study which suggest a conceptual framework for studying the association between land-use pattern and choice of travel mode. They found three factors related to travel demand and selection of travel mode. These three factors are: Density, diversity and design.

Cervero ande Kockelman (1997) did not have any solution for quantifying the features of the built environment influencing choice of slower travel modes such as walking. A wide range of variables about built environment are really difficult to be translated in terms of urban policies. Furthermore, shortage of sufficient theories about thresholds of environmental measures has hampered any quantitative study about built environment.

A considerable number of urban design movements including new urbanism, smart growth and traditional town planning have been interested in travel demand and the common objective of all of them are:

1) decreasing the number of motorized trips
2) increasing walking and biking as the most affordable means of non-motorized transport
3) Reducing travel distances and increasing public transportation.

Reform-minded designers such as new urbanists believe that improving the 3Ds of built environment, density, diversity and design are the significant ways of achieving above mentioned goals.

Cervero and Kockelman (1997) in their study, "travel demand and the 3Ds: density, diversity and design", classify the number of individual destination parcels and number of neighborhood centers according to their regional location. Then highly environmental variables with high relation with walking are chosen. Distance measurements to daily destinations, offered in this article are demonstrated to be influential and simple solutions in studying complicated measures used for assessing land-use mix and street connectivity. Finally 3Ds+R which are destination, distance, density and route are proposed as significant factors quantifying neighborhood walkability (Cervero & Kockelman, 1997).

Southworth (2005) believes that preparing an environment appropriate for walking has become important challenge of urban design and transportation planning in American cities as well as many other metropolises in the world. Walking and biking previously being accepted as recreational activities, has taken attractions of planners and designers as means of transportation within recent decades. Southworth (2005) considers pedestrian requirements in urban and suburban areas with regard to retaining significant criteria for a walkable city. Transportation planners deal with variables concerning travel demand and walking as important travel mode at macro scale. For instance, capacity demand, volume, rate of flow, origin-destination analysis, patterns of congestion, and regional land use patterns. Urban designers on the other hand, focus on micro level variables such as the form and land-use of local places. Southworth (2005) defines walkability as the extent to which a safe and convenient environment encouraging walking is provided for pedestrians. A walkable built environment is the one which provides a variety of destinations which are accessible within a logical amount of time and effort and one which offers visual interest in walking throughout the network. The walkability criteria for an urban environment are:

1. Connectivity of path network, both locally and in the larger urban setting;

2. Linkage with other transportation modes such as bus and subway

3. Fine grained and varied land use patterns, particularly for local serving uses;

4. Safety from traffic and criminal activities;

5. Path quality, including width of path, paving, landscape, signing, and lighting;

6. Path context, including street design, visual interest of the built environment, transparency, spatial definition, landscape, and general explorability" (Southworth, 2005).

Lastly, the proposed criteria by the researchers are grouped as locational and personal factors in Figure 2-8.

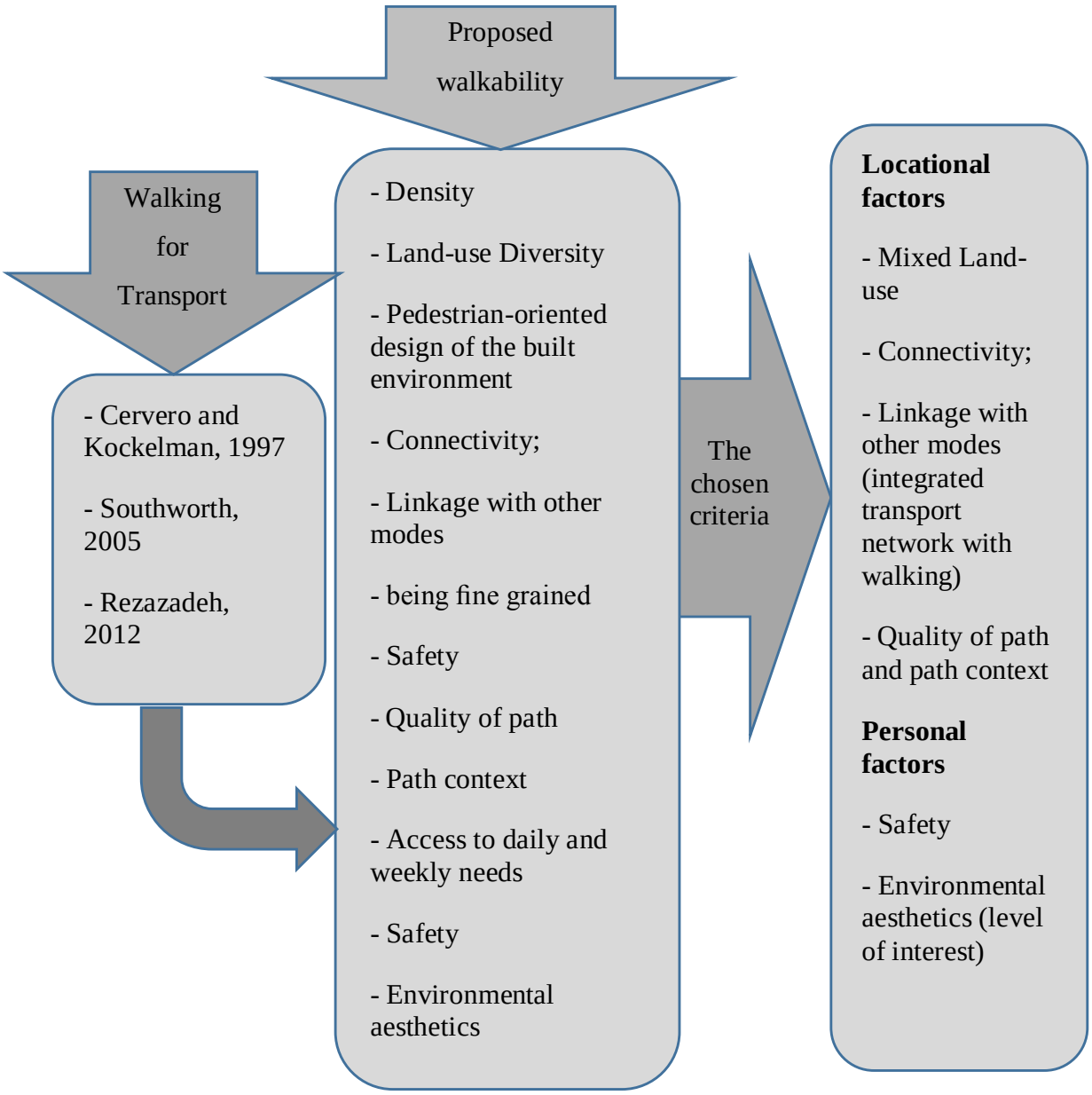


Figure 2-8. Proposed walkability factors in literature concerning walking as transportation mode.

2.2.4 Walking for socialization

Kevin M. Leyden (2003) argues that social interactions and social involvement positively influence people's physical and mental health. He aims to search for the impacts of mixed-use and pedestrian-oriented neighborhoods on level of social engagement. For this

purpose, Leyden studies the relation between neighborhood design and individual level of social capital. Social capital' refers to "the social networks and interactions that inspire trusted reciprocity among citizens". High level of social capital in community members cause them to be more involved in volunteer activities and have more tendencies to get together with other people (refer to Figure 2-9).

Figure 2-9. The rational association between walkability and socialization. Adapted from (Rogers , et al., 2011)

Leyden (2003) directs an inclusive household survey which assesses social capital of citizens who live in the case study of this study located in the city of Galway, in the Republic of Ireland. This case study encompasses both mixed-use, traditional and pedestrian-oriented neighborhoods and also car-dependent, sub-urban modern environment. Neighborhood walkability , the feeling of being connected to the society, familiarity with neighbors and sense of trust and how much people can walk to work, are investigated and the analysis of collected data have demonstrated that people who live in mixed-use, walkable neighborhoods have a high level of social capital in comparison to those living in car-oriented suburban neighborhoods. This study shows that those living in walkable neighborhoods have more social ties with others and sense of trust and engagement in political and social activities are higher in these people. Accordingly, high level of neighborhood walkability and mixed-use design offer more social capital and enhance people physical and mental health (Leyden, 2003).

Lance Freeman studies how car-dependent lifestyle in a sprawling neighborhoods affects social ties among people. Low density neighborhoods with separate land-uses and car-oriented transportation system are thought to generate social isolation among citizens. According to Ewing (1997) "strong communities of place, where neighbors interact, have

a sense of belonging, and have a feeling of responsibility for one another, are harder to find" (Ewing, 1997).

New urbanists are strong advocators of mixed land-use neighborhoods with high density, since such neighborhoods increase social interactions in contrast to sprawling areas. Jane Jacobs (1961) is one of the pioneers of building pedestrian-friendly streets and mixed use neighborhoods in order to promote sense of community among citizens. High densities are strongly proposed since it facilitates use of public transport and when such a high density is appropriately integrate with mixed land-uses, it is possible to put various urban amenities in a way to be accessible by walking for the residents (Jacobs, 1961). Accordingly, in such a walkable and highly dense neighborhoods urban amenities became places for social interactions among people. Sprawling neighborhoods, on the other hand, decrease social capital since such a car-oriented neighborhood decrease the opportunity for spontaneous social interactions. The lands with low density provide people with sufficient lawns, patios and private gardens accessible by personal automobiles. Therefore, there is no need to use open public spaces such as parks and plazas. Consequently, the potential for spontaneous contacts and making new friends decreases (Freeman, 2001).

The movement of the New Town which is inspired by Ebenzer Howard's "Garden City" proposes cities with lower densities providing more open spaces for people in comparison to those of compact cities. One of the significant predicted outcomes of New Town is promotion of sense of community provided through building more friendships among neighbors and participating in co-operative activities in New Towns (Stein, 1957). The advocates of New Town and environmental behaviorists and urban sociologists argue that very high densities also can have negative influence on social ties. This argument is not against the argument discussed above stating that neighborhoods with low density decrease social ties. The literature suggest that the density should be high to the extent that do not negatively affect the positive impact of density on increasing social ties (Freeman, 2001).

Street is known as the most significant public space in every urban area which should satisfy functional, recreational and more importantly, the social requirements of the citizens. The social role of street is stronger in commercial neighborhood streets, since they provide more social interactions among people in their daily routine. Accordingly the design of streets, particularly, the commercial neighborhood streets is significant also in terms of increasing social interactions (Mehta, 2009) .

Jacobs (1961) argues that "Streets and their sidewalks, the main public spaces of the city, are its most vital organs. Sidewalks, their bordering uses, and their users, are active participants in the drama of civilization".

In traditional cities, streets were the places where all necessary requirements of people were satisfied. Furthermore, those streets were where various religious, political, commercial and social activities of citizens were taken place. However, in many developed contemporary cities most of the urban functions have shifted to virtual and personal realm or have been changed to distinct sorts of parochial and public places.

Although today's streets may have lost their previous functionality as the most important place for social interactions, still in some city centers and in many mixed-use neighborhoods streets can be influential place for functional, leisure and social activities of people and the place where they meet and interact with other people. Studies have demonstrated that in mixed-use neighborhoods people wish to have a vital and distinct core not only for shopping but also for other significant social engagements, group recreational activities and also for relaxation. Investigations on shopping behavior of people have proved that the basic aim of utilizing goods and service is not the merely purpose of people coming to shopping streets. People come to such streets also to spend time with their friends, to walk around and watch other people and make new friends. Accordingly sociologists introduce social interactions, sensory stimulations and various recreational activities as the chief motivations of the people coming to shopping streets (Mehta, 2009).

Barker (1968) have brought the concept of "behavior setting" to the literature which studies the relation between the human's daily behavior and physical setting of the environment. A "behavior setting" is comprised of three parts:

1) A milieu for an especial environmental layout
2) A standing pattern of behavior or a recurrent activity
3) A synomorphy or a congruent association between two things.

Accordingly, "The greater the congruent relationship between the particular layout of the environment and the activity, the better the 'behavior setting' is able to afford human behaviors and needs" (Lang,1987 and Barker,1968).

Mehta (2009) studied the link between the layout and features of the blocks and behaviors and urban activities occurring in them in order to find out how it supports lingering, sustainable, stationary activities and social interactions. Finally Mehta (2009) suggests three significant interrelated dimensions of public spaces regarding socialization of people. These dimensions are demonstrated in Figure 2-10.

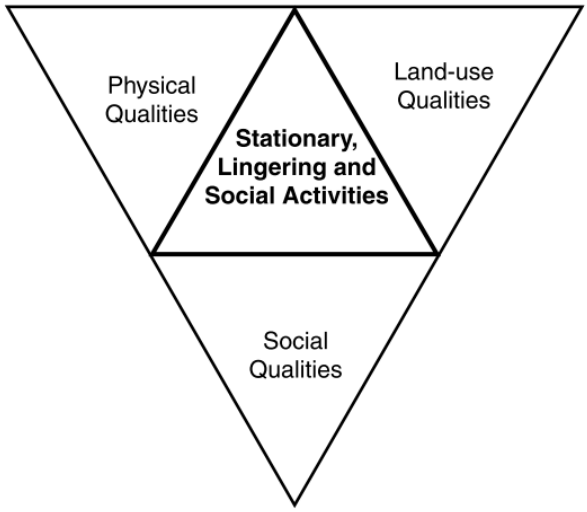


Figure 2-10. Three dimensions of public and parochial spaces.

The summary of three significant studies concentrating on association between walkability of built environment and socialization is shown in Table 2-10.

Table 2-10. The researches focusing on the link between walkability of built environment and socialization.

Socialization and Walking		
References	**Scope**	**Suggested influential factors on walkability**
K. M. Leyden, (2003) "Social Capital and the Built Environment: The Importance of Walkable Neighborhoods"	This article aims to search for the impacts of mixed-use and pedestrian-oriented neighborhoods on level of social engagement.	
L.Freeman, (2001**)** "The Effects of sprawl on neighborhood Social Ties An Explanatory Analysis"	How car-dependent lifestyle in a sprawling neighborhoods affects social ties among people.	
V.Mehta, (2009**)** "Look Closely and You Will See, Listen Carefully and You Will Hear: Urban Design and Social Interaction on Streets"	People do not use shopping streets to utilize goods and service People come to such streets also to spend time with their friends, to walk around and watch other people and make new friends.	Three significant interrelated dimensions of public spaces regarding socialization of people: - physical qualities - land-use qualities - social qualities

2.2.5 Walking as significant objective of reform-minded movements

Fast growing automobile usage and many social, environmental and economic outcomes caused by it concerned many researchers about negative outcomes of this phenomenon. Accordingly from about 1960s some researchers in the field of urban planning including Jane Jacobs and William Whyte brought the notions such as liveability and regaining the vitality and walkability of urban spaces. Later, other reform-minded thoughts such as

sustainable transportation, New Urbanism, Smart growth and smart transportation became to agenda.

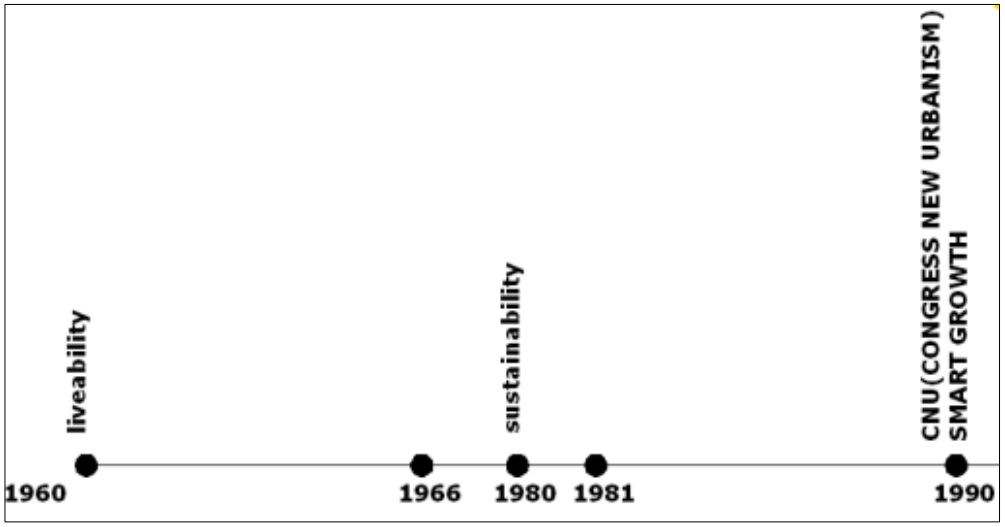


Figure 2-11. The advent of Liveability, Sustainability, New Urbanism and Smart Growth movements and their advocators (Ghadimkhani, 2011).

Liveability

Liveability is sustaining "long-time well-being or quality of life". Liveability is actually social and environmental quality of an area which is perceived by the residents, employees, customers and visitors (Lambert, 2005). Liveability can be handled from diverse aspects. Environmental conditions such as quality of air and water, cleanliness, dust and noise level is the first aspect of liveability. The second aspect, includes traffic safety, personal security and public health and the third aspect of liveability refers to the quality of social interactions such as neighborliness, fairness, and respect and community identity. Finally, recreational opportunities, aesthetics, and existence of cultural and environmental elements like historical structures, mature trees and preservation of local traditional architectural styles are other aspects of liveability in an urban space (VTPI, 2014).

Walkability is considered as a sub-heading of the notion of liveability. Hence, the theories about liveability would help to better analyze and understand the walkability and its importance. Liveability gained importance at the 1960s when the negative effects of motorized cities and urban sprawl were recognized as a significant problem of urban areas. These problems has diminished the vitality and liveliness of cities (Kaiser, et al., 2003).

Various groups have put special importance on regaining the vitality of urban space since the 1960s. Therefore, diverse movements and thoughts advocating the priority of pedestrians were initiated in order to increase the number of pedestrians in the streets and decrease the extra usage of private cars. These movements were initiated by discussions of Jane Jacobs in her book, "The Death and Life of Great American Cities" (1961). Jacobs (1961) believed that "density "and "diversity" played a significant part in enhancing "sociability" and "liveability" of urban areas and demonstrated how the old urban communities such as the urban areas in Greenwich Village of New York and North End of Boston were vital and liveable.

Kevin Lynch was the prominent theorist who put particular emphasize on the perceptions of people from the urban environment. Lynch in his famous book, "The Image of the City" discusses about the mental images of people from city and claims that each citizen has a long connection with some part of his city and his image is consisted of memories and meanings. A legible and imageable city is one whose urban design elements are easily identified. Later in 1981 Lynch, in his book "The Good City Form", took a look at the connections between human values and physical form of the city and set requirements for a normative theory of city form by reviewing the earlier physical images of what utopian communities might be. Dealing with the issues such as city size, growth and conservation Lynch explained how his good city form might be. Lynch's idea of "Good City Form" actually constituted a significant framework for the idea of urban "liveability." He also developed the criteria of legibility, transparency, congruence, diversity, efficiency and convenience as the indicators of a liveable urban environment.

Montgomery (1998) was an urban theorist inspired by Kevin Lynch and one of the advocates of liveability. He focused on the evaluation criteria, developed by Lynch. These criteria were: vitality, sense, fit, access and control. In his article, "Making a City: Urbanity, Vitality and Urban Design", Montgomery added three important values in terms of liveability in order to improve the pedestrian life in urban spaces. These values were: form, image and activity.

In the mid-1970s, the 'Silent Revelation' of state-wide growth management and planning processes was initiated. Its purpose was to maintain open spaces in the face of growth in order to provide appropriate recreational and aesthetic amenities for urban residents, which could increase liveability of urban spaces.

Another movement which emphasized the significance of liveability in cities was feminist perspective in the 1980s. During that time feminist advocates emphasized on the amenity of women, children and the elderly in the urban spaces and they believed that the increase of amenities for these groups could actually contribute to the liveability of urban space. Furthermore, in the late 1970s, in some countries such as Germany and Netherlands streets were redesigned according to priority of pedestrians. The objective of these projects was to increase the amenity of the pedestrians, attract more people to walk in the streets and increase liveability of the urban environment. A preliminary conference was held on 'International Making Cities Liveable' in 1985 and after that many other conferences have been held around the world and in particular in Europe to discuss various aspects of liveability.

Since the 1990s, the Congress for New Urbanism (CNU) which main purpose was to regain the liveability of traditional American cities and Smart Growth focusing on promotion of mixed land-use policies and creating pedestrian-friendly streets, have been the most influential movements in urban design field in the United States.

All of these diverse perspectives aim to make cities and urban areas more 'liveable' and seek to find appropriate solutions toward this issue. Therefore these movements attempt to regain the lost quality of life in cities from various aspects including physical, environmental, economic, social and cultural (Figure 2-12).

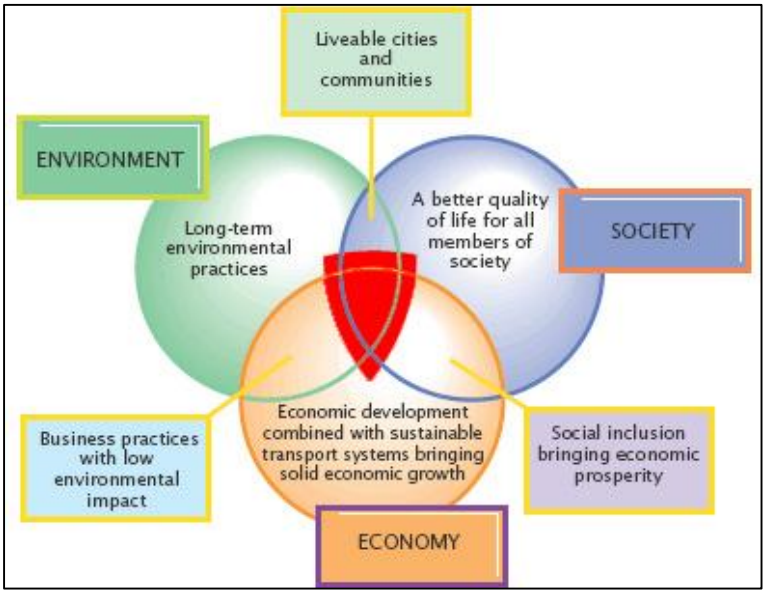


Figure 2-12. The outcomes of sustainable development (Green Planet Ethics, 2014).

In creating liveable urban spaces, the quality of urban design carries special importance. Barlas (2006) in his book, 'Urban Streets and Urban Rituals' explains street as one of the most significant urban places that includes a wide range of spaces and affords a wide range of behaviors. Therefore, street is a place that meets the diverse needs of people such as physiological needs such as hunger, thirst and belongingness and the need for face to face interactions (Barlas, 2006). Accordingly, high quality of urban design plays a major role in liveability of an area, however, it is not merely sufficient in creating a liveable space. To increase liveability, the issue should be handled with various dimensions such as physical, social, economic and environmental issues (Lambert, 2005).

The car-oriented neighborhoods and car-dependent lifestyles has caused sprawling and unsustainable development of cities. Due to the phenomenon of climate change sustainable approaches gained more significance in diverse scientific fields as well as urban planning. One of the important initiatives of designing a sustainable neighborhoods is designing walkable housing zones and increasing walkability of urban spaces. Understanding walking behavior of people and community facilities can be helpful to measure walkability of an environment and develop a sustainable lifestyle. In order to enhance the walkability of neighborhoods, design and planning requirements should be

improved towards a sustainable living. Sustainable development is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." By United Nations (1987).

According to Barton et al. (2003), the sustainable urban neighborhood design consists of six principles which are stakeholder involvement, increased local autonomy, connectivity, diversity, response to place and adaptability (Barton, et al., 2003).

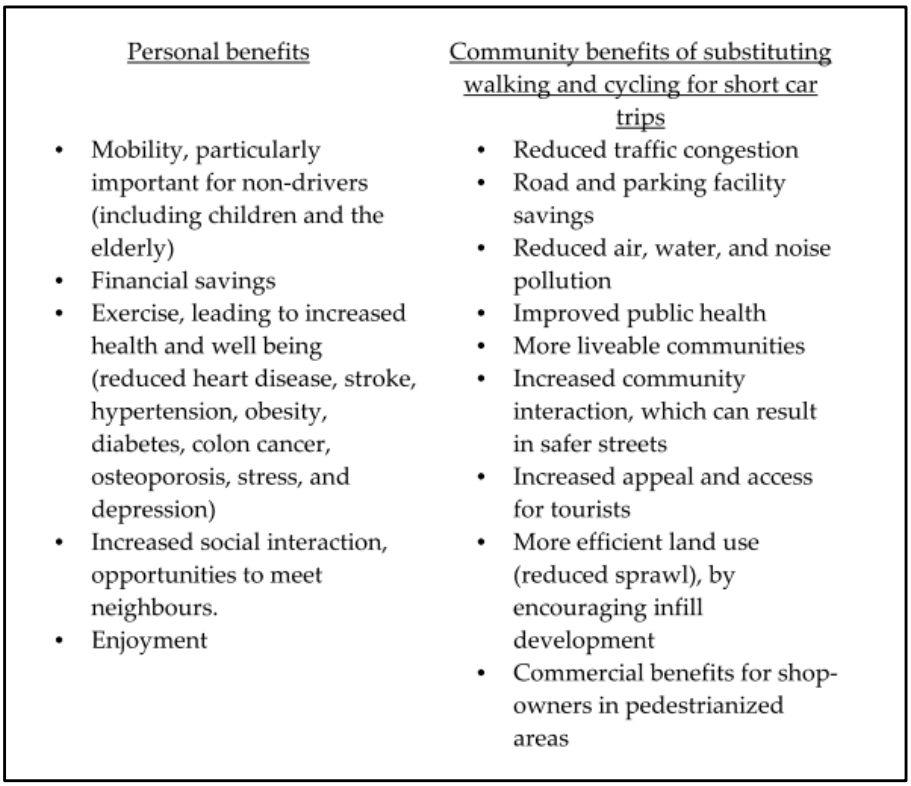
Inani Azmi and Karim (2012) introduce three principles in order to testify whether sustainable principles can be modified in association with design and walkability of the neighborhood. These three principles are:

- Raising local autonomy which is enhancing the degree to which localities supply services and activities and manage them at the lowest practicable level. The neighborhoods offers the suitable level for playground, school and local shops in terms of catchment area range and strategic position.
- Diversity which is considered as an important factor in response to the failure of conformity. The tendency has to separate uses to protect the quality of environmental including diversity of travel modes, safety and comfort.
- Response to place and adaptability refers to the ecosystem procedure which necessitates recognition of the heritages of each neighborhood, for instance landscaping and climatic condition (Inani Azmi & Karim , 2012).

Sustainable transport and smart transportation

Sustainable transport is an important concept being handled in designing walkable urban areas. It aims to minimize environmental damages caused by excessive automobile usage and improve quality of transport systems which has least environmental harms and promote socio-economic situation in transportation. Walkability of urban space and increased walking are the most significant strategies of sustainable transportation. Rezazadeh et al. (2012) argues that establishing a sustainable transportation pattern can

contribute to economic, social and physical sustainability in a neighborhood and promote environmental long-term cycles. On the other hand, walking as an important sustainable transportation mode has a great effect on promoting physical and mental health of people since it enhances mobility and sociability between neighbors within a walkable neighborhood. Residential density, block size, sidewalk quality, presence of attractive destinations (grocery, retail and restaurant and cafes), neighborhoods deterrent land uses are some of the main features of a walkable neighborhood (Moudon, et al., 2006).



Personal benefits	Community benefits of substituting walking and cycling for short car trips
• Mobility, particularly important for non-drivers (including children and the elderly) • Financial savings • Exercise, leading to increased health and well being (reduced heart disease, stroke, hypertension, obesity, diabetes, colon cancer, osteoporosis, stress, and depression) • Increased social interaction, opportunities to meet neighbours. • Enjoyment	• Reduced traffic congestion • Road and parking facility savings • Reduced air, water, and noise pollution • Improved public health • More liveable communities • Increased community interaction, which can result in safer streets • Increased appeal and access for tourists • More efficient land use (reduced sprawl), by encouraging infill development • Commercial benefits for shop-owners in pedestrianized areas

Figure 2-13. The personal and community benefits of non-motorized transportation.

"Smart growth" is a term majorly used in North America which emerged in 1992 from the UN Conference on Environment and Development, held in Brazil. In Europe the term "compact city" or "urban intensification" is used instead. All these terms mainly are related to urban transportation planning which focuses on designing compact walkable urban centers and preventing cities from urban sprawl. Smart growth is a multifaceted concept encompassing many fields. "Smart transportation" is one aspect of smart growth.

Smart transportation, which is a significant indicator of a liveable street or neighborhood, refers to high-quality network of transportation system increasing accessibility of various public spaces and providing pedestrian-friendly streets that encourage walking and biking as means of daily transportation.

Smart transportation encourages the development of non-motorized transport systems including walking and biking, mixed-use compact urban development, pedestrian oriented streets, and neighborhood facilities such as schools, parks and various shops. Smart transportation and in general smart growth advocate long-term sustainability values in urban planning and urban design.

New Urbanism

New Urbanism is powerfully affected by urban design standards that were noticeable until the advent of the automobile in the mid-20th century; it includes values such as traditional neighborhood design (TND) and transit-oriented development (TOD) (Kelbaugh, 2002)

Although "New Urbanism" has many principles in common with "Smart Growth", they have some differences with each other. Smart growth was launched by environmentalists and policy planners but new urbanism was majorly affected by architects and city planners. The Congress for the New Urbanism (CNU) established in 1993 by cooperation of architects, environmentalists and urban planners constructed the foundation of New Urbanism. The principles of New Urbanism encompasses a wide range of scales including buildings, lots and blocks, neighborhoods, districts and corridors and generally the whole regions and cities.

New Urbanism , similar to, Smart Growth have significant principles proposing development cities which have a compact form and a range of housing, and are mixed use, walkable and transit-oriented. While smart growth advocators emphasize on growth of urban economy, new urbanists majorly concentrate on physical form and claim that changes in urban form is essential prerequisite of social and ecological change and urban economy. New Urbanists also accentuate the potentials of market forces, eliminating

regulatory barriers of urban development and the necessary requirement for reformation of planning policies (Knaap & Talen, 2005).

Smart Growth

"Smart growth" is a development which concerns the economy, the society and the environment. The concept of "smart growth" emerged in 1992 from the United Nation's adoption of Agenda 21 at the "UN Conference on Environment and Development (UNCED)" held in Rio de Janeiro, Brazil by participation of many city planners, architects, community advocates, and historic conservationists. As the result of this significant conference, it was agreed that growth and development as an inevitable phenomenon will continue to occur in urban spaces. Therefore intentional and comprehensive ways of growth should be investigated. The rapid development of "smart growth" owes to three important projects in the mid-1990s.

Firstly, American Planning Association (APA) conducted a project in 1997 which prepared "Growing Smart Legislative Guidebook". In the same year, the "Natural Resources Defense Council (NRDC) "published a "toolkit" for policy makers which aimed to promote compact, walkable and transit-accessible growth in cities. (Burchell, et al., 2000).

Again, in 1997, another smart growth legislation at the state level was conducted by Maryland which encouraged brownfield redevelopment, living near workplaces, concentrating infrastructure in priority funding areas, preserving rural legacy lands, and spatially concentrating job creation tax credits. Since then, smart growth programs have been promoted by a wide range of groups such as the National Association of Homebuilders and the Sierra Club (Knaap & Talen, 2005).Some of the main principles and aims of "Smart Growth" can be stated as follows:

Creating mixed land-uses in which mixture of homes, retail, business, and recreational opportunities are available for the residents. Building compact neighborhoods in which residents have opportunity to live, work, do shopping and play in close vicinity. People

also have easy access to daily activities and feasible transit, and local businesses are maintained in such neighborhoods. Providing diverse transportation options. Preparing attractive and safe infrastructure for walking, cycling and transit within neighborhoods can make it more liveable. Creating a range of housing opportunities and providing people with different family types, life styles and income levels with a home in their neighborhood.

Development should be encouraged in existing communities and investments and infrastructure including roads and schools should be used efficiently. Accordingly new developments should not occupy new lands. Reservation of open spaces, natural resources, and environmentally vulnerable areas has special importance in smart growth. Urban growth compliments natural landscape and puts high importance on aesthetic, environmental, and financial values. A unique neighborhood identity should be developed by creating distinct and striking places with a strong sense of place. Further engagement of citizens should be encouraged which can lead to promotion of social relationships. Engaged citizens take part in community life and have more influence in decision-making.

U.S EPA founded in 1996 funds various organizations advocating smart growth and due to supports of this network, smart growth became a part of the lexicon of planners, policy makers and diverse fields of urban and regional planning field.

CHAPTER 3

WALKABILITY AND FACTORS CONTRIBUTING TO WALKABILITY

Walkability has become one of the most debating and fast growing concepts in the profession of urban planning and urban design. Walkability is "the extent to which the built environment is friendly to the presence of people living, shopping, visiting, enjoying or spending time in an area" (Abley, 2005). Walkability which can be considered as a rather new phenomenon in urban design field has many social, economic and health benefits for the society. Walkability and factors contributing to walkability is also very important in sustainable urban design. One of the best ways to determine whether a block, corridor or neighborhood is walkable is to "count the number of people walking, lingering and engaging in optional activities within a space" (Gehl & Gemzoe, 1996). Presence of people particularly children, the elderly and the disabled in an urban space is a good indicator of the walkability (Zehner, 2012). Policies and principles about walkability may not be developed in non-western countries due to the differing idea of 'optional activities' in them (Hutabarat , 2009).

Gebel et al. (2009) define walkability as the extent to which an environment is 'friendly' for pedestrians. They introduce a compact, well-connected environment which is mixed-use and in a rather high density provides shorter distance between origins and necessary destinations. Hence, such an environment can be very encouraging for pedestrians to walk for transportation (Gebel, 2009).

Franks (2006) argues that walkability is a notion that majorly depends on human behavior. Today, many citizens in a large number of cities are complaining from traffic congestion in sprawling low-density urban areas. Accordingly, the attractions of planners is drawn to the association between land-use pattern and travel behavior. People majorly aim to participate in an urban activity or satisfy a particular need when they travel in urban space. They select a quick and convenient way to achieve the destination. This is why they drive. Accordingly in order to decrease the need for driving, transportation and urban planners propose that the distance between origin and destination should get decreased (Inani Azmi & Karim , 2012). Furthermore, enhancement of density in a neighborhood can also be influential in decreasing distances to various destinations and increasing walking. Increased walking directly and indirectly can decrease use of automobiles within a neighborhood.

As it was reviewed in previous chapter a wide range of researches is done with aim of increasing walkability in urban space and each group of researches handle this issue from a particular perspective. Based on criteria proposed in literature, this thesis developed four groups of factors being influential in increasing walking rate and walkability of urban space. These criteria are demonstrated in Figure 3-1.

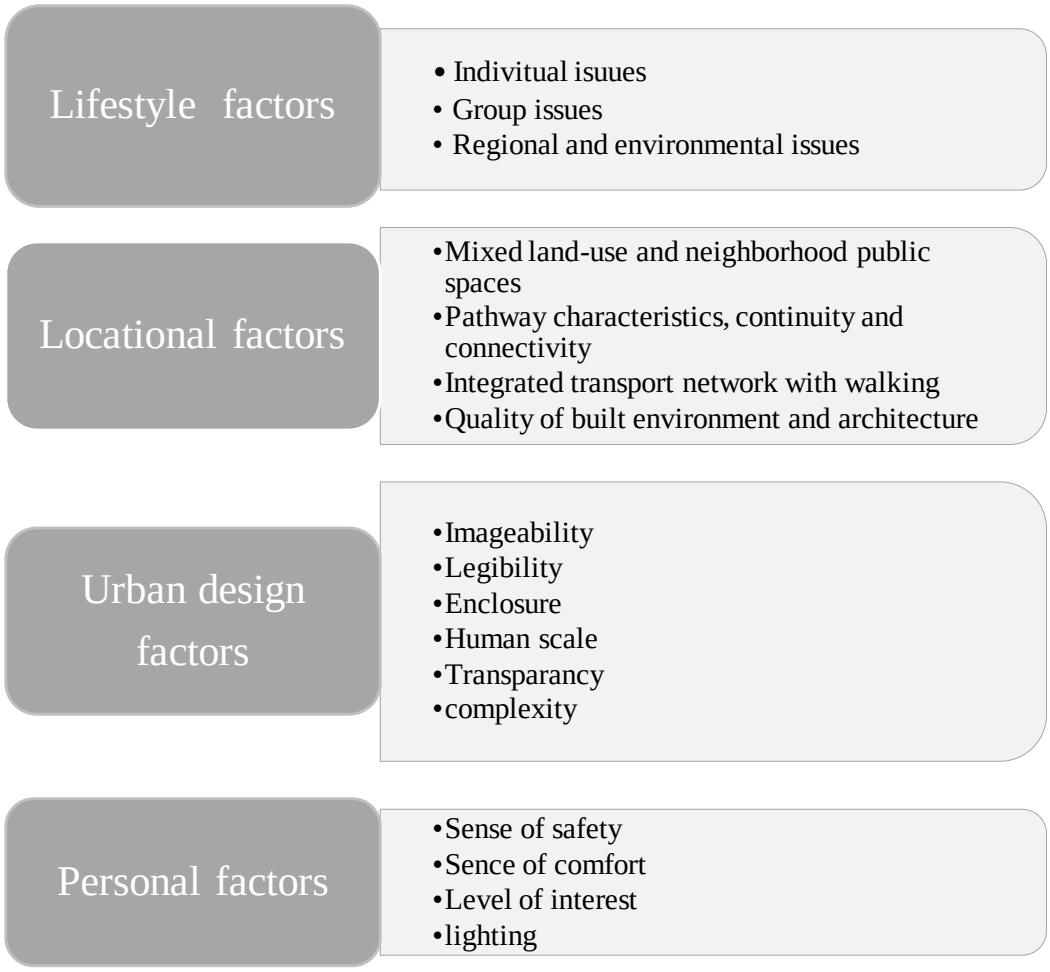


Figure 3-1. Four main factors of walkability and their subcategories

3.1 Life style factors

The factor of lifestyle circumstances influencing walkability of an urban space is divided into three different groups including individual issues, group issues, regional and environmental issues.

3.1.1 Individual issues

Individual lifestyle that influences walking behavior and walkability in an area is mainly related to "ecologic models of behavior". Figure 3-2 demonstrates the impacts of physical features, urban design qualities and individual reactions on walkability and walking behavior.

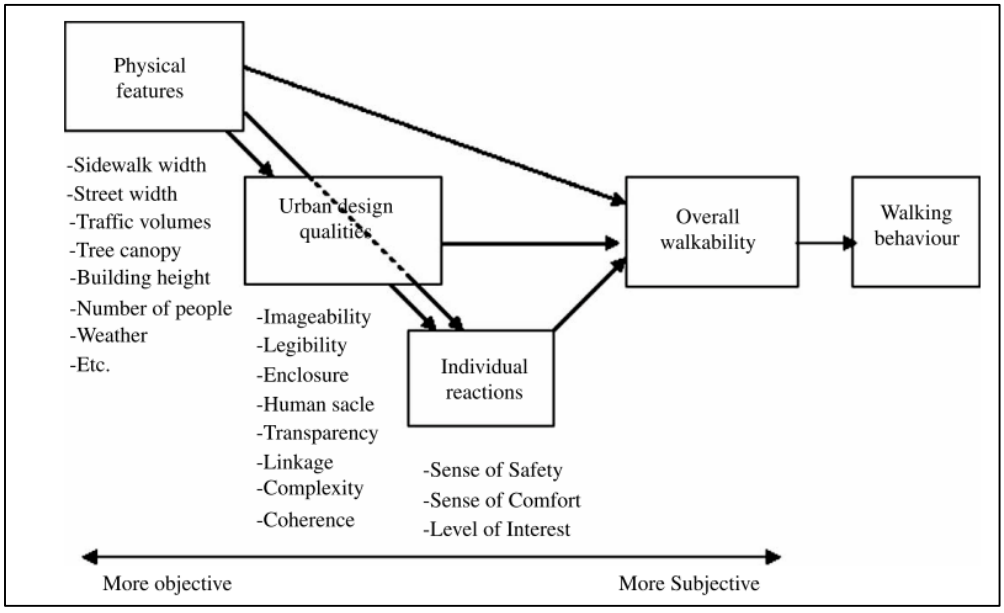


Figure 3-2. Influence of physical features, urban design qualities and individual reactions on walkability and walking behavior (Handy & Ewing, 2009).

Researchers believe that walking and generally physical activity depend on environmental conditions as well as psychosocial factors. Self-efficacy, positive perspective about walking as a significant physical activity and social support are main features influencing individual's eagerness for walking (Saelens, et al., 2003). Therefore an individual who has positive perception and high level of awareness about benefits of a walking-based and active lifestyle, prefers walking. Other individual factors influencing walking whether walking as a mean of transportation or recreational are car ownership, income, age and gender. According to Saelens,et al.(2003) psychological correlates of physical activity (walking and biking as significant modes of physical activity) and demographic issues such as age, gender and income are very significant interrelated issues which should be investigated when analyzing walking rate and behavioral factors affecting decision of walking.

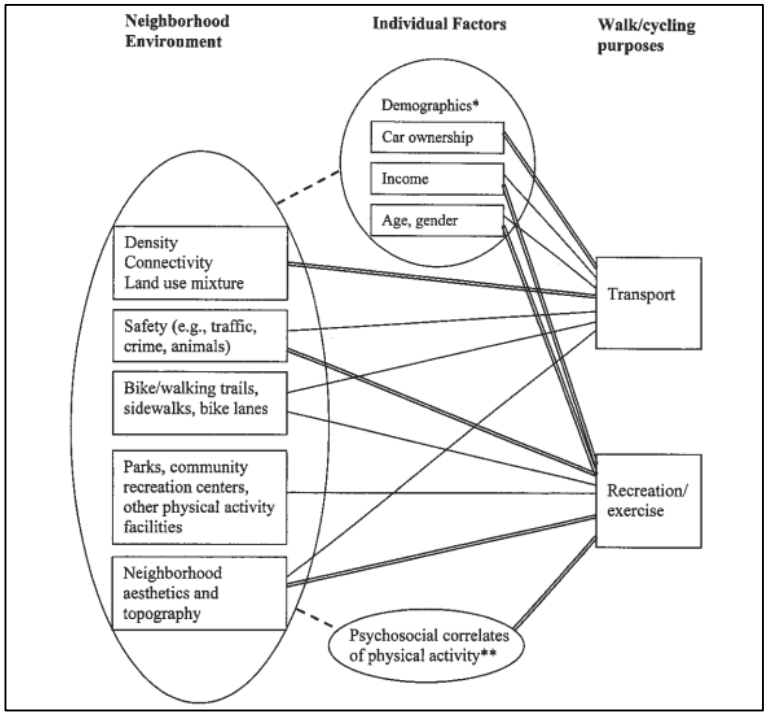


Figure 3-3. Relation among individual factors, neighborhood environment and aims of walking (Saelens, et al., 2003).

3.1.2 Group issues

Researches demonstrate that high degree of social connections and community involvements have positive effect on both physical and mental health. It has been revealed that people with high social engagement with others and those who are involved in communal activities live longer and have higher level of health (Saelens, et al., 2003). Social connection mainly is part of a more inclusive concept called ‘social capital’ which refers to “the social networks and interactions that inspire trusted reciprocity among citizens”. High level of social capital in community members cause them to be more involved in volunteer activities and have more tendencies to get together with other people. People with high social capital, also, have more kindness and trust towards the other people. Social capital plays a great role in social health, appropriate implementation of democracy and decreasing criminal activities. Researches on connection between social capital and built environment demonstrate that pedestrian-oriented neighborhoods and mixed-land use have a great interrelation (Saelens, et al., 2003). Neighborhoods with

high level of walkability and having compact form with mixed land-uses cause people to get together and have stronger social capital. For instance, traditional neighborhoods in the cities are more walkable and encompass most of daily requirements of residents including grocery shopping, parks, schools, etc. within walking distance. Such walkable pedestrian-oriented and mixed land-use places enable residents to have more interaction and in long-term sense of trust and connection between people and their living place starts to take place.

The relation between group and walking rate can also be handled from another perspective which is 'culture of walking'. In the societies in which people are more social and have more tendency to social interactions, building walkable streets can increase walking rate but in communities in which automobile usage for any trip has gotten part of people's lifestyle and even a part of their culture, merely construction of walkable streets cannot be sufficient for promotion of walking.

3.1.3 Regional and environmental issues

The third aspect of lifestyle circumstances affecting walkability and encouraging people to walk is regional and environmental factors. Proximity and connectivity are two significant factors which can be considered as both regional and design factors which can discourage people to drive and encourage them to walk to short-distance destinations. Proximity refers to closeness between activity points and optimum distance of travels routinely accepted by people. Proximity directly depends on compactness of land uses and density of the district. People living in a compact area in which various sorts of uses such as residential, commercial areas, schools, etc. are within walking distance, have more walking-dependent lifestyle in comparison to those living in low-density areas with single-family homes. Connectivity refers to directness or ease of travel between two activity points that is directly related to the characteristics of the street design" (Saelens, et al., 2003).

Weather and seasonal conditions are other significant regional and environmental factors which influence walking level in a society. Pleasant weather particularly in some specific season of the year attracts people to walk to their workplaces, schools, and neighborhood

commercial area. Unpleasant weather conditions such as rainy, snowy, too sunny and windy, on the other hand, are major disincentives for walking.

Generally in compact cities which have traditional pattern, mixed land-use can be observed in a way that street-levels belong to the various sorts of shops and residents live above the street-level. Additionally, workplaces, shops, schools and other public spaces are within walking distance in such compact cities. Therefore most of people prefer to walk to access these destinations. In modern suburban regions, on the other hand, there is a completely different lifestyle. In these areas residential land-use is separated from other land-uses. In these areas there are majorly large shopping malls and stores far from residential area instead of small retail shops within residential neighborhood. Far distances between diverse and scattered activity areas make it impossible to walk from home to these destinations (Saelens, et al., 2003).

Similarly modern sub-urban areas have low levels of connectivity as well because there are low density of intersections and many barriers interrupting direct movement of pedestrians and also there are very limited route choices in such areas which make walking in these areas boring in the long-term.

Topography of a region is also one of the significant regional and environmental factors affecting rate of walking in an area. For instance, topographic areas with steep upgrades make walking very difficult, particularly for children and the elderly. Accordingly, those pedestrian routes locating in such topographic lands have less eagerness for walking.

Neighborhood amenities such as presence of walking trails, well-designed sidewalks, and various sorts of recreational centers also encourage people to be physically more active and choose walking as a significant routine physical activity instead of using automobiles.

3.2 Locational factors

The second group of criteria influencing walkability of an urban space is locational factors which are listed as follows:

- Mixed land-use and neighborhood public spaces

- Pathway characteristics, continuity and connectivity

- Integrated transport network with walking

- Quality of built environment and architecture

3.2.1 Mixed land-use and neighborhood public spaces

Mixed land-use refers to the appropriate integration of various sorts of uses of physical space within a given urban area. The most significant and essential uses required for a qualified mixed-use urban area are official, residential, retail and commercial uses and various sorts of public spaces. Saelens (2003) argues that land-use majorly is determined and controlled by "zoning ordinances that reflect political decisions often made at the local level in development planning".

A walkable street or neighborhood should have a high level of accessibility to diverse urban activities particularly those required for routine life. Such an access in a walkable neighborhood means that necessary activities including various shops, grocery stores, banks, schools (especially elementary school), cafes, libraries and parks should be accessible on foot within 10 to 20 minutes or ½ miles. A mixed land-use neighborhood can encourage elementary students to walk to their schools and to the neighborhood parks to play, provided that high-speed vehicles are extremely restricted and high level of safety from both traffic and criminal dangers is retained in the neighborhood. Therefore, existence of at least one retail store's entrance on the public way with open doors during typical business hours can have special effect on walkability and liveability of the environment.

Figure 3-4. Existence of open entrances to stores on a public way, (Brantley , 2012) and (Linda Randall Word Press, 2013).

Mixed land-use neighborhoods can provide the adults from a wide range of age groups to satisfy their daily needs such as doing shopping, going to public spaces such as cafes, fitness centers and parks without any need to use private cars. Diversity and intensity of land-use are the factors which can be best created at the design process and at the beginning of planning. Because maintaining high diversity of land-use is possible in a fine-grained pattern which is determined in design process. No doubt, in a coarse grained neighborhood pattern which is designed according to low density and lower diversity of uses, altering land-use and inserting more density would be legally and practically difficult (Southworth, 2005).

3.2.2 Pathway characteristics, continuity and connectivity

Kevin Lynch (1960) explains two important elements constituting physical form of a city: ‘paths’ and ’nodes’. Paths are streets, walkways, transit lines, canals or railroads along which the observer habitually moves. Generally people observe a city when they are moving through paths. The other significant environmental elements of a city are all located and arranged along these paths. Nodes, on the other hand, are strategic points that an observer in a city can enter in. Nodes can be “junctions, places of a break in transportation, a crossing or convergence of paths, movements of shift from one structure to another or concentrations that gain their significance from being condensation of any use or physical character such as a street corner hangout or an enclosed square” (Lynch, 1960).

A well-designed pedestrian path provides all pedestrians including children, the elderly and the disabled with an ideal level of safety and comfort. A walkable and comfortable pathway should have standard width that two or three people can walk easily beside each other without interrupting the others. A well-designed path also should has a relatively smooth surface without gaps, pumps or any other irregularities negatively affecting walkers or wheelchair users' mobility.

Continuity of a pathway and its connectivity are also significant factors in increasing walkability. Moreover, topography of land is a crucial factor affecting path quality and level of walkability. For instance, steep pathways, particularly in region with cold and snowy climate in which in several months of the year the surface gets covered by ice, can decrease safety and security of pedestrians and restricts their mobility. In such steep pathways utilizing steps or railings can be helpful in making walking easier.

Street furniture and urban elements such as mailboxes, light poles, etc. should be placed in a way that do not restrict pedestrian movement. Appropriately placed landscape elements and trees also enhance path quality and walkability, since they increase pedestrian safety by functioning as buffer between pedestrian and moving vehicles. Another advantage of street trees along a path is that they provide shade for pedestrians and protect them from direct sun rays during hot summer days and also define street space and create perceptual continuity.

Another important feature influencing quality of a walkable path is the presence of human-scaled lighting system. Well-lit path, particularly those having visual interest increase safety and promote nighttime walking. Enriching a path network with use of artistic designs, attractive lighting and various sort of public art not only gives special identity to a given path but also makes it interesting for pedestrians (Southworth, 2005).

High connectivity of path network can be determined by appropriate sidewalks, various pedestrian paths, continuity of path and removing barriers from the route. In finer grained street patterns the size of blocks become rather smaller and connectivity of paths increases in such streets. Furthermore in a highly-connected street pattern anything hindering

pedestrian access and ease of movement including dead-end paths, cul-de-sacs and topographic barriers should not exist (Southworth, 2005).

3.2.3 Integrated transport network with walking

A highly connected street has a great positive effect on walking, provided that the street is also highly linked with various modes of transportation. Since walking to anywhere is not practically possible in even the most walkable cities. Therefore providing high connectivity and linking walking paths to other modes of public transportation including subway and bus, is very significant in contribution to high walkability. Sufficient public transport stations are required in order to permit pedestrian access between residential and commercial areas which is usually between ¼ to ½ miles or about 10 to 20 minutes of walking distance (Southworth, 2005). During recent decades the way built-environment and pattern of land-use affects "urban travel damand" has become very popular in agenda of urban planning and urban design. "smart growth" and "new urbanism" are two significant movements supporting researches which study the role of neighbourhood design and physical form of cities in people's choice of travel mode. There are various factors affecting people's preferences among different modes of transportation. Firstly, the time and cost spent for traveling between two destinations, affect selection of transport mode. Secondly, indivitual charactristics of the traveller such as affordablity and availability of automobile is also very influential in choosing travel mode. Built-environment factors such as density of housing and presence of appropriate and continous sidewalks are also as important as the role of travel time and cost (Cervero, 2002).

Density, diversity and design are the main features of built environment which impress travel demand and people's choice of travel mode. According to the "new urbanists", constructing compact and mixed-use neighbourhoods (with higher densities) and designing pedestrian-oriented urban spaces can lead to "degeneration" of motorized trips (Cervero & Kockelman, 1997). An appropriate integration of non-motorized transport (walking and biking) with public transit can considerably decrease the usage of personal automobile travels. Cervero and Kockelman (1997) also argues that for work trips, the factors such as presence of convenience stores close to the residential units and presence

of pedestrian-friendly urban environment are very influential in encouraging non-motorized travel and use of public transit. For non-work travels, presence of attractive and walkable paths with diverse retail shops in a compact neighbourhood and with a well-integrated public transport system can encourage walking and biking for short transit.

3.2.4 Quality of built environment and architecture

Built environment mentions to the environment constructed by human that provides location for human activities. Built environment encompasses a wide range of space including buildings, green space, neighborhoods and cities that can often contain their supporting infrastructure such as water supply, or energy networks as well. The built environment can be considered as material, spatial and cultural product of human which integrates physical elements and energy in a forms to satisfy human's various requirements such as living, working and playing. Built environment can also be defined as "the human-made space in which people live, work, and recreate on a day-to-day basis" (Roof & Oleru, 2008).

Built environment is extremely influential factor in walkability of urban space because its role in increasing legibility, aesthetitics, convenience and many other items of a city is important. The form and placement of various urban elements should be precisely chosen and their particular features and values should be considered both in design and implementation process. Successful urban design and appropriate combination of urban elements encourage people to walk and spend time in urban area. Architectural style of buildings and style of urban design define a special identity for a given street and create sense of place and belongingness in pedestrians. Qualified architecture and urban design are mainly concerned with characteristics such attractiveness, comfort, legibility, green space and a sense of place.

Kevin Lynch in 1981 developed the theory of 'Good City Form' and introduced five basic rights for public spaces which are as 'the right of presence', 'the right of use and action', 'the right of appropriation' and 'the right of modification and disposition', meaning that people should not only have access to a public space, but also to use, change and even

claim the space as well as to transfer their rights of use and modification to other individuals.

A good example of a walkable public space having qualified architecture and urban design is Naghshe-Jahan Square known as Imam Square, (formerly known as Shah Square), situated at the city center of Isfahan in Iran as shown in figure 3-5 and 3-6. This large square is one of the best examples of a walkable space with a harmonic design of structures. This square, as one of UNESCO's World Heritage Sites, was constructed between 1598 and 1629. It is 160 meters wide by 508 meters long and encompasses an area of 89,600 m^2. The square is surrounded by significant historic buildings from the Safavid era. The Shah Mosque is situated on the southern edge and Ali Qapu on the western edge of the square. Sheikh Lotf Allah Mosque is situated on the eastern side of this square and at the northern side Keisaria gate opens into the Isfahan Grand Bazaar. The harmonious architectural style and human-scaled proportions together with attractive urban design features such as a large pool with fountains in the middle has created a walkable space for pedestrians.

Figure 3-5. Naghshe-Jahan Square in Isfahan (Tadjdini, 2010).

Figure 3-6. Naghshe-Jahan Square in Isfahan (Tadjdini, 2010).

The picture 3-7 also demonstrates a street with high level of walkability in Prague, the capital city of Czech Republic in which the modern and historic buildings' architectural style has a satisfying consistency with each other and despite the variety of color, texture and ornamentations there is not a chaotic view tiring the eyes.

Figure 3-7. Celetná Street in Prague with high level of walkability (Project for Public Spaces, 2014).

3.3 Urban design factors

The third group of walkability attributes is urban design factors. Although design factors affecting walkability can encompass a wide range of criteria, this thesis concentrates on the following design factors: imageability, legibility, enclosure, human scale, transparency and complexity.

3.1.1 Imageability

Imageability refers to features of a place, which makes it memorable and recognizable in the observer's minds. In an imageable place, existing physical elements and their arrangement or harmony with each other attract the attentions of people and influence their feelings. Many physical elements can contribute to imageability such as presence of any building with different and distinct form or color, presence of any historic buildings, comprehensible signs or symbols demonstrating special land use of a building in the street-level. Shops with famous brands, public places such as school, hospital and well-known restaurants can make a place imageable. The most important element impressing imageability of an urban space is landmark (Purciel & Marrone, 2006).Landmark is a defined physical object such as building, sign, statue or even a mountain. Innumerable signs, storefronts, trees, doorknobs or other especial urban details affecting mental image of majority of observers, can be considered as local landmarks (Lynch, 1960). Landmarks enhance legibility of an urban area, contribute to better way-finding and create memorable images in people's minds. Therefore landmarks help people to recognize where they are and realize whether they are in the right way or not. 'Nodes' in peoples mental maps are defined by built forms. Detailed form of buildings and junctions, its dissimilarity or singularity (including sharpness of boundary, unity, wholeness and closure) promote level of legibility of urban space and contribute to define landmark in people's minds. The level of dissimilarity should also have a balance. Lack of harmony among components of urban public spaces make people to remember various parts of such a complicated urban space with difficulty. Furthermore, singularity is argued by Kevin Lynch as an effective criterion which specifies urban components. Singularity of an urban space can be defined as any quality which identifies an element, make it prominent, noticeable and recognizable and creates vivid images in observer's mind.

3.1.2 Legibility

Legibility of a street is another important factor enhancing walkability. Lynch in his book, "The Image of the City" defines legibility as "the ease with which its (city's) parts can be recognized and can be organized into a coherent pattern" and introduced five important components for a legible city. These are: paths, nodes, edges, districts and landmarks (Lynch, 1960). The appropriate design and combination of these elements contribute to legibility of urban space.

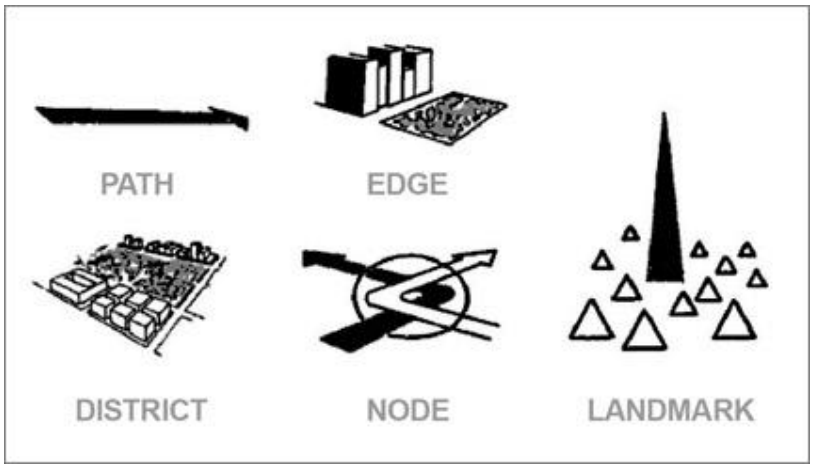


Figure 3-8. The five features of a legible city. (Lynch, 1960).

Paths: Paths are routes along which people move throughout the city by Lynch. According to interviews done with people in his book, paths were the predominant elements of the city in people's minds. The importance of the paths depends on familiarity with the city. People perceive a city when they are moving through the paths of it. People who know a city, majorly think of the city in terms of a particular path structure. Additionally, all other significant elements of a city are located and arranged along these paths.

Figure 3-9. The examples of the paths; George Street in Sydney (Andrew, 2006) and southeast corridor of Denver, Colorado (Parsons, 2014).

Nodes: Nodes are unforgettable places or strategic points that are majorly significant for orientation. Nodes are not merely intersections. There are various types of nodes: major nodes, minor nodes, linear nodes, nodal nodes and seasonal nodes.

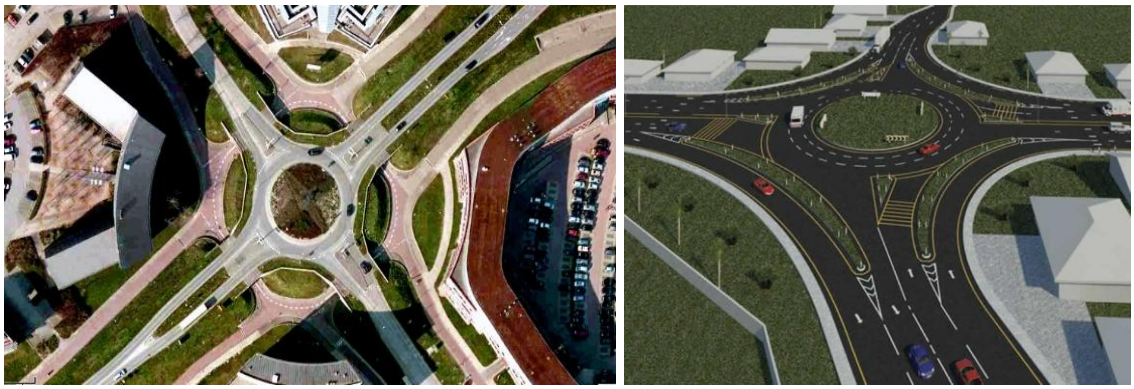


Figure 3-10. The examples of the nodes (NL Cycling, 2011) and (AKSG Online, 2010).

Edges: Edges are the elements which separate two regions. Edges can be manmade, natural, overhead or fragmentary elements.

Figure 3-11. The example of a natural edge, Seoul's river (the left) and a manmade edge, (the right) (Gardens of My Life, 2011) and (Severin, 2013)

Figure 3-12. The example of an overhead edge (the left) and a fragmentary edge (the right) (Collowân, 2013) and (Paulson, 2014).

Districts: Districts are distinguished by homogeneity, functionality and repetition of physical images. Homogeneity addresses continuity of color, texture or material of surfaces. A district also encompasses diverse functions such as green space, residential and commercial area.

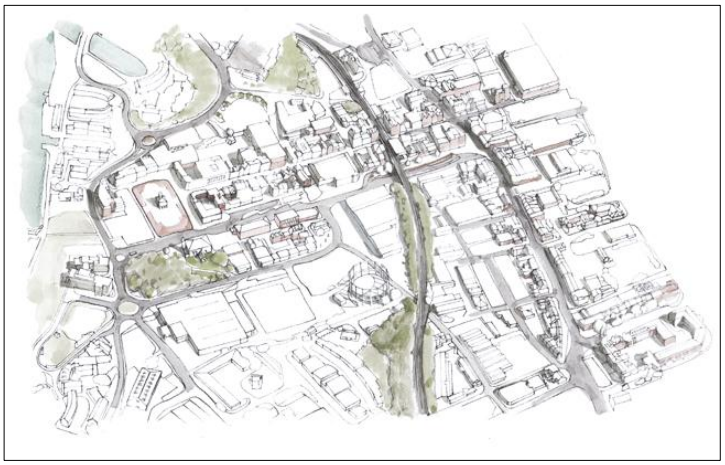


Figure 3-13. The example of a district. Resource: (MAUD blog, 2012).

Landmarks: Like the node 'landmark' is a type of 'point-reference'. Landmark is a defined physical object such as a particular building, sign, symbol or even a hill or mountain which is observable from various distances. Landmarks can be distant elements seen from various parts of a city and from diverse distances. They also may be located within the city in a determined distance symbolizing a constant direction for all practical objectives. Other types of landmarks are local ones which are visible merely within restricted locality.

Figure 3-14. The examples of landmarks (Wikipedia, 2012) and (GTT, 2011).

Lynch argued that although becoming completely lost in a city may rarely occur in modern cities due to existence of various way-finding facilities such as maps and street numbers, mishap of disorientation may occur for many people and this often causes sense

of anxiety (Lynch, 1960). These negative feelings caused by poor legibility of urban area can affect people's feeling of safety and convenience and decrease walkability of the area.

Since pedestrians are considered as the slowest individuals moving in urban space, a legible street pattern can contribute to creation of a simple mental map in their minds and decrease the fear of getting lost. Therefore a legible street pattern can encourage pedestrians to conveniently and easily find their destinations when they are walking in the city. Highly connected street patterns which are regular and simple in addition to appropriate arrangement of buildings around these street patterns can make them more legible in comparison to irregular and complex hierarchical street patterns (Ghadimkhani, 2011).

3.1.3 Enclosure

The term 'enclosure' refers to "the degree to which the edges of the street are defined" (Jaskiewicz, 2000). Pedestrian enclosure keeps the pedestrians' eyes along the street. Enclosure mainly is the visual definition of a space in which the width of the street has a rational proportion with the height of vertical elements of that street (Purciel & Marrone, 2006). Such a spatial definition can be created through arrangement of trees, walls or any vertical elements. If we imagine a street like a room, the buildings along the street are perceived as the walls of a room and the street bed is perceived as the floor. This is what we call the feeling of enclosure that a pedestrian feels in an urban space.

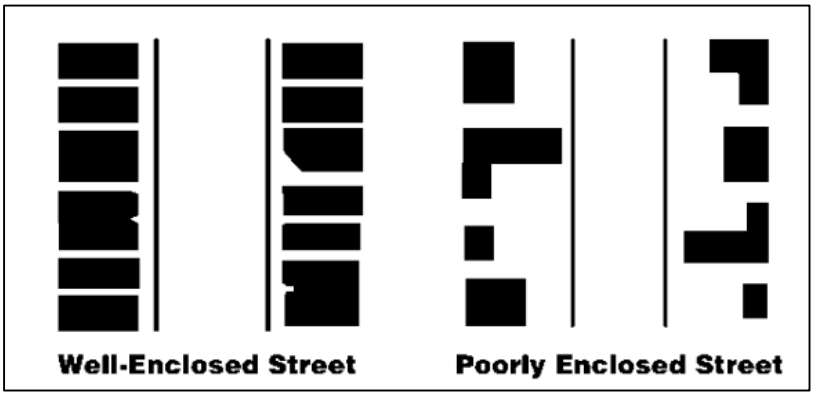


Figure 3-15. Schematic figure of a well-enclosed street and a poorly enclosed street (Jaskiewicz, 2000).

In order to estimate the level of enclosure in a street or any urban space we consider two important qualities:

1) **Long Site Line:** Long site line along a street is the ability to observe a minimum distance of 1000ft at any point during ones walk along the street.

2) **Street Wall:** Street wall is an edge along the path that make the observers perceive a wall-like space. Diverse elements in front of buildings can generate street wall. For instance, fences or greenery with minimum height of 5ft, façade or any wall which are taller than 5ft and any similar elements over 5ft can contribute to the creation of a street wall in people's minds provided that they hinder 60% of the observers sight. Large areas of open land, roadways, alleys and lawns somewhat break the street wall (Purciel & Marrone, 2006).

Pedestrian enclosure is an important factor influencing pedestrian safety both physically and perceptually. Pedestrian enclosure is influenced by three factors: human scale, building orientation and street furniture.

Human scale in a well-enclosed street mainly refers to "functional width of sidewalk which could provide pedestrian movement and their activity". Minimum width of a sidewalk, which responses to people's needs, whether the people who are walking on the sidewalk or those resting, skating and biking, is about 1.525 m (Axelson, et al., 1999). Generally, appropriate width of sidewalk enables pedestrians to better realize the route structure and the placements of the entrances. Moreover, appropriate sidewalk width increases the functionality of various parts of sidewalk. Therefore it enables pedestrians to move more conveniently.

Allan B. Jacobs (1993) in his book, "Great Streets" identifies a cross-section ratio of almost one (height) to two (width), (1:2), and supposes that this ratio between height of buildings and width of street could create appropriate closure along the street. He also states that in places where this ratio in building orientation could not be ensured by means

of structures, trees can be planted in order to strengthen definition of closeness and completeness (Jacobs , 1993).

Street furniture is the last significant factor creating pedestrian enclosure. Various street furniture and street trees play role of buffers between pedestrians and vehicles and provide walkers with safety from traffic noise and its dangers (LA-Walkability, 2008). Another function of trees is to define the boundary for pedestrians by decreasing the proportion of building height to open space. Moreover, trees make street be perceived narrower by framing the roadway and enforce drivers to slow down and be more careful due to fear of collision with solid objects or trees. Wide and open unconstrained spaces, on the other hand, encourage high speeds and create a dangerous position for pedestrians, bicyclists and children at play (Jaskiewicz, 2000). As a result, all of these features due to their significant benefits for promoting pedestrians' safety, contribute to walkability of a street (Lambert, 2005).

Figure 3-16. The role of street furniture in walkway enclosure (LA-Walkability, 2008).

3.1.4 Human scale

Human scale deals with features and elements which put human size at the hub of the designs. The size and articulation of physical elements should be proportionally suitable with human scale (Purciel & Marrone, 2006). At the issue of walkability, human scale mainly refers to any physical elements' design which matches with the speed that human walk. Average building height is very significant human scale criterion influencing walkability. If the height of a building is excessively higher than human size, a person walking in such a space can feel itself being pushed by those huge buildings. For instance streets in some of metropolitan cities with large towers and skyscrapers at the both sides are the best examples of such spaces neglecting human scale.

Figure 3-17. Excessive height of buildings along a street (Booms Beat website, 2014).

About the width of streets, it should be noted that human scale mainly refers to "functional width of street which could provide pedestrian movement and their activity". Human scale standards are related to building height which should be determined according to width of pathway.

The amount of windows on the street level, small planters and gardens in front of buildings, street furniture and small urban elements, pedestrian lights and outdoor dining tables are some examples of urban elements and features related to human scale and strongly influencing walkability. Historic city centers and close-in neighborhoods are best examples demonstrating the significance of human scale in attracting walkers rather than drivers. These kinds of city centers due to their original structure, which were basically designed for pedestrians, encourages walking. Most of the contemporary strip mall corridors, structures and billboards, on the other hand, are designed for high-speed automobiles movement rather than low-speed pedestrians. Finally, articulation of buildings along a street can influence safety and comfort through attracting pedestrians. Figure 3-18 compares a well-articulated building with a poor-articulated one diagrammatically.

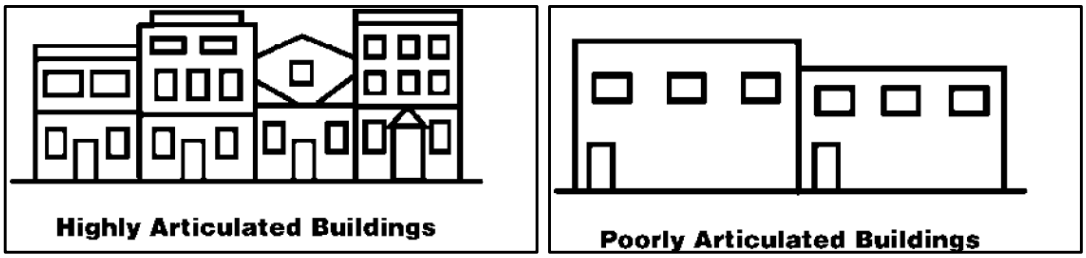


Figure 3-18. Schematic figure of a highly and poorly articulated building (Jaskiewicz, 2000).

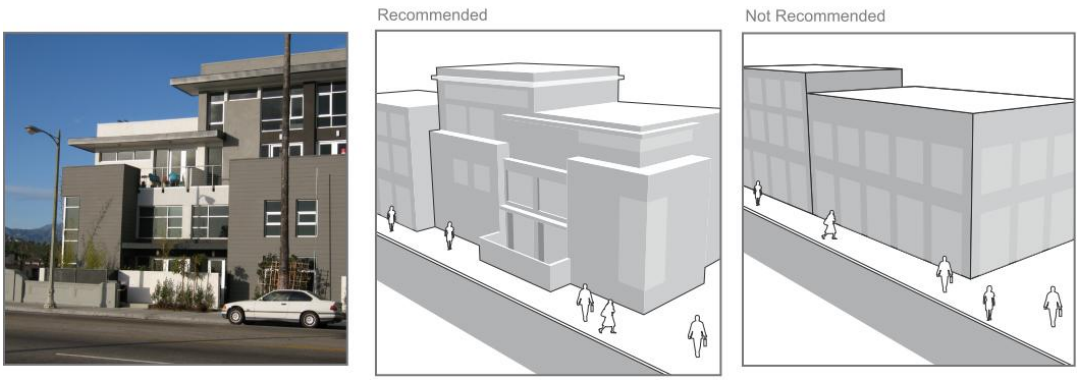


Figure 3-19. Mass articulation can increase human scale and add interest to the building façade (LA-Walkability, 2008).

3.1.5 Transparency

Transparency mainly refers to transition between private and public space (Jaskiewicz, 2000). Transparency in a commercial street and a residential street can be achieved through diverse ways. High level of transparency in a commercial street can be generated by use of outdoor displays, large shop windows and through sidewalk cafes and restaurants. Windows at street level and presence of street wall are two ways of achieving transparency in residential areas. For sure, porches in front of buildings are the most important transitional space connecting private and public space. These sorts of transitional spaces make pedestrians to have a general feeling or perception about private space lying at the edge of street. Amount of active-use buildings can also create high degree of transparency.

Active use building refers to those buildings in which there is a constant pedestrian flow entering to the building or existing from it. Accordingly, public places such as cafes, parks, residential apartments, schools and hospitals are considered as 'always active buildings'. Setback area of the buildings can provide an 'outdoor room' next to the pathway in which seating places and other interesting urban furniture elements are placed in order to increase vitality and walkability of street.

Figure 3-20. Creation of an 'outdoor room' next to the pathway (LA-Walkability, 2008).

On the other hand, places with less pedestrian traffic such as parking lots, under-construction sites, detached single residential units and vacant or abandoned buildings are considered as inactive places. Accordingly, the buildings which meet the public space or

sidewalk with no sign, mark, decoration, or anything indicating buildings' function and bare walls with no windows have a very poor level of transparency.

3.1.6 Complexity

Complexity of a pathway is related to visual richness of a space. The features influencing complexity are the diversity of building types, appropriate variety of architectural styles, ornamentation of buildings, quality and number of street furniture and human activity. Diverse features of buildings including form, color, material, number and shape of windows and doors, diversity of lighting systems and amount of pedestrian traffic are very influential in increasing complexity of a street or an urban space (Purciel & Marrone, 2006).

Complexity of urban elements in a public space whether commercial or residential, enhances the level of attraction and interest. Furthermore, presence of a park, plaza, courtyard or existence of a fountain, various trees, plants and other natural elements can add to spatial complexity of a street or any public space (Purciel, & Marrone, 2006 and Jaskiewicz, 2000).

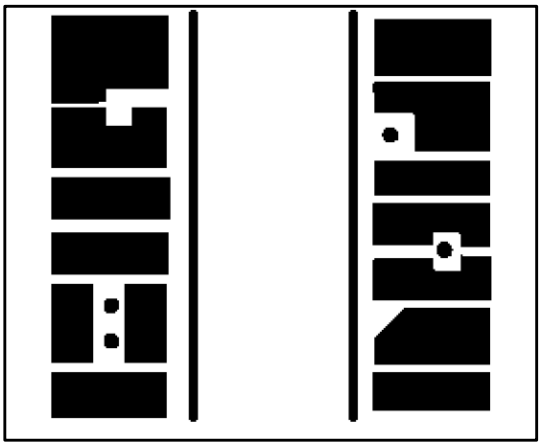


Figure 3-21. A schematic figure demonstrating a complex space (Jaskiewicz, 2000).

3.4 Personal factors

3.4.1 Sense of safety

Safety of urban space has two aspects: actual safety and perceived safety. Actual safety means a safety achievable through physical properties in urban spaces. Since Street is a three-dimensional entity including various elements such as sidewalks, vehicular path, buildings and Street furniture; actual safety in an urban space should be achieved through diverse ways. Function of a street is not merely accommodating transportation facilities, street also includes many activities. Montgomery (1998) claims that activity in urban space is the product of two important interrelated concepts which are vitality and diversity. Vitality which is one of the basic criteria of assessing a successful urban area, mainly refers to the number of people (or pedestrian flow) existing in urban area during various times of day and night and in long term the permanence of vitality in an urban area can be achieved simply through a complex 'diversity' of land uses (Montgomery, 1998). Accordingly, feeling of safety is one of the main factors enhancing number of people walking through a street.

Perceived safety is another aspect of safety which majorly refers to maintaining security of pedestrians from the perception or negative feelings of criminal activities in an urban area or dangers of traffic. For instance, a well-enclosed street with continuous buildings opening to sidewalk yield "eyes on street" and discourage crime and increase sense of perceived safety in pedestrians. Controlling excessive traffic noise which generates anxiety in people is also concern of perceptual safety. Moreover, appropriate arrangement of buildings in a way that minimize the dark and frightening hiding spaces between buildings also can be considered as one of the factors which enhances perceived safety (Jaskiewicz, 2000).

Jane Jacobs (1961) in her book "The Death and Life of Great American Cities" introduces three important qualities for perceptual safety which are:

a) a clear delimit between public and private spaces
b) buildings oriented towards the street to provide ' eyes on the street'

c) common use facilities to add more ‘eyes on the street’ (Jacobs, 1961)

Although safety has particular importance for pedestrians and drivers, pedestrians are considered as more vulnerable groups in terms of both physical and perceptual safety. Safety is necessary requirement of urban area since it directly influences the tendency of people to walk in streets. “The safer pedestrian feels on the street, the more they will use it” (Kolody, 2002).

3.4.2 Sense of comfort

Comfort level of pedestrians in an urban space is also one of the significant factors influencing walkability of an urban space. Comfort of pedestrians depends on satisfaction of a wide range of requirements. In this part of the study, various factors influencing comfort of an urban space are introduced. To put this end, continuous pavement, floor quality, ideal air condition and appropriate design and placement of overhanging and awnings are studied.

- Continuous pavement

Continuous pavement provides pedestrians, particularly disabled people, with a convenient path to move freely along the streets without interruptions of vehicles. Continuity of sidewalk can be determined both actually and perceptually. For instance, removing all interruptions on the pedestrians’ path is considered as a physical form of providing continuity while appropriately placed street furniture creating a harmonious rhythm is considered as a way of increasing perceptual continuity. Coherent light of lighting poles and coherent canopies are also some examples of providing perceptual continuity.

Figure 3-22. Continuous sidewalk pattern is a significant factor enhancing walkability.

In comparison to street patterns such as cul-de-sacs, crescents, loops and lollipops, grid-iron pattern -due to its high interconnection- offers more continuous and walkable sidewalks for the pedestrians. However, it does not mean that walkable street pattern merely is grid-iron. Various important historic centers in European cities are examples of complicated street patterns with high quality of walkability. Because other significant factors such as human-scale dimensions, diversity and landmarks are features influencing walkability of these centers (Ghadimkhani, 2011).

- Floor quality

Floor quality is another factor contributing to actual safety and comfort of pedestrians. A qualified floor of street and sidewalk makes walking convenient and enjoying for walkers and also provides the disabled with more comfort and freedom of movement. Accordingly both material quality of floor scape and standard sidewalk ramps have importance in terms of providing a safe and secure surface for pedestrians. (LA-Walkability, 2008).

- Ideal air condition

Ideal air condition here means maintaining a pleasant heat in cold weather and providing a relatively cool and convenient air condition in hot weather for the pedestrians. Unpleasant weather conditions causing inconvenience for the pedestrians are very influential in attracting people to use automobiles. Therefore, maintaining ideal air condition in each season as much as possible, can considerably influence walkability of an urban space. In fact success of shopping malls in maintaining ideal air condition and

increasing comfort level of pedestrians in unpleasant weather conditions is one of the major attractive aspects of the shopping malls.

- Overhanging and awnings

Shade elements above the street level and within human scale play a great role in promoting aesthetic quality, functionality of street and enhancing comfort level of pedestrians. The presence of varied overhangs, canopies and diverse sorts of rooflines have an effect similar to articulation of buildings with varied ornamentation and material in enhancing aesthetic and visual interest of a street. Moreover overhangs and awnings have an important functionality which is providing pedestrians with shadow in hot summer days and providing shelter from snow and rain fall. This function of these elements plays a great role in increasing comfort level of street and in promoting walkability of it. Providing pedestrian comfort by use of awnings, overhangs, canopies and rooflines is better possible in commercial streets rather than residential. Because in residential areas standard setbacks are longer and there is a rather wide space between structures (Jaskiewicz, 2000).

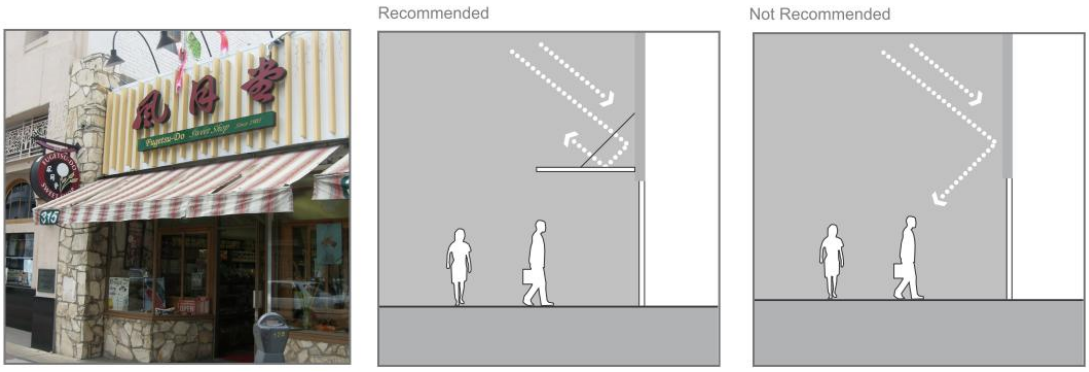


Figure 3-23. Shade elements above the street level not only promote aesthetic quality of a street but also protect pedestrians from sun rays, rain and snow.

Trees are important from various aspects. Trees promote aesthetic quality of an urban space as the most important landscape element, create enclosure between pedestrians and moving vehicles and also provide shadow in hot summer days for the pedestrians walking

through a street. Additionally, trees protect the pedestrians from rain, snow and wind to some extent.

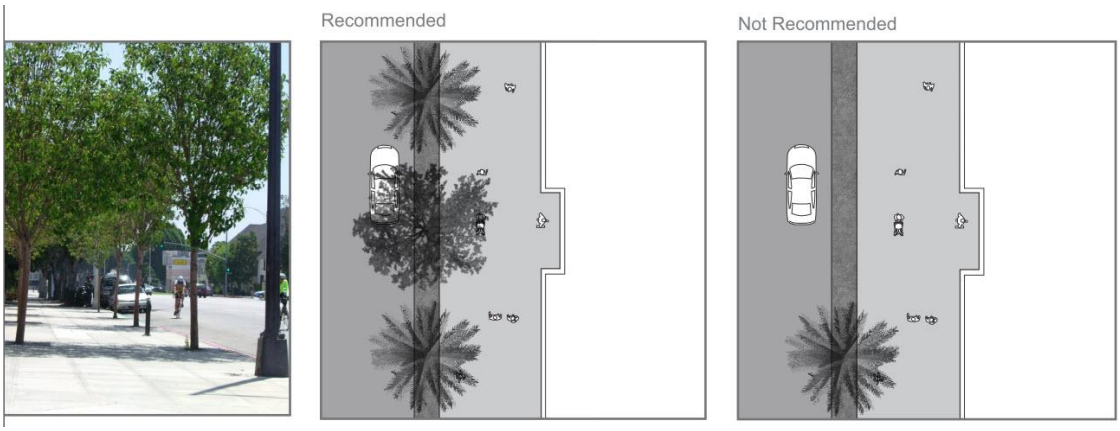


Figure 3-24. Closely planted trees are more influential in providing shade for the pedestrians along a street (LA-Walkability, 2008).

3.4.3 Level of interest

This part of the thesis analyses aesthetic level that raises interest and attracts people to an urban space by means of Gestalt principles. Despite of the fact that discussion about aesthetic or attraction is a debatable and complicated issue, Gestalt principles can help us to evaluate whether an urban space is attractive or not.

- Gestalt Principles

Gestalt means shape, form, pattern or configuration in German language. Gestalt principles are considered as rules for perception of form or visual organization. Various principles of Gestalt including contrast, balance and harmony are the elements applied for description of compositions. Gestalt psychology was firstly discussed by Max Wertheimer in Germany in 1910. Max Wertheimer with cooperation of other Gestalt psychologists including Kurt Koffka and Wolfgang Kohler claimed that in creation of a melody the whole will not be the sum of its parts, if the notes comprising the melody be independent parts. Wertheimer argued that parts which behave individually do not indicate a perfect meaning. In fact parts gain meaning in a nature of whole. Human generally experience perceptual wholes instead of remote parts. Therefore, we do not

observe shapes lonely. We see shapes as dynamic 'figure-ground' relationships. In fact it was Max Wertheimer who applied Gestalt psychology in the field of art and design by introducing 'the theory of form'. He claimed that "such tendencies are inborn, not learnt, is suggested by cross-cultural effectiveness of sleight-of-hand magic and camouflage" (Wertheimer, 1943, cited in Eraydın, 2007).

First of all when Wertheimer theorized Gestalt rules, he found that in order to achieve belongingness and togetherness of elements, three significant rules are necessary. These are similarity, proximity and continuity. Later, more rules were added to Gestalt rules when it got a well-known rule in design field. For instance closure, symmetry, alignment, simplicity, common fate and connectedness.

According to Gestalt psychology human perceives environment through four steps. The first one is detection of simple features such as colors, curvatures and end of lines. The second step is parsing of the scene in a way that shapes can be recognized from the background. This step of visual perception is called 'perceptual segregation'. In this step the mind separates the objects from their background, therefore the object is observed as a coherent whole which is distinct from its background. This is called 'figure-ground' relation in Gestalt. The third step is perceptual organization in which mind groups the parts into one single object. The fourth step of visual perception is pattern recognition which determines what the object is (Pare, 2006, cited in Eraydın, 2007).

Gestalt psychologists introduce several essential and significant factors which influence human perception of form or space. The principles which will be more of a concern in aesthetic analyses of this thesis are: similarity, symmetry, proximity, continuity and closure.

Similarity means "elements that look alike" (Günay, 2007). Elements which look alike each other are perceived as a group. In the similarity rule, physical similarity factors such as color, shape and value are more significant than spatial similarities. Wertheimer emphasizes that there is a degree of similarity and it is "more or less dissimilar". This means that similarity is not an absolute rule (MacEachren, 1995).

Proximity refers to "elements that are close together". The rule of proximity deals with items which have close relationship with eachother. Gestalt psychologists state that elements which are close to eachother are percieved as a whole .The distance between objects demonstrates diverse attributes as objects which are close to each other form groups in observerss mind (MacEachren, 1995). proximity is considered as a relative rule since a same distance being an intramembral distance in a particular pattern may be considered as an intermembral one in another pattern (Koffka, 1963). Koffka defines proximity through the term 'equality'. He states that equal parts with a great proximity can be recognized into a higher unit.

Closure refers to "parts enclosing a void". 'Closed form' is another important gestalt rule majorly applied in design field which refers to "a complete whole even if there are missing elements" (Günay, 2007). Max Eachren (1995) claims that "closed object form wholes". Since human mind supplies the missing parts in a composition, there is a tendency in visual perception to observe the objects with boundaries.

Symmetry provides coherence of composition. This principle mainly describes the instance that the entire figure is perceived rather than individual parts constructing the figure.

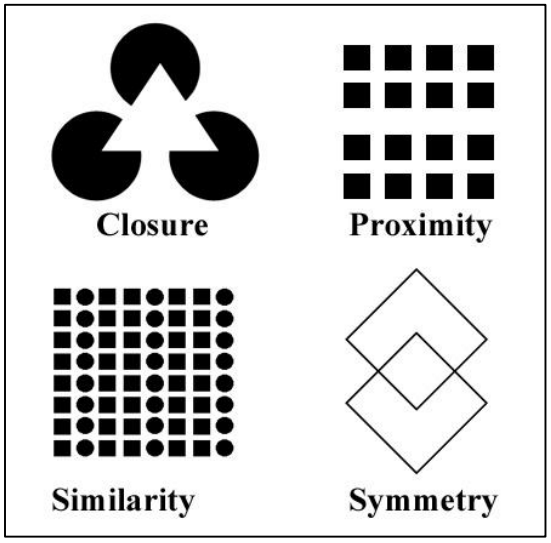


Figure 3-25. Four significant Gestalt principles

Continuity is related to "elements that show good continuance though interrupted" (Günay, 2007). This rule of gestalt is based on "the movements of eye in the direction of the element or elements that move together". In this way the eye follows a determined direction with continuity.

Bentely (2002) defines continuity as "spatial enclosure of various parts of public space system". Continuity in an urban space enhances legibility and aesthetic of the environment. Continuity and differentiation balance each other. Providing continuity is majorly possible in grid street pattern in which the connections are direct. Continuity of sequential elements and continuity of pathways is very helpful in way-finding and orientation. Furthermore, well-defined paths with edges can enhance legibility and imageability (Eraydın, 2007).

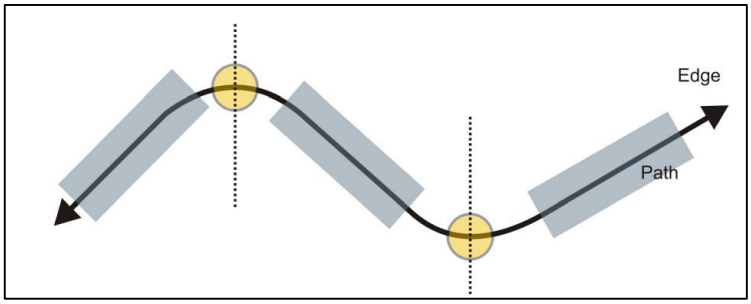


Figure 3-26. Continuity of sequential elements and well-defined paths with edges enhance legibility (Eraydın, 2007).

3.4.4 Lighting

Lightening and visibility is the other factor influencing people's feeling of safety and comfort. The quality of lighting along street has a considerable influence on both pedestrians and drivers. 'Appropriate and adequate lighting' system enhances the visibility. Appropriate lighting can increase level of safety in terms of both criminal activities and protection from vehicles (Jaskiewicz, 2000). The Illumination Engineering of North America (IES) determines lighting standards for sidewalks located along various types of roadways in order to increase pedestrian safety and comfort in streets, particularly in sidewalks. These standards aim to ensure a certain light quality along pedestrian

corridors, beneath and between light poles (Jaskiewicz, 2000). These required illuminations determined by IES standards can be obtained by means of ‘bright, widely spaced, high-mounted lamps or dimmers, closely spaced, low-mounted lamps, the latter of which are usually preferable due to its consistent contribution to the pedestrian corridor’ (Jaskiewicz, 2000). Lighting standards for residential areas are generally lower than the commercial ones (Jaskiewicz, 2000). Los Angeles walkability checklist (2008) introduces ‘glare-free’ lighting system as ‘appropriate lighting’. Street lights should be placed in a way to discourage crime and also decrease the pedestrian and vehicular conflicts.

Although lighting system of a street is a factor being handled in design process, the impact of light in feeling of safety and comfort is somewhat dependent on personal perceptions and feelings of pedestrians about level of lighting and fear of darkness.

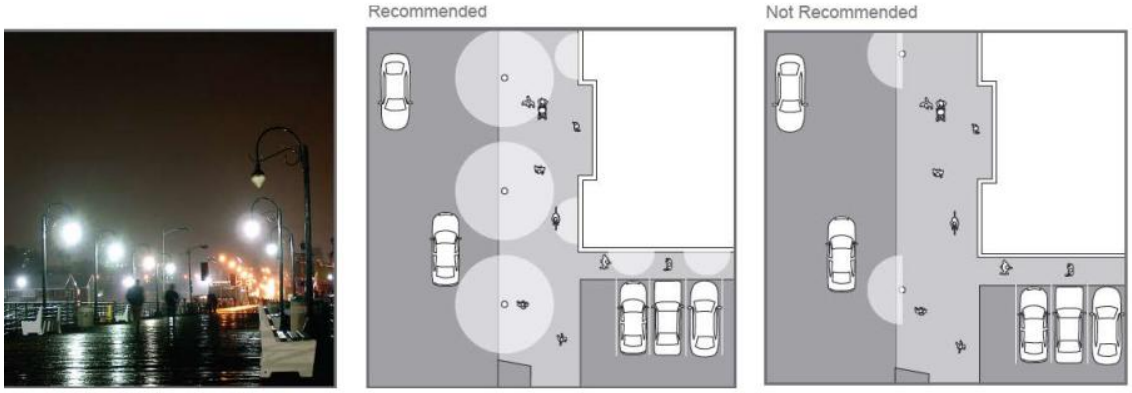


Figure 3-27. Parking areas and sidewalks illumination, (LA-Walkability, 2008)

3.5 Conclusion

Walking is the basic means of transportation and it is considered as the cheapest and the most available physical activity to promote human health. During the recent century, the advent of automobile and rapid development of it changed many vital and pedestrian-oriented cities to congested and car-oriented spaces. Excessive usage of motorized vehicles have caused many environmental, social and economic negative outcomes. Therefore during recent decades many movements such as Smart Growth and New

Urbanism have brought the issues of regaining liveability and walkability of urban spaces to the agenda of city planning and urban design.

Various sorts of influential factors in increasing walkability and encouraging people to walk through urban spaces are proposed in a wide range of researches concerning this issue. The scopes and suggested walkability factors were collected in the previous chapter and these factors were selected and categorized in four main groups: lifestyle factors, locational factors, urban design factors and personal factors.

CHAPTER 4

INTRODUCING THE CASE STUDY YÜKSEL STREET HISTORICAL BACKGROUND

In this part of the analysis, the research investigates the historical development of Ankara within recent century and the evolution of city center of Ankara in order to put Yüksel Street in the context of Ankara and CBD's historic development and investigate the evolution of this street as part of one of the significant green spines of Ankara. For this purpose firstly the planning history of Ankara is studied. Then the study focuses on development of CBD in Ankara (Kızılay and its peripheral area) and finally Yüksel Street's Development as part of Jansen's green spine is investigated.

4.1 Planning history of Ankara

Ankara was chosen as the capital city of the Republic of Turkey in 1923. Despite of the fact that Ankara has experienced bright periods during its historical development in ancient times, the most vivid period in Ankara started after foundation of Republic and selection of it as the capital city of Turkey Republic (Gökçe , 2008).

Ankara is considered as the first city in Turkey whose development was according to a development plan at the first years of Republic era. Overall 6 development plans were prepared for Ankara after selection of it as the capital city up to today. Each of these plans reflect the urban planning approaches and requirements of their periods.

A German architect named Carl Christoph Lörcher prepared the first development plan for the new capital city of Turkey in 1924-1925.

Figure 4-1. The location of Old Town and New Town in Lörcher's Plan (Günay, 2005).

Lörcher's Plan had a compact city form with a new center around the central station. Although the plan prepared in 1924-1925 was implemented in the following years, the planned area considered for this aim was insufficient to accommodate a population of almost 250000 to 300000.

Consequently, in the year 1927 another competition was held in order to gain a new development plan for Ankara. For this purpose three German planners were invited to competition among which Hermann Jansen's plan won the competition in 1928. This plan with some modifications was approved in 1932. The aim of this plan was further development of the new town and developing Administrative quartier (Cengizacan, 2004).

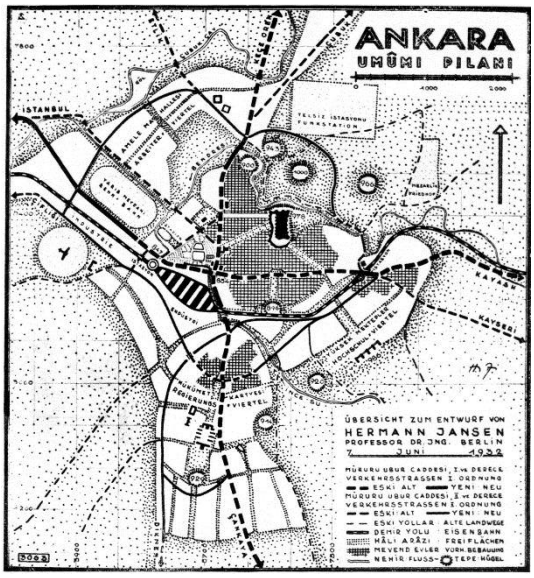


Figure 4-2. Hermann Jansen's Master Plan (Architekturmuseum, 2014).

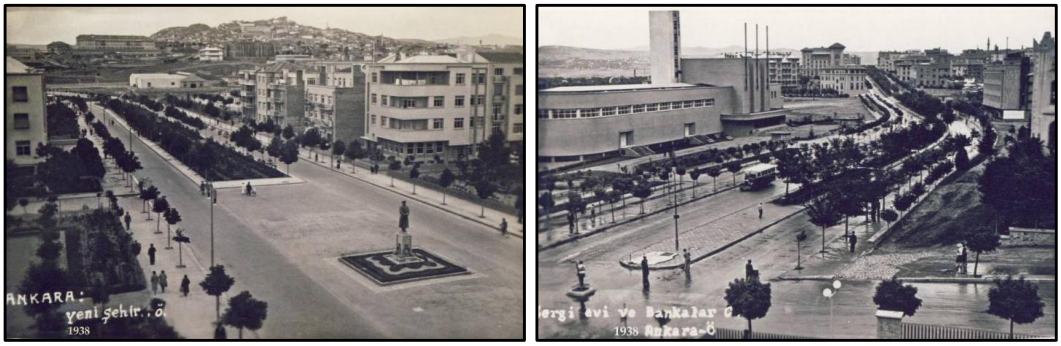


Figure 4-3. Ankara, New Town (Yeni Şehir), 1938 Ankara Exhibition Hall (Sergi Evi) and banks 1938, (Günay Archive).

In Lörcher Plan a new part was offered for Ankara as New Town (Yeni Şehir). The most significant contribution of Lörcher's Plan was arrangement of lands in order to construct public and governmental buildings for the new capital city. Therefore, The New Town's basis was established and it was an administrative city with a residential area surrounding it. Both of Lörcher's and Jansen's Plan were similar to development plans of German cities in the early 1990s. The purpose of both of the Lörcher and Jansen Plan were mainly finding solutions for the development problems of the new capital city of the Turkey Republic. Jansen Plan was considering the concept of the 'Garden City'. The main principles of Jansen Plan were functional zoning, segregation of the pedestrian and car

traffic, preservation of the castle and the old city and developing the new sections through the southern parts of the city (Tankut, 1993).

The most significant problems were deficiency of governmental buildings, public services and housing which was the most important requirement of this new capital city. Because there was a high migration rate to Ankara from various parts of the country. The fast-growing population in Ankara led to a population of 226.000 in 1945 and then 290000 in 1950. Accordingly the population of 300.000 people predicted in Jansen Plan reached in nearly 25 years and in the middle of the 1950s Ankara started to develop beyond the borders of Jansen Plan. Therefore a new development plan was required for Ankara and again an international competition was held to prepare another development plan for Ankara. In this competition, the plan proposed by Raşit Uybadin and Nihat Yücel won the competition. The estimated population of Uybadin-Yücel Plan for coming 20 years was 75000 and this plan proposed a wide range of plans for development of residential area in Ankara (Altındağ Belediye Başkanlığı, 1987). Although this plan intended to solve new planned plot requirements and proposed new social residential districts, such as Yenimahalle and Etlik in the western and northwestern areas of Ankara, a new CBD, or a hierarchic sub-center system, intended at satisfying the requirements of the fast-growing population, were not suggested. Hence, whereas the traditional CBD (Ulus) lived new and over concentrations, the public producer service in Kızılay was diversified, and got specialized and integrated with the correlated public and private service focuses. (Gökçe , 2008).

Uybadin-Yücel Plan aspired to prolong the culturist city of the Lörcher's Plan. Its aim was to preclude further growth of Ankara and its excessive density. Ultimately this idea of the third plan confronted the devastation of the city by disregarding the natural forces of society. This process changed Ankara from being a planned city to a city growing with spontaneous development (Günay, 2012).

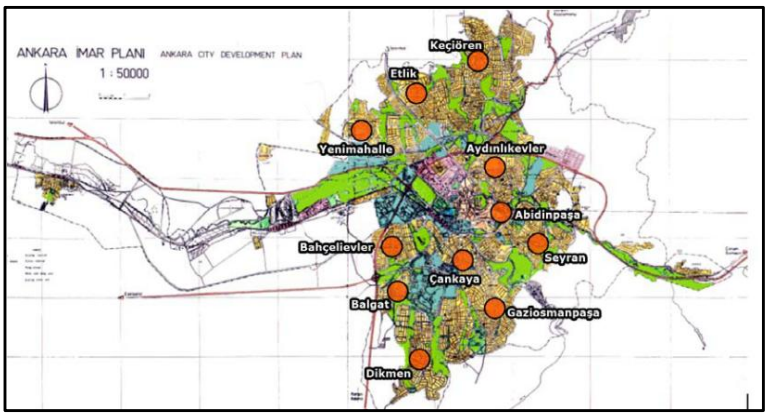


Figure 4-4. Uybadin-Yücel Plan for future development of residential areas in Ankara (Baykan Günay's archive).

The fourth plan is the development plan of Ankara for the year 1990 which was approved in 1982. This plan was prepared by the Ankara Metropolitan Planning Bureau founded in 1969. This plan was fairly distinct. Because it was introducing a structure plan rather than a Master plan for Ankara. The purpose of the plan was to generate new residential and employment opportunities at the fringe of the city for the middle classes. (Burat, 2008).

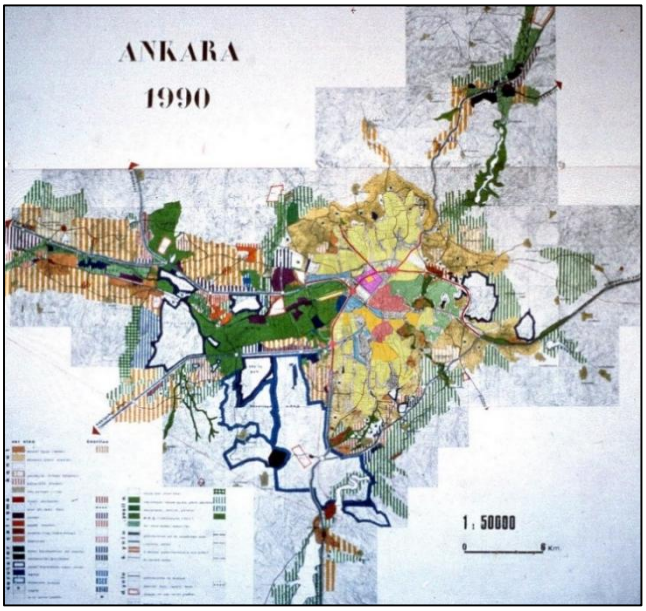


Figure 4-5. Master Plan of Ankara, 1990, Evolution of the Fringe (Gökçe , 2008).

The fifth development plan of Ankara was also a macroform and transportation plan for the year 2015. A group in the City and Regional Planning Department of the Middle East Technical University were assigned to conduct a planning study for Ankara. This group formulated the planning aims of Ankara for a period of 30 years (Burat, 2008). The plan prepared by METU group suggested the development of additional corridors into the fringe of the city. Moreover, it introduced a new attitude towards the old city, and transferred the gained information to the transportation team for use in the selection of an appropriate underground network. The fifth plan also could not provide a completely controlled development for Ankara. Therefore, this plan resulted in only partial developments in the fringe and further focus in the core. The most significant occurrence of this period was "the squatter amnesty law" that initiated a process which still continues until today (Günay, 2012).

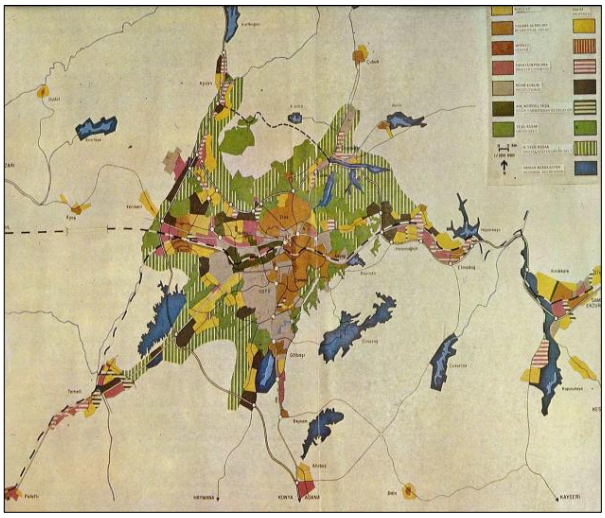


Figure 4-6. Ankara 2015 Structure Plan (Gökçe , 2008).

Ankara is a city which grew very rapidly in less than one century and its population increased from 20,000 to almost 4.8 million in less than a century. After above mentioned plans and by utilizing the experiences gained from them, "2023 Capital Ankara Master Plan" was approved by Directorate of Greater Municipality of Ankara in 2008. The researches for this master plan revealed that there is a tendency for sprawling in producer-

consumer services and these functions are scattering from the CBD towards the southwestern areas of Ankara (Gökçe , 2008).

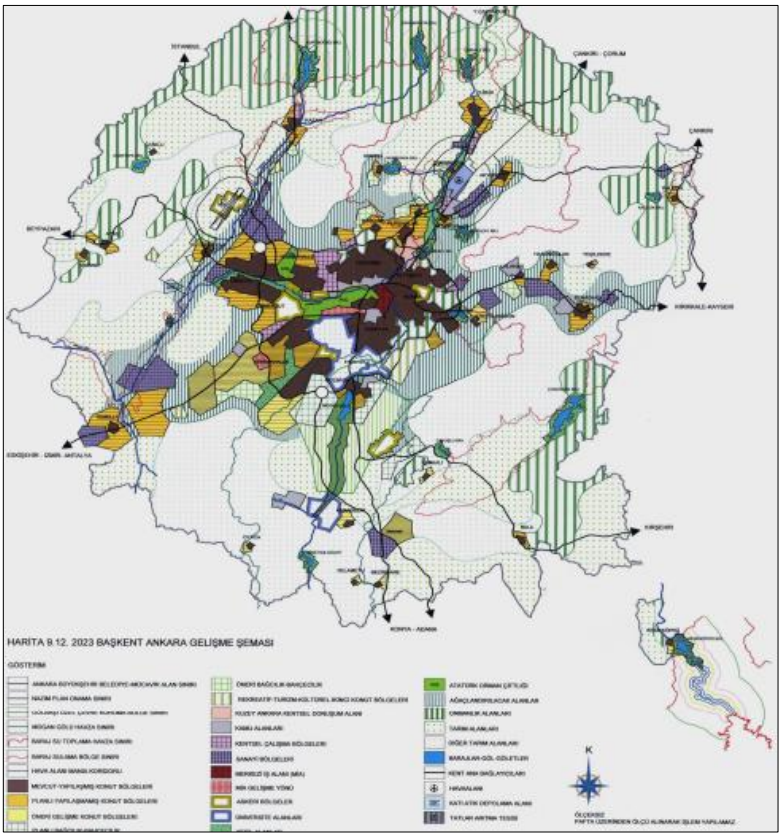


Figure 4-7. Ankara Master Plan for 2023 (Gökçe , 2008).

Because this plan suggests limitless development along the south-western corridor. This lead to the decline of the Central Business District (CBD) of Ankara. This decline has caused CBD's functionality to become limited to private educational institutions and private offices. Additionally, inferior uses such as erotic shops have appeared; whereas high end shopping spaces and recreational public spaces such as cinema and playing grounds has been decentralized to the shopping malls which are majorly located along the main corridors out to the fringe.

4.2 Development of CBD in Ankara (Kızılay and its peripheral area)

After introducing Ankara's development plans from beginning of Republic era to recent years, in this part of the study it is focused on development of city center and its modifications in each of these plans. At the end, it is investigated how Yüksel Street, the case study of this thesis, emerged in development plan of Ankara and how it evolved through diverse master plans.

CBD of Ankara in Carl Lörcher's Plan 1924

Carl Lörcher's Plan in 1924 defines the central district of Ankara as Ulus. However, the basis of Kızılay was determined in Lörcher's Plan. This plan proposed a compact development for CBD of Ankara. In Lörcher's Plan the area in the southern part of the railway was defined and as the development area, this plan suggested Yeni Şehir district. Additionally the spine of Atatürk Boulevard until Güven Park was determined in this plan.

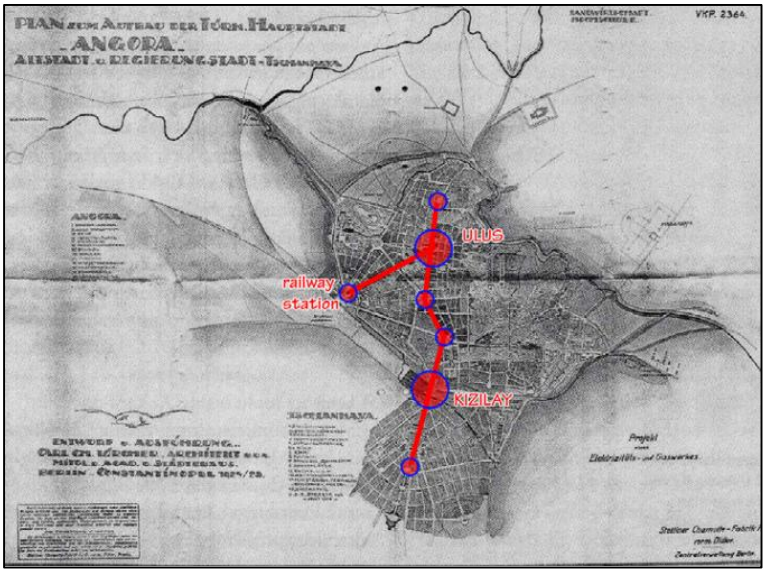


Figure 4-8. The spine of Atatürk Boulevard to Güven Park (Günay, 2005).

CBD of Ankara in Jansen plan 1932

Development plan of Jansen in 1932 was taking the Ankara Castle as the central point of the city. Jansen considered the north-east and the north-west areas of the city as residential districts (Celep, 2009).

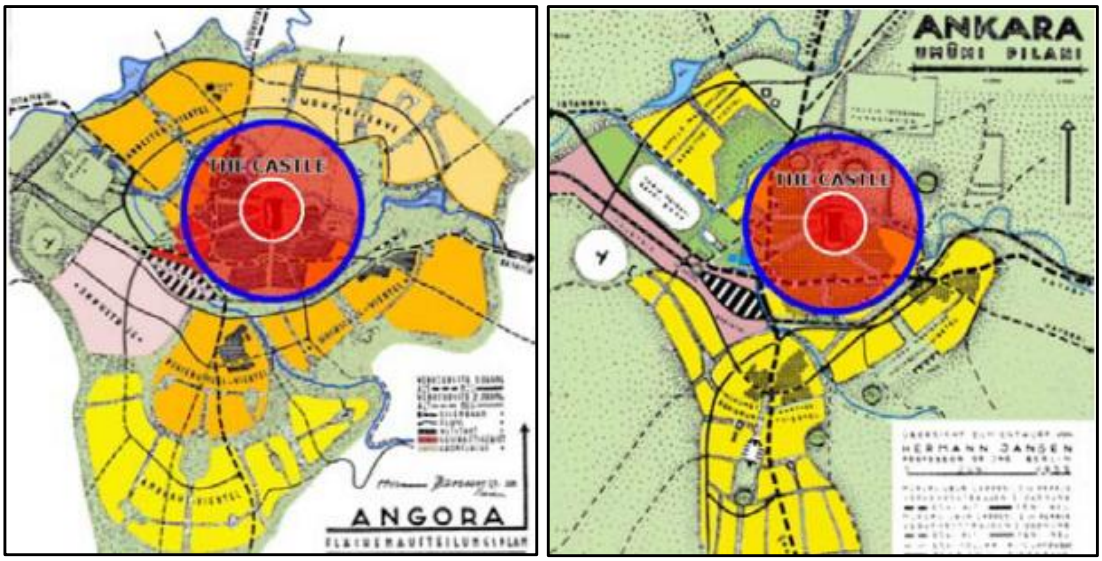


Figure 4-9. Jansen's both 1928 and 1932 plan were taking the Ankara Castle as the central point of the city (Celep, 2009).

Figure 4-10. Ankara New Town after implementation of Jansen Plan, (Günay Archive).

Jansen Plan which had won the competition in 1928 had some differences from the implementation plan in 1932. In Jansen 1928 competition plan, the commercial district had a circular decentralizing form in which the castle was considered as central point. In

1932 plan, Jansen demonstrated the Atatürk Boulevard as north-south spine of Ankara and Ziya Gökalp street (formerly Kazım Özalp Boulevard) as west-east spine which were located between Ulus, Kızılay and the New Town (Yeni Şehir) forming a planned central business district. . In Jansen Plan, the intersection of these two spines forms Kızılay node and later by the development of the ministries in the southern part of Kızılay district, it was developed and accepted as the new central business district of Ankara. Commercial activities were planned for Kızılay and the foundation of the ministry districts were also defined in Jansen 1932 plan (Celep, 2009).

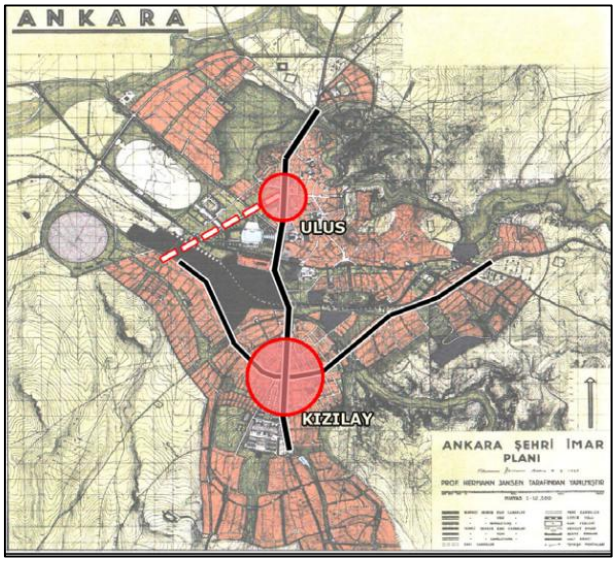


Figure 4-11. The location of the old city center and new CBD in Jansen Plan 1932, (Celep, 2009).

CBD of Ankara in Uybadin-Yücel Plan

Due to new requirements and problems of fast-growing Ankara, Jansen Plan remained incapable. Therefore a new competition for a new master plan was held in 1955 and Uybadin-Yücel Plan was the winner of the competition. The main features of Uybadin-Yücel Plan can be stated as Consolidation of the core, defining a compact development for the city, absence of any policies for valleys and having no policies for gradually growing squatting. Uybadin-Yücel Plan did not have any development policy for the city center. Merely a boulevard was defining the central area of Ankara in this plan and there is not sufficient policies for development of central area of the city. However, Uybadin-

Yücel plan proposed a wide range of plans for development of residential area in Ankara (Celep, 2009).

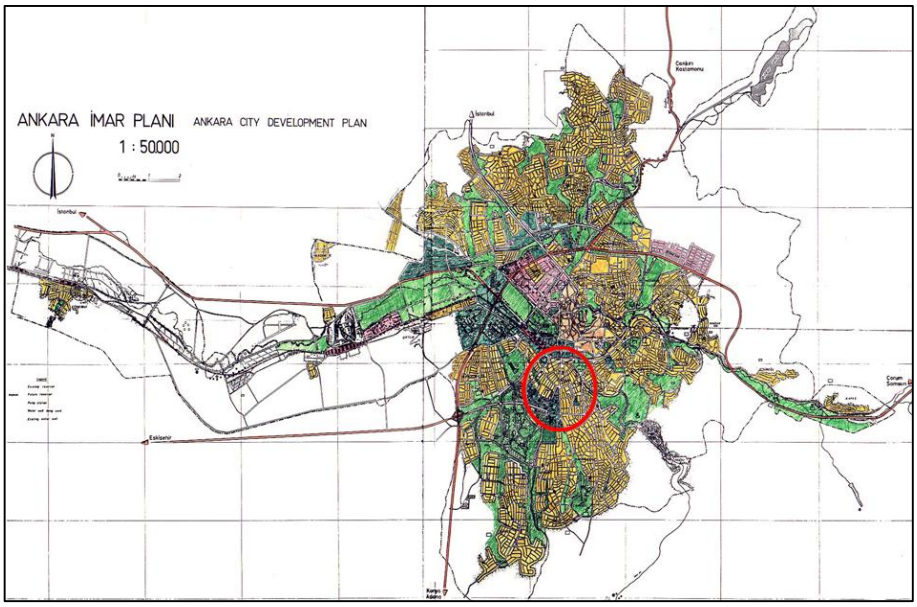


Figure 4-12. The CBD of Ankara in Uybadin-Yücel Plan, (Günay's Archive).

Later in 1970 a development plan was prepared by the Ankara Metropolitan Plan office in which central area of Ankara developed in Uybadin-Yücel Plan was preserved and a new plan was accepted for the peripheral area of Kızılay.

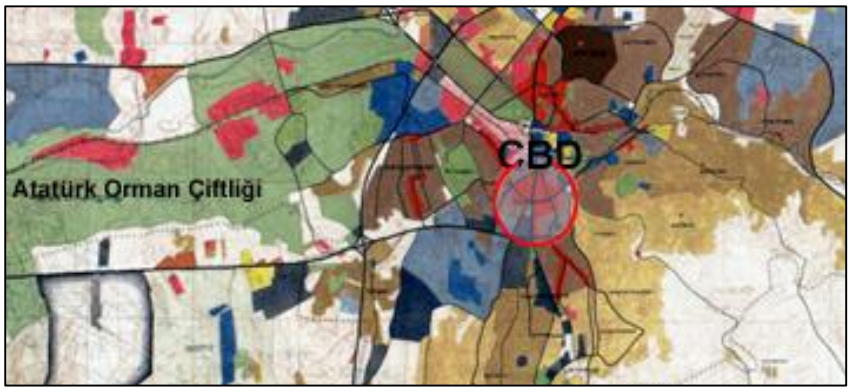


Figure 4-13. CBD of Ankara in 1970 plan (Günay's Archive and personal rendering).

4.3 Yüksel Street as part of Jansen's green spine

The main principles of two Jansen plans are the same in both 1928 and 1932 plans but there are some modifications in implementation plan. One of the significant features of Jansen's 1928 competition plan is appropriate definition of green space and its functional integration with the city. Green space is defined as an important aesthetic and recreation element. Additionally green ways serve as buffer zone which separate various districts.

Jansen 1932 implementation plan did not include all the proposed green structure and green ways proposed in competition plan of 1928. In the Jansen 1928 plan, the green spines and Yüksel Street -which can be considered as a part of one of these green spines- is not precisely defined. Jansen's 1932 plan defined the green spines of Ankara and Yüksel Street emerged as part of a continuous green spine from Tandoğan to Güven Park and continuing through Yüksel Street to the eastern part of Ankara. Jansen 1928 plan is a more porous plan with less density of settlements. In Jansen 1932 plan various districts of the city are separated by pedestrian green strips and these strips are linked to each other by vehicular roads (Burat, 2008).

One of Jansen's principles was the preference of dead-end streets particularly in use of green strips. The green space structure of the worker's housing quarter and Demirtepe and Maltepe residential area is constructed according to this principle. Such dead-end streets are used to provide quiet and safe residential streets which have direct access to green ways. The organization of green spaces and their connection with streets create a continuous green space structure in various parts of the city. Yüksel Street can be considered as a dead-end street since its accessibility to Libya Street at the end of the street is possible only by a long pedestrian overpass. Accordingly this street can be considered as an example of a green way which is constructed based on Jansen's principles and perspective about design of green ways (Burat, 2008).

Figure 4-14. Jansen 1928 plan , Jansen 1932 plan and the emergence of Yüksel street as continuation of Tandoğan-Güven Park green spine (Burat, 2008).

In Uybadin-Yücel 1957 development plan, Yüksel Street was conserved and developed without much modification from Jansen Plan. In general the green spaces and greenways of Jansen Plan, which were conserved in 1957 Uybadin-Yücel Plan remaining up to now can be stated as follows:

- Kurtuluş park, Güven park and Youth park
- The 19 May sports complex
- Cebeci stadium
- Eastern garden of squared shaped gardens (Zafer square) being used as a park today
- Small parks on the Tandoğan-Güvenpark green way.

Yüksel Street can be considered as continuation of a green spine which starts from Tandoğan, encompasses Kumrular Street and Güven Park and then continues until end of Yüksel Street. This continuous greenway is reflection of Jansen's perspective on design of green spaces. This arterial spine has varied widths in various parts and locates diverse range of urban spaces. Yüksel Street as part of this spine is considered as a significant greenway in Jansen Plan which later has turned into a pedestrian road at south-east part of Ziya Gökalp Street (Burat, 2008).

4.4 Development of Yüksel Street and its Pedestrianization

Batuman argues that building a new core for Ankara mainly was revealed in Lörcher Plan. In that plan the city center was moved from Ulus to New Town (Yeni Şehir) and Jansen Plan transformed this zone to a significant city center. Yüksel Street was part of a green spine that Jansen and Holmzmeister had proposed for the future Ankara with population of 300'000 people (Batuman, 2000). Yüksel Street originally was planned as a housing district with two or three floors in Jansen 1932 plan. However, rapid and uncontrolled population growth increased the demand for more housing units. Therefore, three or four floor apartments of Yüksel Street were replaced by majorly five and six and in some cases by more floors.

Accordingly, the early Yüksel Street had particular significance due to several reasons. Firstly, Yüksel Street can be considered as a straight "wind strip" that form eastern to western wing of Ankara. Secondly, as an early pedestrian strip in new city center of capital, Yüksel Street was considered as a place for social cohesiveness. Thirdly, this street was reflecting the ideas of Jansen about Garden City in Ankara city center. Because Jansen had prepared a pedestrian-oriented plan with diverse sidewalks, garden houses and walk paths for new capital city of Turkey (Akış, 2000).

Spontaneous and unplanned transformation of city center within existing area of Kızılay made it insufficient for responding to requirements of growing population. Inadequacy of Kızılay as city center of Ankara for diverse educational, commercial and official uses changed Yüksel street's housing units to various kinds of business and workplaces.

Latter, the idea of preserving Yüksel as a pedestrian-oriented district was ignored as the outcomes of new politics and new policies. Evyapan (1980), has inclusively studied the alterations that has happened to Yüksel district since about 1930s. She argues that changes in building stocks and building codes in Yüksel district was caused by fast-growing population which had brought changes in market and landowner demands as well. Completely different from Jansen Plan, Yüksel district had changed to a populated place requiring an extension. Due to "Kavana Plan" at about 1936, Sakarya region was used as a shopping street when Yeni Şehir became a commercial center of Ankara. This plan made

Sakarya district a pedestrian site with commercial functions in both sides. Since, Yüksel district also was located near Kızılay square, similarly it became subject to such diverse changes in both its form and function (Torlak, 1983 and Evyapan 1980).

According to Evyapan (1980) in early years of Jansen 1924, this area mainly was "a rare occasional building site". Evyapan (1980) divides the periods of Yüksel's transformation as 1927-1939, 1939-1959 and 1959-1977. She investigates spatial transformation of Yüksel Street by means of documents from Constructor Administration achieve. The plans and sections of Yüksel district in 1939 demonstrates the end of "the first rapid building activity period". Plans of 1959, on the other hand, represent "the era of additional buildings" which were quickly built by enlarging the existing the existing constructions.

The plans and documents in 1970s, shows the period of "rebuilding" in Ankara which was taking place through destroying and replacing the constructions with new ones (Evyapan, 1980). Jansen Plan is criticized by many researchers as well as Evyapan due to its failure in estimation of population growth in coming years. Uncontrolled and unpredicted increase in population negatively influenced the physical and social development of city center as well as Yüksel Street as part of it. Accordingly, the residential function of Yüksel Street was replaced by official and commercial functions.

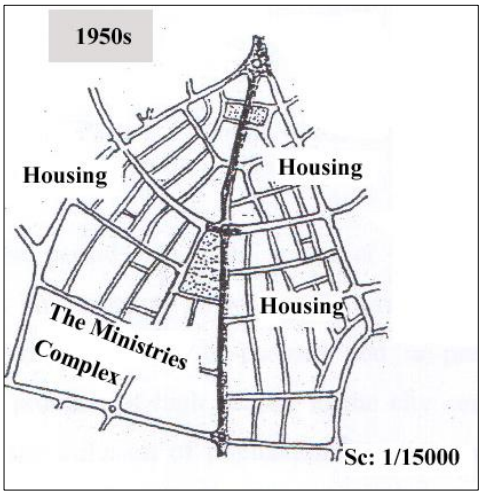


Figure 4-15. The situation of urban core and Yüksel Street within it in 1950s (Akış, 2000).

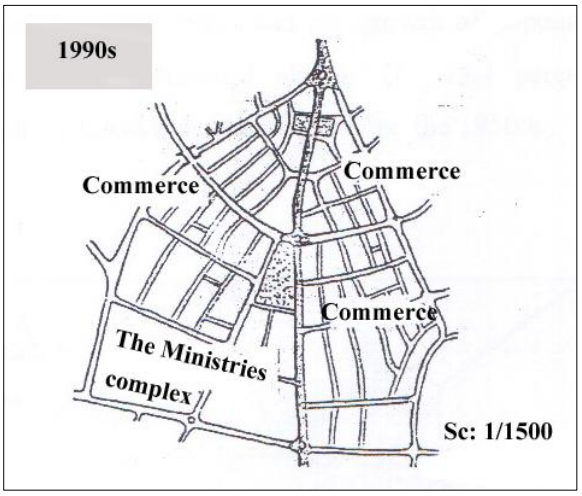


Figure 4-16. The situation of urban core and Yüksel Street within it in 1990s (Akış, 2000).

Decision of pedesrianization of Yüksel Street is certainly the most significant turning point of Yüksel street transformation. During the period 1959 -1970, construction of multi-storey high blocks instead of old single-storey buildings, became very prevalent in whole Ankara. The requirement of more buildings for growing population also influenced the planning legislations. For instance, the size of plots in most districts were reduced and the number of floors were increased. Therefore based on 1968 law, the floor limits of buildings in Yüksel street and its vicinity reached to six floors while this limit in the year 1925 was two and in the Jansen Plan this limit was maximum three-floor (Akış, 2000).

At the end of 1970s, the high-rise buildings had started to dominate Kızılay square and its periphery. Moreover, increasing number of personal cars coming to city center had negative impacts on pedestrian environment of Kızılay. To provide automobiles with easier movement, the width of sidewalks were decreased and bus stops had flowed into pedestrian zone and these changes in Kızılay directed pedestrians to streets around Hürriyet Square such as Izmir, Sakarya and Yüksel pedestrian zones.

Accordingly, in the 1970s new development plans and projects were prepared to improve the chaotic situation of CBD and Yüksel Street as a prominent segment of it. Ankara Great Municipality gave the pedestrianization project of Yüksel and Olgunlar Street to Yalçin-Oğuz's firm in 1980s.In order to prepare an appropriate pedestrian district in Yüksel, the

firm visited and studied successful pedestrianization projects in city centers of Germany and Austria. Although Yalçin-Oğuz plan for Yüksel Street did not have any correspondence to Jansen's Plan, they preserved the green spine of Jansen (Akış, 2000).

They aimed to add more green spaces to the city center. They believed that city center was changing to a large square and the streets surrounding it were becoming pedestrianized streets with particular service paths. Accordingly, Yüksel became one of the most popular and significant pedestrian-oriented streets in Ankara.

In fact pedestrianized streets of city center of Kızılay were classified to four spaces according to sort of activities done in each space. Accordingly, Sakarya Street was dedicated to gastronomic activities, Izmir Street for commercial activities and Yüksel Street for intellectual activities. Because the aim of pedestrianization was basically to provide citizens with pleasure and richness of urban life (Torlak, 1983).

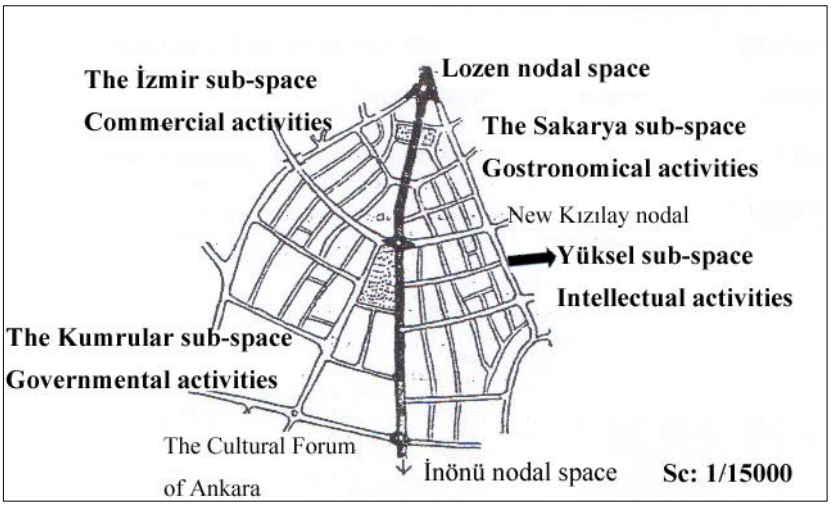


Figure 4-17. The potential approaches from sub-space to the linear main urban space (Akış, 2000).

Since Yüksel Street was considered as an "art street" dedicated to intellectual activities various kinds of cultural and artistic activities were forecasted to take place in this street. For instance: holding open exhibitions for the youth and their hand-made innovations, various art works such as drawings and sculptures and even for architectural projects.

Accordingly, Yüksel pedestrian district was predicted as an environment for citizens of Ankara similar to those of Euoropean cities during that period (Akış, 2000) .

Yüksel pedestrian zone contains Yüksel Street, Karanfil Street and Konur Street. A particular segment of Selanik Street also is considered as part of Yüksel pedestrian zone (Levent, 1999).

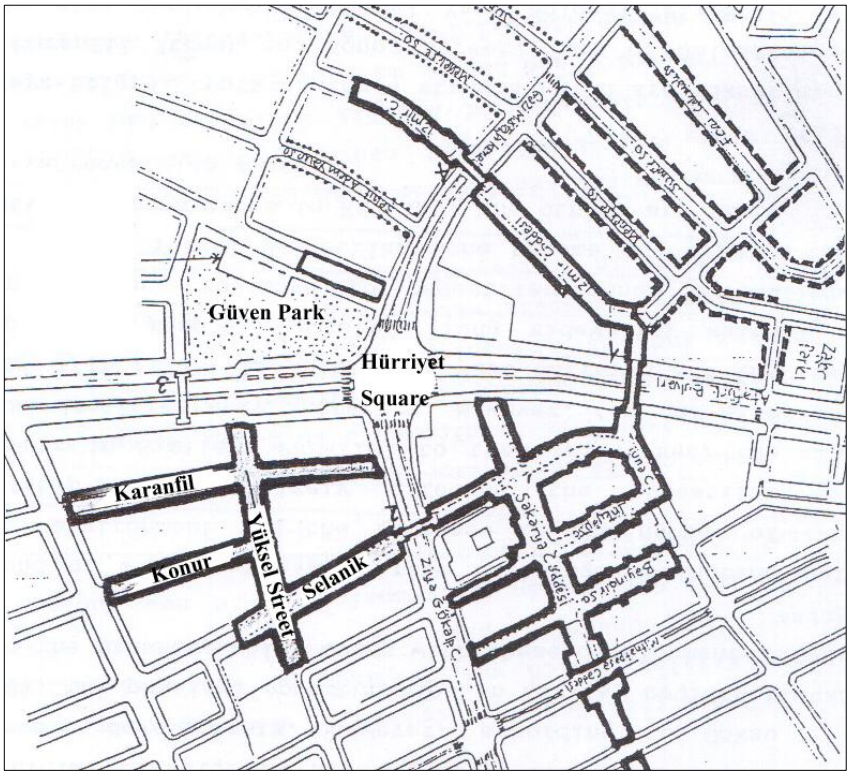


Figure 4-18. Pedestrianized zones in Kızılay and Yüksel Pedestrian Zone (Levent, 1999).

During the early 1990s, Yüksel street was functioning like a woonerf but today Yüksel street can be defined exactly as a pedestrian zone (only in the segment from Atatürk Boulevard to Mimar Kemal School) completely forbidden for automobiles (Levent, 1999).

CHAPTER 5

METHOD OF STUDY

The main method of this thesis is based on various kinds of investigations carried out on a case study and the thesis tries to measure the walkability level and potentials of this case study from perspective of urban design criteria. Yüksel Street as one of the most significant pedestrian-oriented streets of Ankara is chosen as the case study. This street is very important because it can be considered as a street with notable historical and social background.

After investigation of Kızılay and its peripheral area's evolution through planning history of Ankara, the study focuses on demonstrating the exact location of the case study within city center and its connections with other streets and its accessibilities. The extent of Yüksel Street's accessibility by public transportation and its relation with other streets is analyzed.

Then the current land-use of Yüksel Street is studied in order to introduce the existing functions and activities in this street and search for more potentials of this street considering the current land-use pattern. Then the thesis methodology chapter proceeds according to walkability attributes being developed in previous chapters. These attributes are classified as: Locational factors, urban design factors and personal factors. Each of these factors and their subcategories are investigated through urban design perspective and direct observations, photographing and using street maps. Additionally a questionnaire is conducted with the users of Yüksel Street in order to understand their viewpoints about potentials and problems of this street.

Spatial analysis of Yüksel Street is inclusively discussed from the view of an urban designer and the questionnaire survey helps the researcher to complement the spatial analysis of the thesis by observing the quality of space from the perspective of pedestrians. In this study method, overall 64 questionnaires were conducted with various groups of pedestrians in Yüksel Street with a temporal variation. 20 questionnaires were conducted between 11 am to 14 pm on Wednesday, 26 March 2014. 16 questionnaires were completed between 17:30 to 19:30 on Thursday, 27 March 2014 and 28 questionnaires were filled in a weekend evening, Saturday, 29 March 2014. The number of the participants in questionnaires according to their personal characteristics including their educational status, gender and age groups is classified in Table 5-1, Table 5-2 and Table 5-3.

Table 5-1. The classification of the respondents regarding their educational status

Time of conducting the questionnaires	Primary education	High school education	University education	Total
Wednesday 11:00-14:00	4	7	9	20
Thursday 17:30-19:30	1	8	7	16
Saturday 17:00-20:00	5	9	14	28

Table 5-2. The classification of the respondents regarding their age groups

Time of conducting the questionnaires	8-13	13-18	18-40	40-60	60-	Total
Wednesday 11:00-14:00	0	2	8	8	2	20
Thursday 17:30-19:30	1	3	12	0	0	16
Saturday 17:00-20:00	1	4	12	7	4	28

Table 5-3. The classification of the respondents regarding their gender.

Time of conducting the questionnaires	Women	Men
Wednesday11:00-14:00	6	14
Thursday 17:30-19:30	8	8
Saturday 17:00-20:00	14	14

Qualitative analysis of the thesis -in addition to direct observations and photographs of the researcher- includes interviews with various groups, walking through this street and feedbacks about the potentials, problems and necessities of the street. “Closed questions” which are answered by choosing among multiple choices presented in the questionnaire or among three options, “yes”, “no” and “medium” were asked. Closed questions are answered using a piece of information or selecting one of multiple choices. Open-ended questions, on the other hand, can be a statement or a question which requires a response (Wikipedia, 2014). Answers of closed questions provide statistical information about various qualities of Yüksel Street from view of the users.

The first question of the questionnaires is an inclusive question asking about the reasons of the pedestrians to use Yüksel Street or walk through it. Various possible choices are offered from which the pedestrians participating in questionnaires can select one or more arbitrarily. These choices are listed as

- Recreational walking
- Resting and refreshing
- Meeting friends and socialization
- Going to cafes and restaurants
- Shopping
- Transportation (passing through this street in order to go to another place)
- Health walking.

The respondents are free to choose more than one option. For instance, some stated that they came to Yüksel Street in order to meet their friends and spend time with them in one of the cafes or restaurants. Therefore, these groups chose both "meeting friends" and "using cafes" alternatives among walking purposes or those who some stated that they were using Yüksel Street for recreational walking with their friends, chose "recreational walking" and "meeting friends".

It worth to mention that lifestyle factors including individual issues, group issues and regional and environmental issues being discussed in literature review, are factors which are related to a wide range of people from various age groups, social and economic statues. About case study of this thesis also lifestyle factors encompasses lifestyle factors of whole Ankara's citizens. Therefore the small sample of people using Yüksel Street are not sufficient and logical for studying such an inclusive study area. Accordingly lifestyle factors as an important influential factor of walkability being mentioned in literature review are not analyzed in Yüksel Street and we analyze walkability of this street by use of locational, urban design and personal factors which are more objective issues.

5.1 Walkability level of Yüksel Street

This thesis uses a case study as the research method. Yüksel Street, one of the most significant pedestrian-oriented streets located at CBD of Ankara is chosen as the case study. This study attempts to measure the level of walkability and analyze the potentials of Yüksel Street as a place with high value and identity. In this thesis walkability of Yüksel Street is investigated by spatial analysis in terms of locational, urban design and personal factors. Additionally, as the second method of the thesis questionnaires and interviews with users of Yüksel Street is conducted providing more information about problems and potentials of this street.

Yüksel Street is studied by means of following resources:

- Various maps and photographs demonstrating the current land-use activities and existing situation of the street

- Direct observations to evaluate the walkability of the street and its potentials and problems concerning pedestrians
- Questionnaires and interviews with the pedestrians

We have developed an assessment criteria concerning walkability in the previous chapter. The case study is analyzed in terms of these walkability factors. These attributes are classified as: locational factors, urban design attributes and personal factors influencing walkability of Yüksel Street.

5.1.1 Impact of locational factors on the walkability level of Yüksel Street

Yüksel street which is one of the most significant and well-known streets of Ankara, is located in Central Business District of Kızılay. In determining the exact location of this street and defining boundaries for it, Atatürk Boulevard, Meşrutiyet Street, Ziya Gökalp Street and Libya Street can be considered as edges of Yüksel Street. However, for many of people this edge is restricted to Mithatpaşa Street, since very rare pedestrians pass over Mithatpaşa junction when walking through Yüksel Street.

Yüksel Street is intersected by CBD's most well-known pedestrian districts including Karanfil, Konur, and Selanik Street. Karanfil Street is an urban space which represents modern identity of Ankara. Remarkable facades of buildings and functional properties of this street attracts diverse groups of people due to location of a large number of commercial and service sectors along this street (Akış, 2000).

Atatürk Boulevard as one of the main green spines of Ankara is perpendicular to Yüksel Street in its western edge. Güven Park at western entrance and Çaldıran Park at the eastern end of street create a powerful locational potential for Yüksel Street from view of connection to green spaces. Güven Park as one of the most prominent parks of Ankara, which was originally built as an important archetype of republic ideology, is located exactly in front of Yüksel Street's entrance from Kızılay. This park was designed to provide Ankara's people with a comfortable, clean and modern urban space. Güven Park can be considered as one of the indicators of national identity in capital city. Today Güven Park also is considered as an important transition point and transportation hub in CBD.

Therefore location of such a powerful urban space in close vicinity of Yüksel Street gains this street more locational significance (Sarıkulak, 2013). The exact location of the street is shown in Figures 5-1 and 5-2.

Figure 5-1.The location of Yüksel Street in Kızılay.

Figure 5-2. The location of Yüksel Street.

5.1.1.1 Land-use pattern and neighborhood public spaces

As concluded from literature review and analyses of varied walkable areas, it is revealed that mixed land-use streets and neighborhoods are more attractive for people to walk through and spend their time. Pedestrians majorly prefer places which present them diverse alternative activities. The places where they can do shopping, meet other people and socialize and eat or drink outside. As a pedestrian-oriented street, Yüksel Street, located in city center encompasses a wide range of activities. Figures 5-3 and 5-4 indicate the land uses in the ground floor and the first floor, which are within human scale and more of concern for pedestrians.

Figure 5-3. Land-use pattern in ground floors along Yüksel Street.

Figure 5-4. Land-use pattern in first floors along Yüksel Street.

At the entrance of the street from Kızılay, two 10-floor buildings are located, both of which have mixed commercial, official and educational functions. The first floor of this building is used as a bank and the first floor of the building being located in front of it is dedicated to jewelry shops and a famous brand of cloth shop opening up directly to Yüksel Street. The other floors above the ground floor in both of these high buildings majorly have official uses such as notary, language institute and touristic agencies.

As shown in the figures of land-use pattern of Yüksel Street, there are about 12 cafes and restaurants in this street. This has made the street a very vital, functional and friendly place for people who want to spend time outside. Additionally, there are various shopping choices, i.e. different brands of apparel and retail stores, which have generated an active and attractive commercial node in this street, particularly at the first half of Yüksel Street from Kızılay entrance to the intersection of Mithatpaşa Street (Segment A). Since Yüksel Street is located in city center of Ankara in which there are high number of offices, workplaces, and educational centers, majority of the buildings have official or commercial uses. The first floors mainly are commercial or serve as cafes and restaurants. The floors above the ground floor generally are beautician saloons, lawyer offices, language institutes, touristic agencies, dental offices, etc.

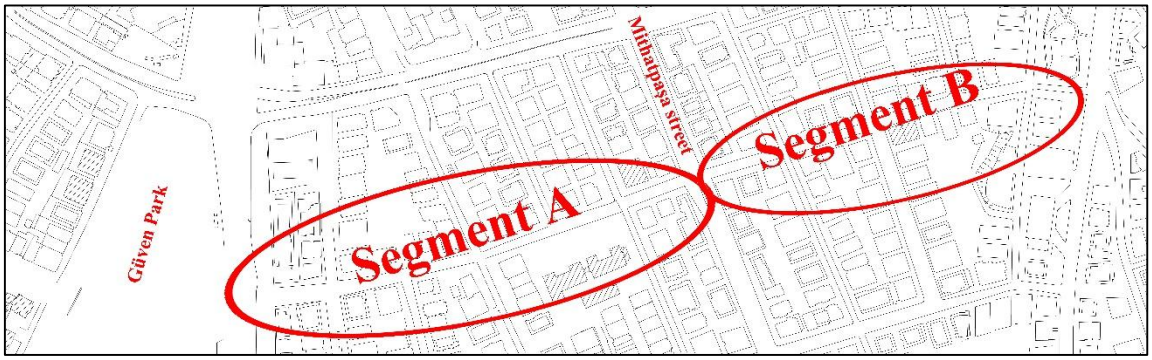


Figure 5-5. The first half of Yüksel Street from Kızılay entrance to the intersection of Mithatpaşa Street (Segment A) and the second half after Mithatpaşa (Segment B).

Presence of essential public spaces such as shops, schools, parks and transport hubs gain more importance in walkability of a neighborhood. Although Yüksel is a mixed land-use street with majorly commercial and official uses, there are very rare residential units in the upper floors of the buildings in Segment A. The number of residential blocks along the street after the intersection of Mithatpaşa Street (Segment B) is more than those of Segment A.

Presence of Mimar Kemal School, Altındağ Branch of Turkey Red Cross, various shopping alternatives from grocery shops to apparel stores, increase walkability and liveability of this street. Additionally, Yüksel Street interlinks Güvenpark with Çaldıran Park from the west to the east.

5.1.1.2 Pathway characteristics, continuity and connectivity

Physical connectivity is achieved by maintaining a continuous street or sidewalk pattern in which there is no obstacles interrupting pedestrians. Perceptual connectivity, on the other hand, is the application of urban elements in a way that generates a harmonious rhythm for the pedestrians. For instance, quality of street furniture such as height of light poles and coherent canopies and awnings has significant impact on increasing perceptual connectivity.

Continuity of sidewalk and pedestrian's ease of movement in Yüksel Street is different in various parts of the street. The half between Atatürk Boulevard and Mithatpaşa Street (Segment A) is a continuous and wide path, almost completely dedicated to pedestrian activities. The part of the street where Mithatpaşa Street intersects with Yüksel Street (Segment B) has the lowest quality of connectivity. Two sides of the street are connected via a pedestrian overpass. It is worth to note that pedestrian overpasses are considered as an indicator of car-oriented cities in which automobiles have priority to pedestrians' movement. Accordingly, in such cities pedestrians are forced to use overpasses, causing difficulties for children, the elderly and disabled. The continuity of Yüksel Street is interrupted with Mithatpaşa Street where high-speed vehicles are passing through. In Segment B, there are relatively continuous sidewalks at both sides. However, the width

and quality of these sidewalks and their state of continuity and connectivity cannot be considered satisfying in terms of walkability.

Highly connected street pattern increases accessibility. Yüksel Street intersects with significant and well-known pedestrian-friendly streets such as Karanfil, Konur and Selanik which connect Yüksel Street with Ziya Gökalp Street in the north and with Meşrutiyet Street in the south. In addition, direct access of Yüksel Street to Atatürk Boulevard at the west makes this street highly connected and legible.

Figure 5-6. The high connectivity of Yüksel Street in Kızılay.

5.1.1.3 Integrated transport network with walking

A highly connected street has a great positive effect on walking, provided that the street is also highly linked with other modes of transportation. Walking to anywhere is not practically possible in even the most walkable cities so providing high connectivity and linking walking paths to other modes of public transportation including subway and bus, is very significant in contribution to high walkability. Yüksel Street is located in Kızılay where diverse modes of public transportation make hubs and connect many districts of

Ankara to the city center. The criterion of accessibility of Yüksel Street is handled from two views:

a. Accessibility via public transportation

b. Accessibility (for children, the elderly and the disabled)

As we can see in Figure 5-7, this street has a high level of accessibility from various parts of the city by public transportation. The subway of Ankara has a station in exactly entrance of the street from Kızılay. Additionally, a large number of bus stations along the Atatürk Boulevard, Ziya Gökalp Street and Meşrutiyet Street provide easy access from various parts of the city to Kızılay.

Figure 5-7. The accessibilities of Yüksel Street by public transportation.

The entrance to the street from Kızılay is possible by electric stairs coming out from metro station or by several steps located at the entrance of the street. There is an upslope of about 30-40 degree from the entrance of the street to the intersection of Karanfil Street. This slope has been moderated by several steps for normal pedestrians and a ramp beside the steps serves for wheelchair users and parents with baby strollers. The exact location of these steps and ramps can be seen in Figure 5-8 and 5-9.

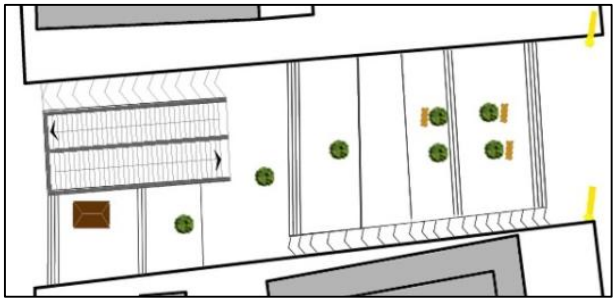


Figure 5-8. The exact location of steps and ramps in the entrance of Yüksel Street from Atatürk Boulevard.

Figure 5-9. The steps have removed the difficulty of walking on a sloppy land.

Except for some small level variations, the rest of the street almost has an even floor. At the end of Yüksel Street, there are several steps and afterwards the street gets connected to a pedestrian overpass.

Figure 5-10. Pedestrian overpass connecting Yüksel Street to Libya Street.

5.1.1.4 Built environment and architectural quality

The appropriate relation between solid objects and void spaces is an important design factor. The ratio of structures' height to the width of a street is a significant factor in investigation of human-scale along the street. If the ratio of street width to structures height is small, the space between the two rows of structures becomes narrow and dark due to the restriction of sunlight by excessively high buildings.

Figure 5-11. The figure demonstrating the number of floors in each building.

Assuming the height of each floor to be 3.2 m, the Figure 5-11 gives a relative information about the height of each building along the Yüksel Street. Additionally, Figures 5-12 and 5-13 demonstrate the distance between buildings in two sides of Yüksel Street in various parts. The relative building-to-building distance in Yüksel Street changes between 16 m and 25 m, except the distance between Mimar Kemal School and Alba Hotel which is approximately 47 m.

Figure 5-12. The figure-ground proportions of Yüksel Street.

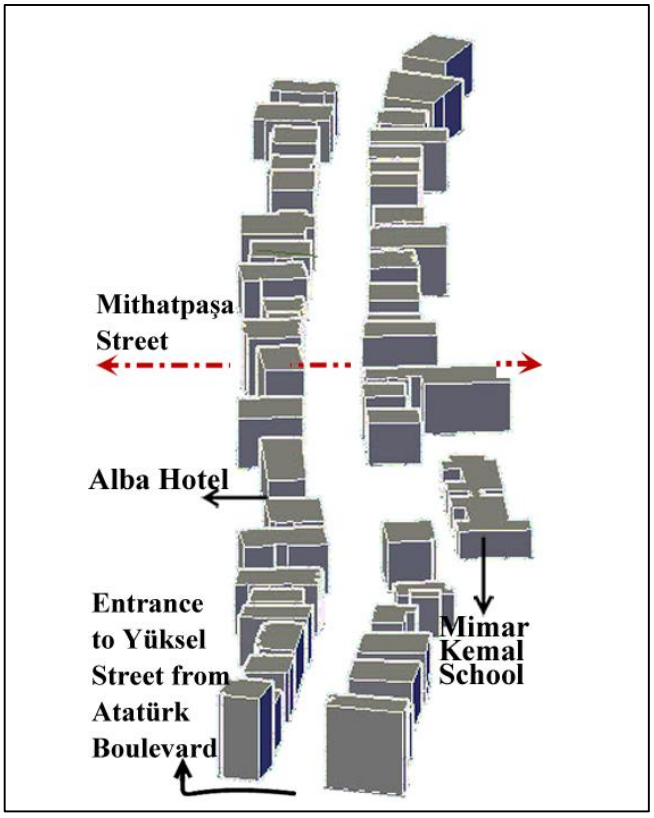


Figure 5-13. The three dimensions of Yüksel Street from the south to the north.

Functional width of sidewalk refers to appropriate width which is adequate for pedestrian movement and their activities. Segment A of the street is majorly dedicated to pedestrians and there is adequate space for various pedestrian activities including those walking in groups, standing with their friends or moving with baby strollers.

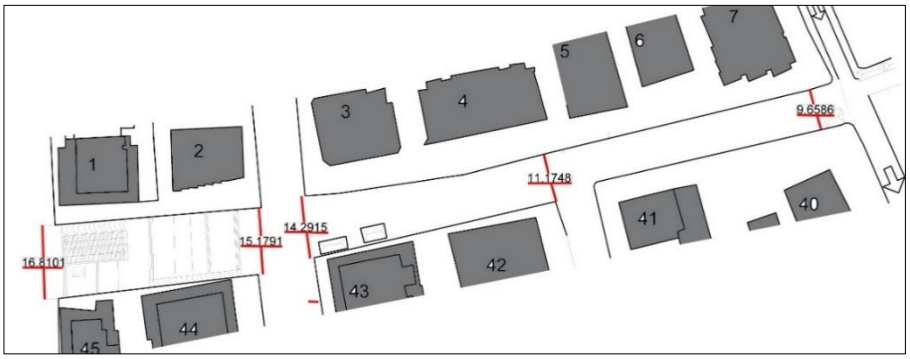


Figure 5-14. Inconsistency in the sidewalk width of Yüksel Street in Segment A.

Figure 5-15. The relations between building height and street width.

In Segment B of the street a sidewalk, narrower than 2 m., is devoted to pedestrians, which gets narrower gradually parallel to the reduction that happens in overall width of the street.

Figure 5-16. The ratio between building height and the street width in Segment B.

The second aspect of built environment analysis in Yüksel Street is studying quality of architecture and urban design. The successful urban design and architecture and appropriate combination of urban elements create more attractive mental maps in people's minds and appeal them to an urban space. Well-designed public buildings and appropriate design of urban elements can increase walkability of the sidewalk. Architectural style of buildings and style of urban design create sense of place and belongingness.

Mimar Kemal School in Yüksel Street is the building with historic value which is constructed at 1927 and it is still an active building being considered as important part of Yüksel Street's identity.

Most of the buildings are the examples of contemporary structures but they have rather poor visual interest and inconsistent ornamentations. There are several new buildings with modern and well-designed forms and architectural styles such as Alba Hotel, ABA Piknik restaurant and İş-Haber Sendikası. These buildings without considering them within their environmental context can be considered as architecturally desirable structures but their inconsistency with other buildings has damaged the general uniformity of the street. In addition, the colors, textures and articulations of the buildings are relatively inconsistent with each other. The situation is in contrast to the main characteristic of a walkable street, that is, the presence of harmony and consistent rhythm between the form, style and ornamentations of the structures.

A serious control about the exterior design of buildings is required in remarkable streets such as streets in city center and the streets with high historic or cultural value. When there is not such a policy and control, anyone can choose any arbitrary design according to personal favor. In such condition despite of the fact that any individual building -separately from the other structures and street design- can be seen aesthetically pleasant, the overall harmony and visual connection and consistency of structures along the street may be poor and this can create a chaotic space for the walkers and decrease walkability of the street. Yüksel Street has this problem to some extent. There are a range of diverse building types with completely different elevation designs which are not consistent at all.

For instance, a citizen living in city center of London is not allowed to change the outer layer of his building with personal favor. Because London municipality's effective urban design policies have a high level of control in urban contexts due to the importance of consistency and harmony of structures and visual order along a significant street. Today in England, the historic buildings whose elevations are covered by stock bricks have become part of identity of British cities. Such an identity which is reflected from buildings' design introduces the city's history and reminds the local people of their history and heritages.

Yüksel is a street in which many important social and political activities have occurred in various decades. Therefore, it has especial value in collective memory of Ankara's citizens. The architecture and urban design of this street should be in a way that define a particular identity and in long-term create sense of place and belongingness in pedestrians walking through it.

The other aesthetic absence of Yüksel Street is urban furniture and other features such as lighting poles and seating that have relatively poor design. To give a particular identity and create sense of place in people, various actions could be taken. For instance, lighting poles, seating and other street furniture could be a piece of art increasing attractiveness and aesthetic of the street.

5.1.2 Impact of urban design factors on the walkability level of Yüksel Street

There are some factors, influencing walkability of a street, which are majorly related to the design of a street and features being taken to consideration in urban and architectural design processes. This thesis categorizes these factors to various groups which are as follows:

5.1.2.1 Imageability

Imageability is any quality or feature in an urban space which creates a memorable, recognizable and distinct image in people's minds. Imageability mainly is physical quality that creates vivid and remarkable visual imprints in minds. Many physical elements can contribute to imageability such as the presence of a building with different and distinct

form or color and a historic building, comprehensible signs or symbols demonstrating special land-use of a building in the street-level. Shops with famous brands, public places such as schools, hospitals, well-known restaurants and cafes can make a place imageable.

For assessing imagebility of Yüksel Street we focused on the elements and features that make this street more distinct and memorable in people's minds. The imageability of Yüksel Street is due to various reasons and features including:

1. **Statues** are the main elements of imageability creating lasting imprints about Yüksel Street in people's minds and they also create a strong sense of place. Human Rights Statue (İnsan Hakları Heykeli) is the most well-known one which was placed at 1990 (wikipedia, 2014). The exact location of these statues and their pictures are demonstrated in Figure 5-17.

Figure 5-17. The location and photographs of the statues in Yüksel Street.

2. **Buildings** with different and distinct shapes and colors are the second elements contributing to the imageability of Yüksel Street. Figure 5-18 shows two of these buildings.

Figure 5-18. The distinct buildings contributing to the imageability of Yüksel Street.

3. The third aspect of imageability in Yüksel Street is presence of **diverse cafes and restaurants** with seating space majorly located outside.

Figure 5-19. Various cafes and restaurants on Yüksel Street.

4. **Mimar Kemal School**, constructed in 1927, is the only historical building of this street. This school is considered as a part of Yüksel Street's identity and it noticeably contributes to imageability of the street.

Figure 5-20. Mimar Kemal School

5.1.2.2 Legibility

Legibility is the ease of recognition and organization of a street or urban space in a coherent pattern. In a legible street people can recognize various parts of street easily. Existence of way-finding facilities such as signs, street maps, clear and observable building numbers and clearly written names of all streets and alleys can help people to better recognize their way through the street. A legible street makes people to feel

perceptually safe and increase walkability of the street. Yüksel Street can be considered as a rather legible street because:

1. There are many signs and building numbers making various parts of the street recognizable.

2. Regular and appropriate location of buildings along the Yüksel Street also influences legibility of street pattern. Buildings have a simple and regular layout along the street and all of which front Yüksel Street with a legible and coherent entrance.

3. Distinct and memorable buildings along the Yüksel Street enhance legibility of street as well as playing a significant in increasing imageability of it. These buildings can also be considered as local landmarks for this street.

Landmarks can be seen from major areas of a city or they can be local landmarks being visible merely within limited locality or area. For instance, diverse storefronts, signs, doorknobs or other particular urban details, which create mental images in people's minds, are considered as local landmarks. In Yüksel Street the landmarks can be considered as local landmarks. For instance, two ten-floor buildings located at entrance of the street from Atatürk Boulevard can be considered as landmarks of Yüksel Street. Alba Hotel with its distinct and recognizable design -being observable from various parts of street- can also be considered as a local landmark of this street.

5.1.2.3 Enclosure

Enclosure is the degree to which streets and other public spaces are visually defined by buildings, walls, trees, and other vertical elements. In a well-enclosed space the height of vertical elements and width of the space between these elements should be proportional. In order to measure the quality of enclosure in Yüksel Street, we analyze the following three issues:

Firstly, we count the number of long sight lines which is the ability to observe approximately 1000 ft. (300 m.) into the distance at various points when one is walking along the street. Yüksel Street is a direct and relatively continuous street in which the buildings are located along a straight line. Therefore, it is possible to observe a distance

of at least 30 m. when walking along the street. These long sight lines are demonstrated in the Figure 5-21.

Figure 5-21. Four points in Yüksel Street in which there are long sight lines.

Secondly, we investigate the presence of street walls. Street wall is caused by structures along a street that continuously front the sidewalk or path and generate a defined edge

being perceived such a wall. For instance, any wall with minimum height of 5 ft. (1.5 m.) or a façade provided that they are located at maximum 10 ft. from the sidewalk or path edge can be considered as a street wall. Furthermore, greenery, gate or fences with minimum height of 5 ft. which obstruct almost 60% of pedestrian's sight of the space beyond, provide street wall. Driveways, alleys lots and lawns are the elements which break the street walls. There is a regular layout of buildings in Yüksel Street and there is no unbuilt area along the street. Therefore, street wall is strong along this street due to presence of structures directly fronting the walkway. However, irregular placement of outdoor displays and on-street parking in some parts of the street damage the effect of street wall to some extent.

Figure 5-22. Excessive outdoor display and on-street parking.

Figure 5-23. The parts of the street in which the quality of street wall is stronger.

Thirdly, the number and layout of street trees have a great role in enhancing enclosure of the street. Yüksel Street has a rather high number of trees which contribute to the enclosure of this street.

Figure 5-24. Enclosure generated by trees layout in Yüksel Street.

5.1.2.4 Human scale

Human scale deals with features and elements which put human size at the hub of the designs. All physical elements and articulations of them should be proportionally suitable with human size. Street furniture and small urban elements, pedestrian lights and outdoor dining tables are some examples that affect human scale factor of walkability. The amount of windows on the street level is another factor of human scale, which contributes to walkability of a street. Almost all of buildings along the Yüksel Street have windows and doors opening to the street.

Figure 5-25. The amount of windows on the street level.

Small planters and gardens in front of buildings also contribute to human scale. The planters which are artistically designed and are considered as components of street design, not only contributes to the state of human scale but also increase aesthetic quality of the street. The number of human-scale planters which is part of street design in Yüksel Street is limited to just the planter shown in picture 5-26.

Figure 5-26. The only planter in Yüksel Street being part of street design.

The other small planters, generally belonging to shops and stores, are mainly used as elements separating private and public space.

Figure 5-27. Examples of small planters and gardens in front of buildings.

5.1.2.5 Transparency

Transparency refers to transition between private and public space. Transparency is the degree of pedestrian's perception about human activity lying beyond the edge of public space or street. Since Yüksel Street is a mixed land-use street, it has both commercial and

residential parts. Therefore, level of transparency in various part of street is fairly different. High level of transparency in Yüksel Street is achieved by the use of below mentioned elements:

- Outdoor displays,
- Large shop windows,
- Sidewalk cafes and restaurants,
- Windows at street level,
- Presence of street wall,
- Amount of active-use buildings.

Transparency and transitional spaces make pedestrians to have a feeling or perception about private space lying at the edge of street. 'Segment A' of Yüksel Street is considered as a significant commercial street with diverse activities. In this segment shops and stores have outdoor displays and large shop windows and high number of sidewalk cafes and restaurants create a high degree of transparency and walkability.

Figure 5-28. Outdoor displays in front of various shops.

Presence of diverse public spaces with active use such as Mimar Kemal School and buildings with diverse official use increase transparency of Yüksel Street. Lack of inactive buildings such as under-construction sites and vacant or abandoned buildings has also enhanced the transparency of the street. Additionally, there are signboards in the elevations of buildings and only a few buildings have no mark or sign demonstrating the use of them. Additionally, there is not any building with bare windowless walls

throughout Yüksel Street. There is an outdoor display space in front of commercial buildings and almost all other buildings have small yards in their front, which increases transparency and thereby, walkability.

Figure 5-29. The signboards in the elevation of buildings.

5.1.2.6 Complexity

Complexity of a street is related to visual richness of a space. The features influencing complexity are diversity of building types, basic building colors, variety of architectural styles, ornamentation of buildings, presence of public art or varied outdoor dining facilities, quality and number of street furniture, diverse features of buildings including form, color, material; number and shape of windows and doors; diversity of lighting systems; and amount of pedestrian traffic; presence of any park, plaza, courtyard or existence of any sculpture, various trees, plants and other natural elements.

We investigate the complexity of Yüksel Street by analyzing the above mentioned features and elements. There are poor diversity of building types, architectural styles and ornamentations, in comparison to those of well-known walkable streets in the world. Although there are some buildings with special ornamentation, incoherency, inconsistency and lack of harmony among buildings have caused chaos and uninteresting view rather than a pleasing complexity.

5.1.3 Impact of personal factors

5.1.3.1 Sense of safety

Actual safety which is the safety achieved via physical elements of urban space is one of the most crucial criteria of walkability. Since Yüksel Street, located in the city center, is one of the most populated streets of Ankara in some particular hours of the day, physical safety of pedestrians has high importance. The location and quality of street furniture, buildings layout, quality and width of sidewalk influence actual safety.

'Segment A' of Yüksel Street due to restriction of traffic-vehicles and actual priority of pedestrians has rather high level of safety. At 'Segment B', there is on-street parking along the both sides of street. Despite of the fact that on-street parking can be considered as a buffer between roadway and sidewalk increasing actual safety of pedestrians, presence of parked cars in both sides of street in all hours of the day creates an overcrowding view. On-street parking also limits pedestrians' movement and disturbs their easy flow from one side to the other side of the street. Actual safety at 'Segment B' is lower than 'Segment A 'of Yüksel Street.

On-street parking besides the narrow sidewalk with rather poor quality in some parts of the street restricts pedestrians in a narrow and monotonous area. Therefore some pedestrians, particularly those with baby stroller or wheelchairs, walk on roadway instead of sidewalk. This can lead to conflict between pedestrian and vehicles and decrease pedestrian safety.

Perceived safety majorly deals with protecting pedestrians from the negative perceptions or feelings of traffic or crime dangers. Controlling excessive noise, maintaining adequate and appropriate lighting, minimizing scary dark hiding places among buildings and other urban elements, can be important actions enhancing perceptual safety. 'Segment A' of Yüksel Street can be considered perceptually safer. The reasons are:

1. Vehicles are restricted in this part of the street and there is an actual priority of pedestrians in this part. People can wander, stand to chat with each other, sit on the

benches located along the street without fear of car- interruptions or disturbance of traffic noise.

2. Rather high quality of pedestrian-scale lighting system has lit up all the area properly and almost no hiding scary place is found in this segment.

3. Large number of commercial buildings, cafes and restaurants which are crowded with people until a certain hour of night also plays a significant role in increasing perceived safety.

'Segment B' cannot be considered perceptually safe enough. Again high speed vehicles passing from Mithatpaşa Street, directing pedestrians to overpass and cutting up their walking with such inconvenience, decrease perceptual safety. Moreover, after this intersection there is no pedestrian scale lighting system. We can only see approximately 15 m. high street lights.

5.1.3.2 Sense of Comfort

Maintaining comfort and well-being of pedestrians in an urban space is one of the important factors contributing to walkability of a street. Comfort of pedestrians majorly depends on satisfaction of a wide range of requirements. In this part of the study the factors majorly related to design are concerned. To put this end, continuous pavement, floor quality, ideal air condition, appropriate design and placement of overhanging and awnings and lighting quality along the Yüksel Street are studied.

- Continuous pavement

Yüksel Street due to being highly pedestrian-oriented in many parts has a relatively continuous pavement. 'Segment A' of the street is completely paved with materials appropriate for walking rather than for vehicles movement. There is almost no obstacle or break damaging continuity of pavement. At 'Segment B' the continuity and quality of pavement is not as satisfying as the 'Segment A' of the street. The sidewalks become narrower and they are interrupted by on-street parking in some parts. Moreover, street

furniture are not appropriately designed and placed in a harmonious way. Therefore, perceptual continuity in the Yüksel Street is rather poor.

- Floor quality

Floor quality is important for both walking people and the disabled with wheelchairs or parents with baby strollers. Hence, the floor should provide people with ease of movement. Material of floor also has particular significance. Yüksel Street is majorly paved by stones appropriate for walking conveniently which is demonstrated in the Figure 5-30.

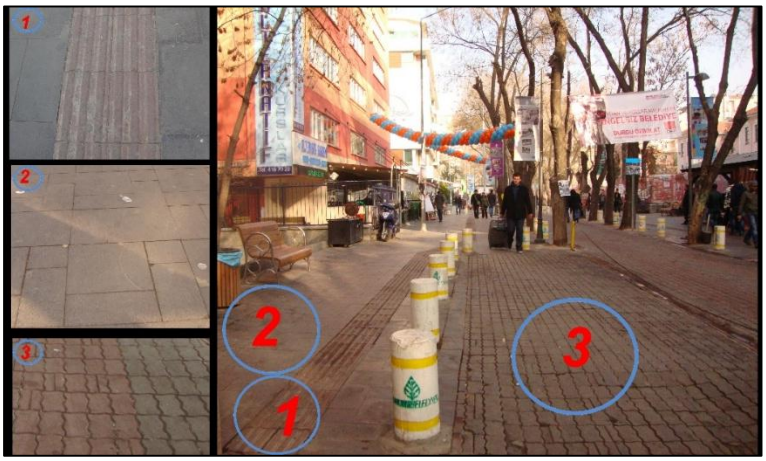


Figure 5-30. Varios sorts of materials used in Yüksel Street.

In ‘Segment A’, the part of Yüksel Street from the building with number 39 to the end of the Mimar Kemal School is open for entrance of cars but the area of pedestrians and the one-way road for passing single car are separated by contrasting color and material at the edge of platform. Additionally, the vehicle route has a different material which decreases the vehicles speed in this part and also provides an alternative route for pedestrians when no car passes through it. Figure 3-50 demonstrates this part of the street.

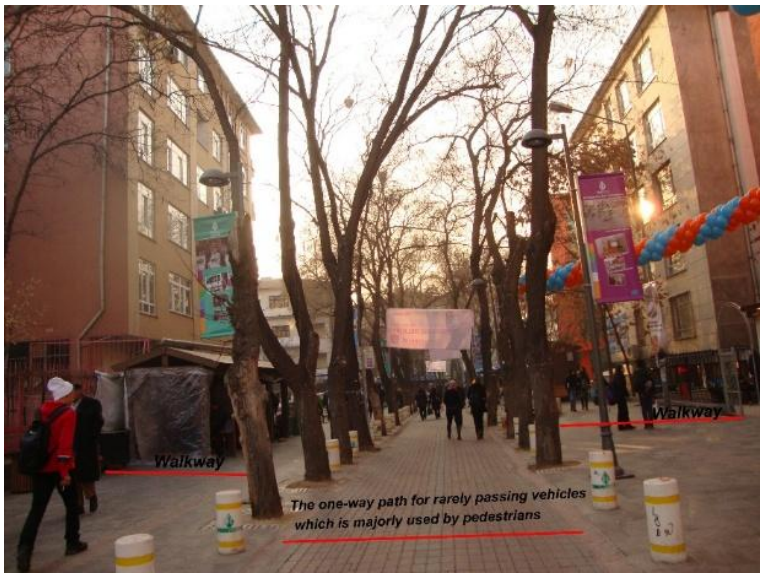


Figure 5-31. Three divisions of the street in front of the Mimar Kemal School.

Furthermore there is specific tactile guideway for the visually impaired pedestrians along Yüksel Street.

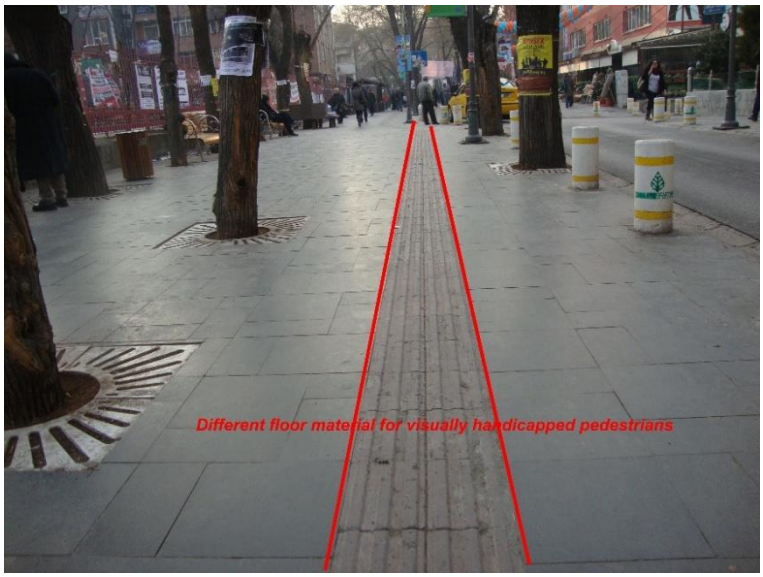


Figure 5-32. Tactile guideway along Yüksel Street.

- Ideal air condition

In walkability, ideal air condition means walking in a pleasant heat of cold weather and a relatively cool and convenient air of hot weather. Yüksel is a street located in Ankara so

the comfort related to air condition directly depends on Ankara's climate. Ankara has a mountainous climate in which at least three months of the year are cold and it is not comfortable for all groups of people to spend time outside. Most of the restaurants and cafes in Yüksel Street provide warm semi-closed spaces in their front for their customers during winters. Thereby, the restaurants and cafes preserve their vitality in all seasons of the year in this street.

In the case of hot summer days, street trees, which are placed in a relatively regular order, provide a shadowy and cool condition. There are a total number of 127 trees along the Yüksel Street. Moreover, the most important advantage of Yüksel Street and such walkable streets is that they present variety of urban activities in a space where pedestrians can breathe fresh air and enjoy sunlight. In contrast to shopping malls, fresh air and sunlight is one of the most noteworthy advantages of a walkable street such as Yüksel Street.

- Shade elements

Shade elements such as canopies, overhanging and awnings above the street level play a chief role in enhancing aesthetic quality, functionality of the street and comfort level of pedestrians in that street. An important function of overhangs and awnings is to provide pedestrians with shadow in hot summer days and shelter for snow and rain fall. Although Yüksel Street is a commercial street, the presence of awnings and canopies are very rare in this street and store fronts are occupied by excessive out-door display in most parts. Therefore, there is not any shelter protecting pedestrians from rain and snow except cafes and restaurants' semi-open spaces.

Figure 5-33. Semi-open spaces of cafes and restaurants.

Trees are considered as the other shade elements which not only enhance the level of comfort but also contribute to aesthetic quality of Yüksel Street. Shade trees are the only elements providing shadow in summer days of the Street. However, they cannot be considered adequate for protecting pedestrians from rain and snow.

Figure 5-34. Shade trees of Yüksel Street.

- Seating

Presence of resting places and convenient street seating is very influential in comfort level of street and encouragement of walkability. There are 39 seats in 'Segment A' and 2 in 'Segment B' which provide pedestrians with stations to take a rest or sit with their friends in pleasant air conditions. The presence of these seats increases walkability and vitality of this street. These seats majorly are located under the trees which provide pleasant shadowy places in summer days and since these trees are leafless during winter, they do

not block sunrays in winter days and pedestrians can utilize moderate sunlight during winter.

Table 5-4. The number of trees, lighting poles and seating along Yüksel Street.

	Segment A	Segment B	Total
Number of trees	109	16	125
Number of seating	39	2	41
Number of pedestrian-scale lighting poles	40	0	40
Number of traffic lighting poles	4	9	13

- Lighting

As we can see in the Table 3-2, there are totally 53 light poles from which 40 are pedestrian-scale lighting poles and 13 are street lights. The location of light poles on the map -as shows in Figures 3-26 to 3-31- demonstrates that there is a lighting pole in approximately every 4 m of distance. There are 40 pedestrian-scale lighting and 4 street lights in 'Segment A' while there is no pedestrian-scale lighting and 9 street lights in 'Segment B'.

Furthermore Yüksel is an active street during early night hours and the diverse lightings of buildings also contribute to the street illumination. Lighting plays a critical role in level of safety in a street. Perceived safety in Yüksel Street particularly is more of concern and this street seems to light up all hiding and scary places along the street during night hours. However the lighting level of 'Segment B' is not as satisfying as 'Segment A'. The reason is that, there is no pedestrian-scale lighting pole in this part and the lighting system is limited to high street lights.

5.1.3.3 Level of interest

Aesthetic quality and attractiveness of Yüksel Street is analyzed by means of Gestalt principles. Although discussing on aesthetic quality of urban space is a really debatable and complicated issue, Gestalt principles can be helpful to realize whether an urban space can be considered attractive or not. Wertheimer argues that individual parts do not indicate a perfect meaning while parts gain meaning in nature of whole. Human generally experiences perceptual wholes instead of remote parts. Therefore, we do not observe shapes individually and see shapes as dynamic 'figure-ground' relationships.

According to the figure-ground relationship in Yüksel Street, the proportion between white and black or figure and ground or solid structures and void spaces is relatively equal. Therefore a person walking through the buildings will not feel himself limited among solid structures. Appropriate proportion of solid to void in Yüksel Street makes it a spacious and pleasant space. In order to achieve togetherness of elements, similarity, proximity and continuity rules are necessary.

There is a relative symmetry along Yüksel Street since there is regular layout of buildings being placed on a given line in both sides. Symmetry does not mean that there are exactly the same objects in both sides but presence of structure in both sides of the street without any unbuilt area and the relative regularity of buildings' height have created a relative symmetry along Yüksel Street.

The principle of proximity, which refers to elements that are close together, is also very dominant in Yüksel Street due to regular and side-by-side layout of buildings beside each other. Continuity of the street is very high since it is not much interrupted or broken along the path. It is a straight street with high level of long sight line which strengthens the quality of continuity along the street. The presence of trees and light poles placed on a rather direct line also contributes to perception of continuity or perceptual continuity.

5.2 Analyses of questionnaires

Spatial analysis of Yüksel Street was inclusively discussed from the view of an urban designer in previous paragraphs. The questionnaire helps the researcher to complement the spatial analysis of the thesis by observing the quality of space from the perspective of pedestrians. In this study method, overall 64 questionnaires were conducted with various groups of pedestrians in Yüksel Street with a temporal variation. 20 questionnaires were conducted between 11 am to 14 pm on Wednesday, 26 March 2014. 16 questionnaires were completed between 17:30 to 19:30 on Thursday, 27 March 2014 and 28 questionnaires were filled in a weekend evening, Saturday, 29 March 2014. The number of the participants in questionnaires according to their personal characteristics including their educational status, gender and age groups is classified in the Table 5-5, Table 5-6 and Table 5-7.

Table 5-5. The classification of the respondents regarding their educational status.

Time of conducting the questionnaires	Primary education	High school education	University education	Total
Wednesday 11:00-14:00	4	7	9	20
Thursday 17:30-19:30	1	8	7	16
Saturday 17:00-20:00	5	9	14	28

Table 5-6. The classification of the respondents regarding their age groups.

Time of conducting the questionnaires	8-13	13-18	18-40	40-60	60-	Total
Wednesday 11:00-14:00	0	2	8	8	2	20
Thursday 17:30-19:30	1	3	12	0	0	16
Saturday 17:00-20:00	1	4	12	7	4	28

Table 5-7. The classification of the respondents regarding their gender.

Time of conducting the questionnaires	Women	Men
Wednesday11:00-14:00	6	14
Thursday 17:30-19:30	8	8
Saturday 17:00-20:00	14	14

Qualitative analysis of the thesis -in addition to direct observations and photographs of the researcher- includes interviews with various groups, walking through this street and feedbacks about the potentials, problems and necessities of the street. “Closed questions” which are answered by choosing among multiple choices presented in the questionnaire or among three options, “yes”, “no” and “medium” were asked. Closed questions are answered using a piece of information or selecting one of multiple choices. Open-ended questions, on the other hand, can be a statement or a question which requires a response (Wikipedia, 2014). Answers of closed questions provide statistical information about various qualities of Yüksel Street from view of the users.

The first question of the questionnaires is an inclusive question asking about the reasons of the pedestrians to use Yüksel Street or walk through it. Various possible choices are offered from which the pedestrians participating in questionnaires can select one or more arbitrarily. These choices are listed as below:

- Recreational walking
- Resting and refreshing
- Meeting friends and socialization
- Going to cafes and restaurants
- Shopping
- Transportation (passing through this street in order to go to another place)
- Health walking.

The respondents are free to choose more than one option. For instance, some stated that they came to Yüksel Street in order to meet their friends and spend time with them in one

of the cafes or restaurants. Therefore, these groups chose both “meeting friends” and “using cafes” alternatives among walking purposes or those who some stated that they were using Yüksel Street for recreational walking with their friends, chose “recreational walking” and ”meeting friends”. The Figure 5-35 demonstrate the percentages of walking purposes, being selected by respondents in Yüksel Street in three different days.

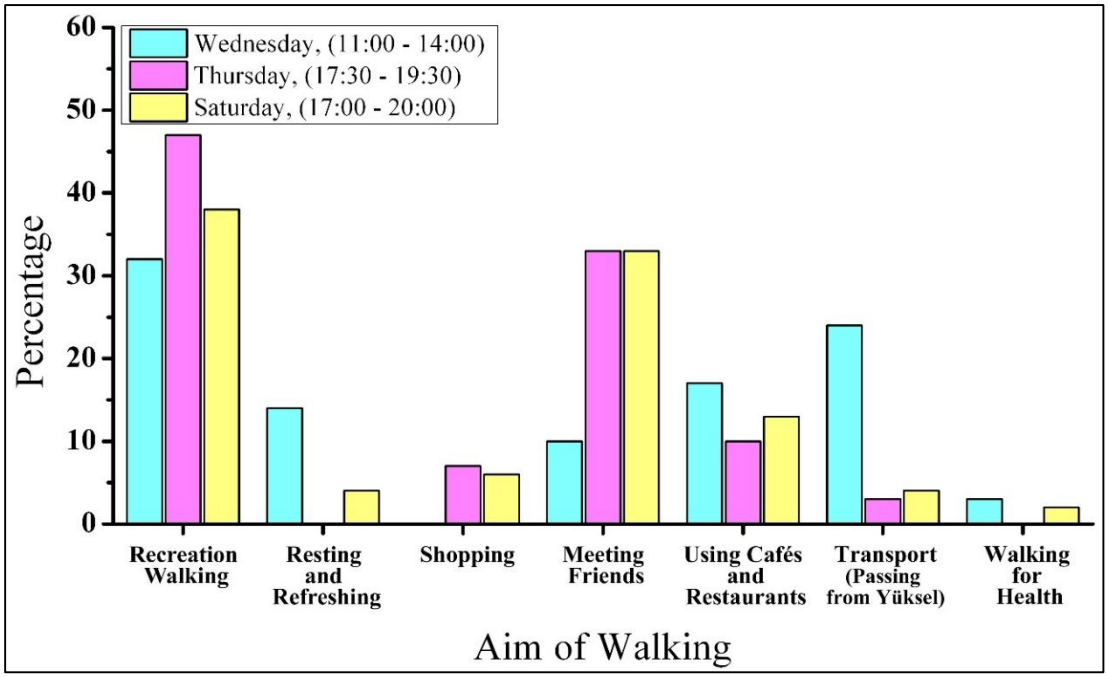


Figure 5-35. The percentages of the walking purposes in Yüksel Street.

Wednesday, 11 am to 14 pm graph demonstrates that in these morning hours of the day the number of people with resting and refreshing purpose is more than the evening hours or weekend. The reason reveals from interviews. Most of the people sitting on the benches or spending time in cafes and restaurants stated that they are working in Yüksel Street or its periphery. During their lunch break, they have about 1 to 1.5 hour of free time so they prefer to come to this street in order to refresh their minds in a peaceful and colorful space and utilize mild sun and fresh air. Moreover, having lunch with their workmates or friends and resting in such a calm and convenient space, revives them for the rest of their workday.

Comparison of three different bars of graph 5-35 reveals that majority of people prefer Yüksel Street for recreational walking. Particularly, evening hours of the weekdays and weekends are more attractive for people to walk through this street. Similarly, the number of people who choose this street in order to meet their friends is high. A pedestrian-friendly street such as Yüksel Street can play a great role in increasing social communications among the citizens. The number of people who choose Yüksel Street for shopping and health walking is limited. According to interviews, shopping alternatives of this street is very limited in comparison to those of shopping malls and high shopping streets of Ankara such as Tunali Hilmi Street. The pedestrians stated that if their purpose was merely shopping, Yüksel Street could not be a perfect choice. However, people walking through the street prefer to have a look at the shop windows or outdoor displays.

The number of people choosing Yüksel Street only as a transportation route to access another place is also small and those selecting Yüksel Street as a transportation route answered a sub-question asking their reason, which presented three different possible reasons including

- Because it is a shorter path,
- Because it is free from automobile noise and disturbance,
- Because it is a green and vital street.

It is revealed that those choosing Yüksel Street only as a transportation route have majorly given the reasons of being free from automobile noise and disturbance and being a green and vital street. 76% of respondents chose the second reason while the rest chose the third one for this question.

Moreover, the number of people who choose Yüksel Street for health walking are very rare. As health walking is majorly vigorous walking and it is done with a high speed in order to be influential in weight loss or being considered as physical exercise. Yüksel Street, particularly in evenings, is very crowded and does not allow fast walking. Therefore, specific walking paths of some parks, fitness centers or uncrowded neighborhood sidewalks are more preferable for health walking and city center's

pedestrian-friendly streets such as Yüksel Street are more preferred for recreational walking.

The second question is a short question that asks which part of the street is more frequently used. Two options, i.e. Segment A and Segment B, are given. It was realized that 100% of pedestrians participating in questionnaires preferred Segment A and Yüksel Street in their minds is defined mostly in this part. Segment B is often used by those who live or work there. Even those working and living in that part, prefer Segment A for recreational walking and meeting their friends. This is why the cafes and restaurants in Segment B have very rare users in comparison to those in Segment A.

There are three important questions included in questionnaires, which concerns the demand of people for walkable spaces and evaluates the adequacy of existing walkable spaces in the city center and other districts of the city. The first of them is "Yüksel, Sakarya and other pedestrian-oriented streets in the periphery of Kızılay square are insufficient for Ankara and such streets are required for each district. Do you agree with this statement?" (Question 1 about the need for walkable streets in neighbourhoods).

The second question is "Would you prefer the Kızılay square and its periphery to be more pedestrian-oriented and restricted for private cars?" (Question 2 about CBD walkability) and the third one is "Do you think if the second part of Yüksel Street after Mithatpaşa (Segment B) had been also pedestrian-friendly and continuous, walkability of this Street would increase?" (Question 3 about walkability of Yüksel Street after Mithatpaşa)

For each of these three questions three alternatives, i.e. "Yes", "no" and "maybe/intermediate" is offered. The respondents choosing "yes" strongly agree with this statement. Those who choose "no" disagree with it and the people who have no determined idea about the question or have a moderate opinion select "maybe/intermediate" option. The chart 5-36 demonstrates the total answers of 64 interviewees about each of these three questions collected in three different days.

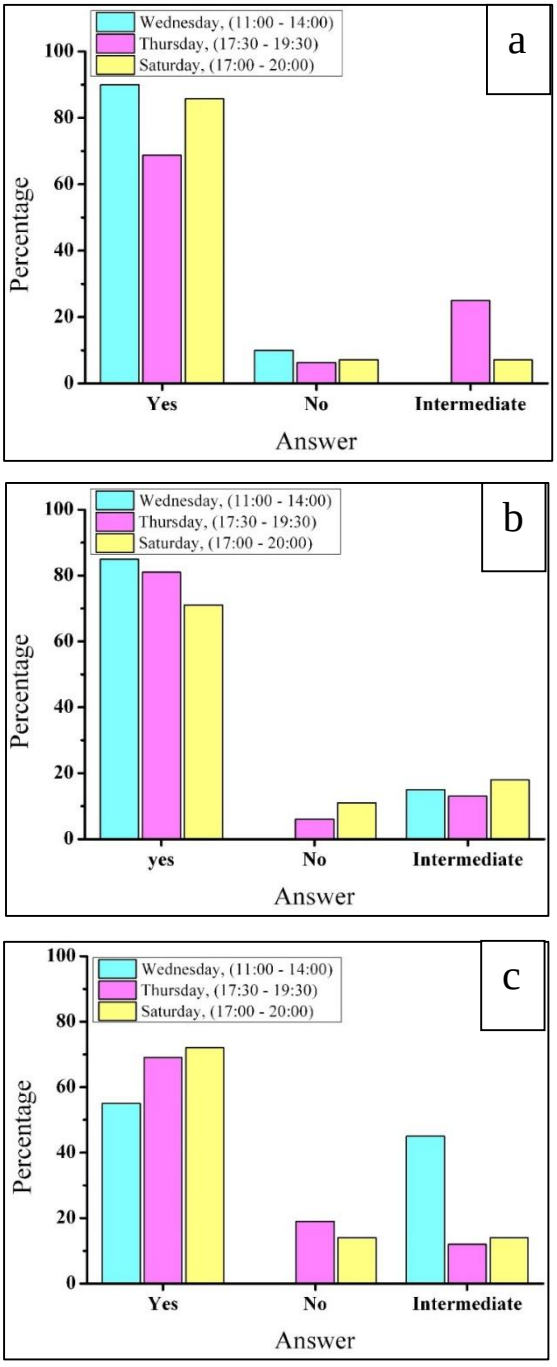


Figure 5-36. a) (Question 1 about the need for walkable streets in neighborhoods), b) Question 2 about CBD walkability, c) Question 3 about walkability of Yüksel Street after Mithatpaşa.

The charts in Figure 5-36 demonstrate the high demand for pedestrian-friendly and walkable spaces in city center and in various districts of the city. The interviews with

people revealed that most of the people complained about excessive invasion of automobiles into people's lifestyle and also into urban spaces. Although most of people extremely agree with pedestrianization of city center (Kızılay and its peripheral area), many of them think that it is impossible practically. This demonstrates that the extent of automobile dependency and its negative role in urban space is so severe in people's minds that despite of their strong desire for car-less city center they find it impossible to have such a wide pedestrian-oriented city center without private cars. Furthermore, according to Figure 5-36, about 84.37% of the respondents are willing to have walkable and pedestrian-friendly streets similar to Yüksel Street in their neighborhoods. This part of survey is generally investigating the perspective of Ankara's citizens about walkable urban spaces and the level of their demand and willingness for having more walkable streets.

The other two question is about spatial analysis of Yüksel Street. The questions are "Do you find Yüksel Street an open and spacious place?" and "Do you find the height of buildings proportional with the street width?" In previous sections the appropriate height-width proportions and their influence on walkability of a space was studied and the height of buildings and street width of Yüksel Street was demonstrated with land-use plans and three dimensional graphics. This question, searches for people's perspective about the quality of street to find out whether they feel themselves in an open and spacious place or narrow and suffocating space. Most of people chose the answer of 'yes' for both of these questions as demonstrated in graph 5-37.

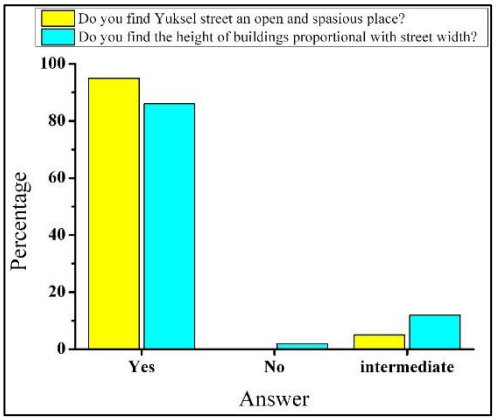


Figure 5-37. Spatial quality survey of Yüksel Street

5.3 Findings and results of the research

Walkability along the Yüksel Street is not the same at whole parts of the street. It is not easy and logical to decide definitely about walkability capacity. In order to better evaluate walkability potentials and problems collected from literature and analyzed about Yüksel Street, we divide the street to 6 segments and based on the locational, urban design and personal factors we tried to identify potentials and problems of each segment.

Based on walkability analysis of Yüksel Street via locational, urban design and personal factors we found out that the quality of each of these factors changes in various parts of this street. Accordingly after general analysis of this street we divided this street to 6 segments to better focus on potentials and problems of street in each segment and give more precise recommendations to improve and enhance walkability capacity throughout Yüksel Street.

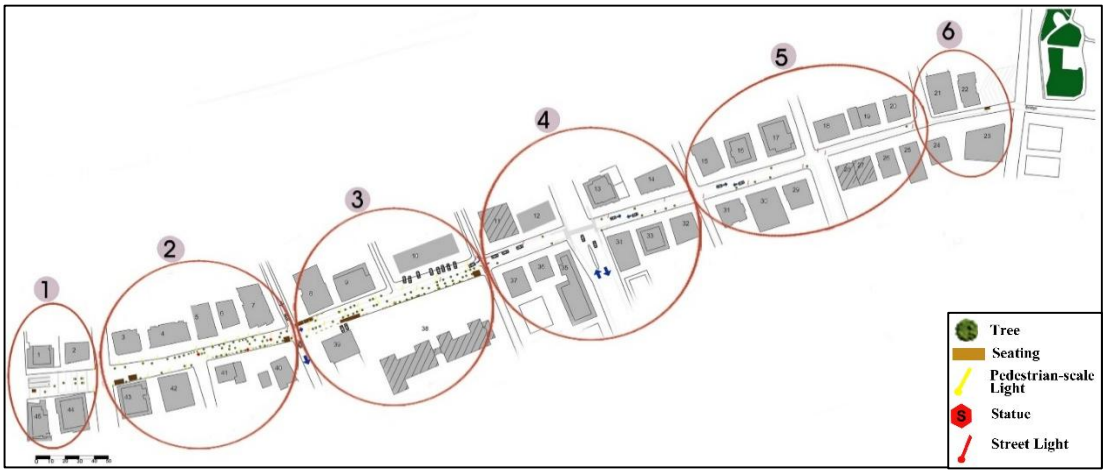


Figure 5-38. Plan of Yüksel Street showing 'Segments' of Yüksel Street.

The segment from Kızılay entrance (Atatürk Boulevard) to the intersection of Selanik Street (Segment 1 and 2) can be considered as the most important and pedestrian-friendly segments of Yüksel Street (Figure 5-38). This part is completely prohibited for motorized vehicles. Intersections of Yüksel with Karanfil and Konur Streets -both of which are the most famous pedestrianized streets of Ankara- have created a pleasant space for pedestrians in this section of the street. As demonstrated in the land-use figure, more than 10 ground-floor land-use is dedicated to cafes and restaurants and approximately all of

them have provided a semi-open seating space in their front for pedestrians. Therefore, there is a vital and social atmosphere in this part. Several barriers are placed at the end of this part of Yüksel Street prohibiting the entrance of automobiles.

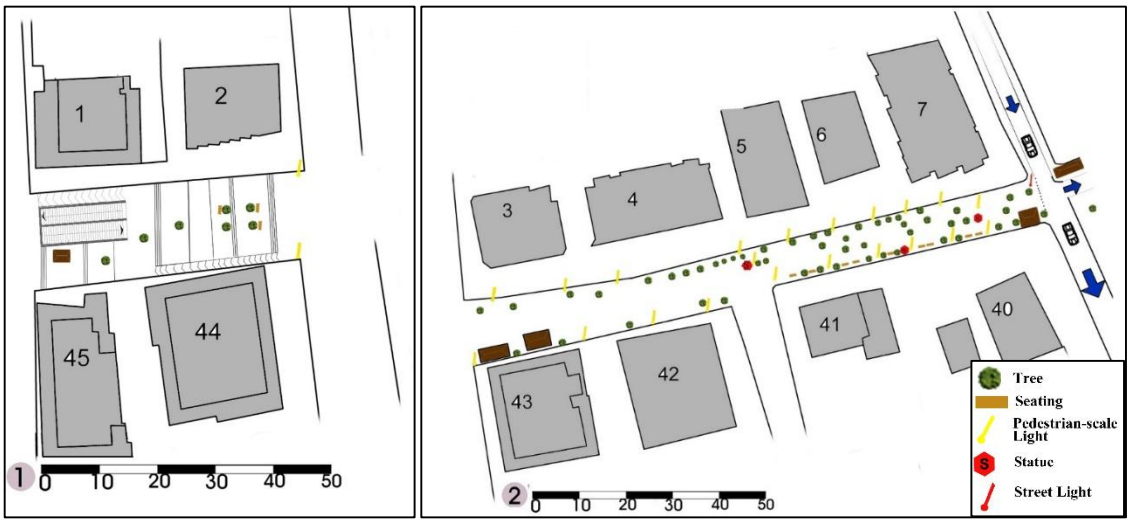


Figure 5-39. Plan of Yüksel Street showing 'Segment 1 and 2'.

The third part of Yüksel Street starts from the building with code 39 and continues until end of the Alba Hotel (building with number 10) and Mimar Kemal School (building with number 38). The street width is divided to three parts in this part of Yüksel Street. A wide area of about 4-5 meters has provided a wide space for pedestrian's diverse activities such as walking, standing or talking with their friends. About 30 seating located along the trees have strengthened the state of being pedestrian-friendly in this part. The second part as seen in Figure 5-39 is approximately a 2.5 meter one-way line for passing of a single low-speed car. Majorly there is a rare movement of vehicles in this narrow route and it has the same material as walkways along the street. Accordingly most of the time, this line also serves as a part of the pedestrian route.

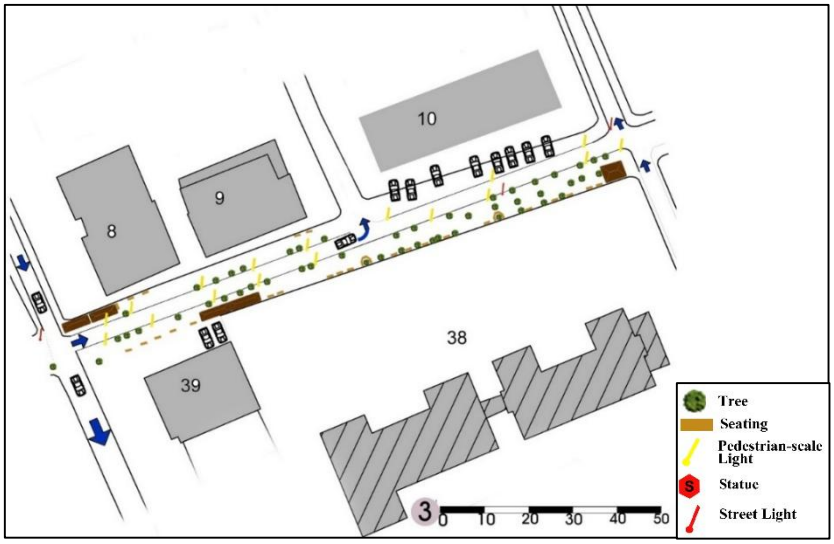


Figure 5-40. Plan of Yüksel Street showing 'Segment 3'.

Therefore the third section of the Yüksel Street until the end of Mimar Kemal School and Alba Hotel can also be considered as pedestrian-friendly as the segment 1 and 2.

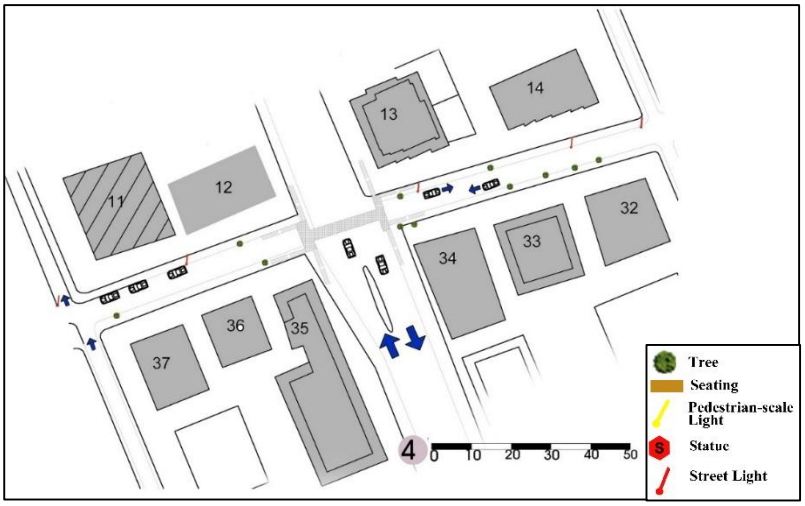


Figure 5-41. Plan of Yüksel Street showing 'Segment 4', Conjunction of 'Segment A and B'.

The next street part starts from entrance of Bayındır Street (end of Mimar Kemal School and Alba hotel) and encompasses Mithatpaşa Street junction (Figure 5-41). From this part of the street, the state of being pedestrian-friendly begins to fade and sidewalk width starts

to diminish to less than 2 meters at both sides and the roadway between is used for both movement of vehicles and also for on-street parking in both sides.

Mithatpaşa Street intersects Yüksel Street at almost middle of the street. Since Mithatpaşa serves for high speed vehicles, it is not safe and secure for pedestrians to pass through. Therefore a pedestrian overpass is located in this part connecting two parts of Yüksel Street to each other and in this part continuity of movement is interrupted. Since majority of pedestrians do not prefer overpasses and find it difficult or boring to climb stairs, this intersection can be considered as a disadvantage for continuity of pedestrian movement in Yüksel Street. The part after Mithatpaşa Street is similar to the part after Mimar Kemal School to Mithataşa. In this part also there are two approximately 2 meters sidewalks with a roadbed in between.

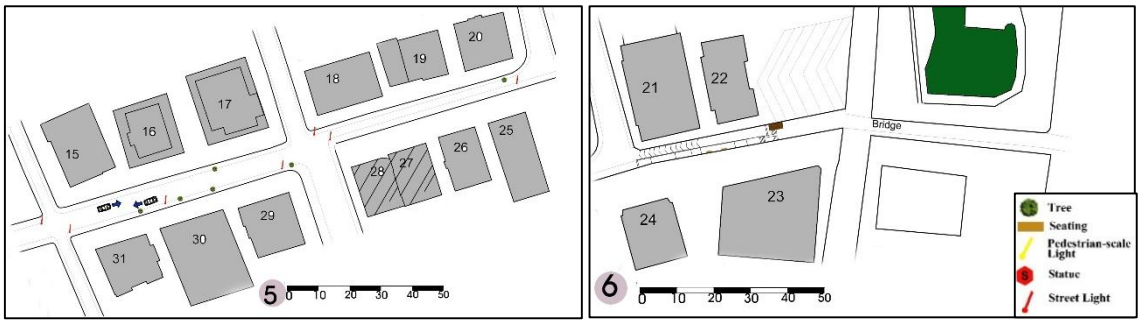


Figure 5-42. Plan of Yüksel Street showing 'Segment 5 and 6'.

In the fifth segment of the Yüksel Street from Iş –Haber Sendikası (Work and News Union) with code 28 (Figure 5-42) the total width of the street decreases to about 16.5 meters while the total width of the street at the entrance from Kızılay was about 23.5 meters. The last part of the Yüksel Street until Başak Girls dormitory can be considered more walkable. There are very rare entrance of vehicles to this part since the street is dead-end for cars and the pedestrians can continue their walk through a long over path bridge connecting Yüksel street to the other side of the Libya street.

Lastly, the potentials and problems of each segment, based on locational, urban design and personal factors of walkability are summarized in Table 5-8. This detailed findings can be later used in improving walkability of whole Yüksel Street.

Table 5-8. Problems and potentials of each segments of Yüksel Street.

Segment 1 and 2						
Segments	**Locational potentials**	**Locational problems**	**Urban design potentials**	**Urban design problems**	**Personal potentials**	**Personal problems**
Segment 1 and 2	- Having diverse sorts of land-uses such as commercial, official and many cafes and restaurants. - Being completely prohibited for automobiles entrance - Being highly connected to periphery streets	-The steps and substandard level variations hinder the pedestrian's movement particularly children, the elderly and the disabled.	- Having 52 trees within approximately 127 m of distance in segment 2 - The presence of three well-known statues of Yüksel Street in this segment creating high level of imageability		- Having pedestrian-scaled lighting poles and high illumination at night - Presence of seating - Well-paved floor and convenience of walking	- Randomly placed trees in some parts decrease convenience of walking - Some people do not feel safe enough from criminal activities at night hours

Table 5-8. (Continued).

Segment 3	Segment 4

Segments	Segment 3	Segment 4
Locational potentials	- Being highly connected to main streets via vertical paths intersecting it - high quality of built environment and architecture provided by Alba Hotel and Mimar Kemal School	
Locational problems		- Excessive on-street parking on both sides restricting pedestrians movement - Broken continuity of the street and confliction with
Urban design potentials	- Presence of about 49 trees within a distance of about 131 m providing a rather green and shadowy path - high spatial complexity - high elevel of imageability	
Urban design problems		- shortage of greenery
Personal potentials	- Presence of about 30 seating for pedestrians who want to take a rest - Presence of 18 pedestrian-scaled lighting poles increasing quality of night illumination	
Personal problems	The existence of a narrow path for car movement and standing taxies in front of Hotel limiting pedestrians to elevated sidewalk	- Poor lighting at nights due to presence of rare street lighting and lack of any pedestrian-scaled lighting system

Table 5-8. (Continued).

Segment 5 and 6

Segments	Locational potentials	Locational problems	Urban design potentials	Urban design problems	Personal potentials	Personal problems
Segment 5 and 6	- being rather mixed-used	- being open for automobiles movement in both directions - decreasing width of sidewalk		- presence of poorly designed steps and extremely substandard ramps for wheelchair users at the end of segment 6		- insufficient lighting at nights - rareness of open facilities until late night which decrease sense of safety

CHAPTER 6

CONCLUSION

This thesis tried to investigate the notion of walkability, the impacts and aims of walking in urban space. The issue was handled via studying the relation between human behavior and the features of built environment affecting walking whether as a means of transportation or a way of recreation. Four general groups of influential factors on walkability of an urban space and walking rate are developed which are: lifestyle factors, locational factors, urban design factors and personal or behavioral factors.

A very important result that is taken from this thesis is that all the criteria developed from literature by which we evaluated our case study's walkability are relative and their impact on walkability of an urban space changes from space to space. For instance, presence of a good enclosure is estimated to be influential in spatial organization and quality of human scale in our case study Yüksel Street but this does not mean that a place without enclosure cannot be walkable. For example many well-known squares such as Trafalgar Square are not visually enclosed spaces but they are considered as highly walkable spaces. However, according to analysis of this thesis in a mixed-use street such as Yüksel Street an appropriately enclosed space which is visually defined by buildings, trees and other urban elements creates a positive effect on walkability of this street.

This thesis included extensive theoretical studies together with inclusive practical analysis of the case study, Yüksel Street. The results taken from analyses covers majorly locational and personal factors. Moreover, appropriate answers are found for the thesis questions and research aims being mentioned in the introduction.

Walking as the basic transportation mode and as a well-known way of recreation and socialization was investigated from various perspectives in this thesis and the aims of people for walking through the case study of this thesis Yüksel Street was surveyed by questionnaires. This survey revealed that such a pedestrian-oriented street in Ankara's CBD is majorly used with purpose of recreation and as a tool of building social ties with other people.

Another important finding of this thesis was detecting problems of Yüksel Street according to walkability factors being categorized in this thesis and suggesting possible solutions to increase vitality and walkability of this street in all segments of it. Because investigations of this study divided Yüksel Street to 6 segments and analysis and questionnaires revealed that just two or three segments are considered as walkable and attractive places for the pedestrians and the rest of street after Mimar Kemal School is not preferred. One of the main problems being handled in this study is shortage of walkable and completely pedestrian-oriented spaces in city center of Ankara and limitation of pedestrians to several restricted pedestrian zones. Accordingly these limited areas should get expanded and improved to satisfy more pedestrians. Therefore a socially, politically and culturally valuable street such Yüksel should not be limited only to the part before Mimar Kemal school and other segments also should get renewed and revitalized to create a continuous and long route for recreational walking in city center.

An inclusive framework for assessing walkability of an urban space was also developed in this thesis and walkability of Yüksel Street was investigated by them. Therefore problems of Yüksel Street is detected according to these factors as follows:

- **Problem detection of Yüksel Street from view of Locational factors**

The land use pattern of Yüksel Street was investigated elaborately in this thesis. Yüksel Street can be considered as a mixed-use street with a wide range of commercial, official, recreational and even educational activities. However, the most significant land-use problem of this street is the shortage of residential units. From scrutinizing planning history of Ankara and CBD it was concluded that although Yüksel Street was originally designed as a housing district, rapid population growth and insufficiency of CBD for

supporting educational, commercial and official requirements changed majority of residential units to various sorts of workplaces.

Continuity of pavement and pathway is a necessary factor of walkability. Street crossings, junctions and overpasses are considered as significant interruptions breaking continuation of walking. This thesis found Mithatpaşa junction with an overpass above it, as the weakest point of Yüksel Street from view of continuity, comfort and walkability. Perceptual continuity of Yüksel Street after Mithatpaşa Street is also very poor due to unappropriated location of street furniture, lighting poles and trees. Additionally, the diminishing width of sidewalk in this segment of the street decreases perceptual continuity.

Excessive pedestrian volume in the evening hours influence the convenience of pedestrian movement in the segment A. This causes the street width to seem inadequate for such volume of pedestrians in particular hours of day. In the segment B, there is a narrow sidewalk dedicated to pedestrians' movement. However, due to very rare presence of pedestrians in this segment, such a width seem to be adequate. A noteworthy finding of this research is that presence of wider, well-designed and well-lit sidewalk in the segment B may promote vitality and walkability of this part and attract more pedestrians to this segment as well as the first one.

- **Problem detection of Yüksel Street from view of design factors**

After Mimar Kemal School due to presence of automobiles transit, a high level of enclosure is required while the only enclosure element in this segment is on-street parking. Although on-street parking contribute to level of enclosure, it weakens aesthetic and comfort of pedestrians. Therefore better enclosure elements are required.

As mentioned in the previous chapter, the presence of small planters along a street can contribute to human scale and increase attractiveness and walkability provided that they are well-designed and appropriately integrated with floorscape. One of serious shortages of Yüksel Street is lack of any planter or landscape element being appropriately integrated with street design.

- **Problem detection of Yüksel Street from view of Personal factors**

Safety is considered as a significant factor contributing to walkability of an urban space. Since Yüksel Street is restricted for automobiles entrance in the first and second segment of the street, it has a satisfying level of actual safety from fear of confliction with cars in these parts. However from Mimar Kemal School slightly automobiles role gets stronger by use of a narrow way for pass of low-speed cars and extra parked automobiles in front of Alba Hotel and on both sides of the segment 3. The result of questionnaire revealed that generally level of safety perceived by the respondents is relevant with the time in which they use Yüksel Street. Many people interviewed in the morning and afternoon found Yüksel Street a safe place, those interviewed in evening hours and weekend evening had less feeling of safety from criminal activities particularly during night hours. The safety perception of pedestrians also differs according to their age, gender and social status. For instance, the women and those with children, did not find Yüksel Street safe at nights. Moreover, many people stated that they cannot feel safe in the section after Mithatpaşa during night hours. Because there is very rare residential units along Yüksel Street and most of the building floors are dedicated to workplaces. During night hours these workplaces are closed and most of the floors of buildings are not well-illuminated during nights. This cause feeling of unsafety in pedestrians along this segment and weakens walkability of it. Accordingly one of the most remarkable findings of this research is that regaining residential use of Yüksel Street in some parts of the street can improve land-use pattern, safety and walkability of this street, particularly at night hours.

The quality of lighting at nights is another factor enhancing walkability and vitality of an urban space during night hours. Yüksel Street has 40 pedestrian-scaled lighting poles in the segment from Kızılay to Mimar Kemal School. After this part there is no pedestrian-scaled lighting poles and illumination of the street is dependent on a total number of 13 street lights along the street. This lighting system is not sufficient for such a significant street and this is one of the main reasons for poor walkability of these segments. Likewise, according to the survey results most of people found the segment A of Yüksel street well-lit but they stated that in segment B the lighting system is not adequate for walkers.

Inadequate and inappropriate lighting system of segment B is another disincentive for walkers in this segment.

In order to maintain safety, vitality and walkability of Yüksel Street after Mimar Kemal School during night hours, the system of pedestrian-oriented lighting system should continue until the end of Yüksel Street. Because traffic-lighting poles- which number is also inadequate- do not illuminate the sidewalk enough.

Sense of comfort is rather weak due to some shortages in this street. Lack of any facility or any element protecting pedestrians from climatic conditions is an important factor decreasing convenience of pedestrians on Yüksel Street. The users of the street also complained from this shortage of Yüksel Street. Although there are about 41seating along Yüksel Street, according to the respondents, there are not sufficient resting places particularly in the crowded evening hours. Since many people choose this street for spending time with other people, socialize and sometimes for resting their minds, more seating is required to satisfy people's needs.

Sense of interest is majorly related to aesthetics quality which play a great part in attracting pedestrians to walk through a street. Attractive landscape, greenery, the design of buildings and the harmony among them, the design and location of street furniture and lighting poles and the floor material are some of examples influencing sense of interest in people and affecting walkability of a street. Some of the factors decreasing visual interest of Yüksel Street are: lack of any designed greenery boxes and landscape element, irregular and somewhat spontaneous location of trees in some parts of the street.

After Mimar Kemal School visual interest of Yüksel Street weakens due to shortage of greenery, shortage of any well-designed and attractive lighting system, poor quality of sidewalk such as broken slabs, substandard level variations, obstacles caused by inappropriate location of trees or street furniture and presence of dirty and bedraggled litterbins in some parts.

Another significant problem decreasing visual attractiveness of Yüksel Street is lack of any control and limitation for sticking various papers such as advertisement posters,

political, social and public announcements on the walls, fences and even trunks of the trees. Accordingly, glue and torn papers generate a dirty and unpleasing view in various parts of the street specifically in the segment 1 and 2.

Finally it should be mentioned that majority of criteria being mentioned in this thesis have relative and changing effects on walkability and their effect depends on the place walkability of which is analyzed. Because walkability in fact is a quality which cannot be measured precisely. Accordingly this thesis tried to evaluate majorly the physical factors of built environment that can be influential in attracting people to walk through an urban space. The criteria developed in this thesis can be utilized in evaluating an urban space from view of walkability. Additionally, the questionnaire of this thesis uses a small sample of pedestrians using the case study, Yüksel Street. Therefore the results taken from questionnaire are generally related to this case study and the results driven from them cannot be expanded to all urban spaces but such a questionnaire can be helpful in analyzing walkability and functionality of any other street or urban space. This thesis evaluates the possible negative or positive effects of physical configuration of an urban space on walkability of a street. Although the effects of all the criteria assembled in this thesis are qualitative and do not have a determined measurement, we have tried to analyze presence or lack of these features in our case study and we have assumed that these features can be influential in attracting pedestrians to a street to walk through.

This thesis collects a wide range of walkability criteria influencing physical/spatial configuration of urban space. Each of these factors are very inclusive and challenging issues and the impacts of them on walkability is a deep and complex issue. Accordingly each of lifestyle factors, locational factors, urban design and personal factors\individual reactions, can be separately studied in detail in further studies. For instance, lifestyle factors in Ankara affecting walking rate and walkability of public spaces can be the issue of further researches.

This thesis tried to identify the possible factors which may play a role in level of walkability of an urban space. ‘How much influential are each of these factors in each urban space’ is a relative issue which can be studied more deeply. This thesis introduces

simple ways by which the walkability of a pedestrian zone or a street can be evaluated. Each of these factors and their extent of influence on walkability of various kinds of urban spaces can be topic of further studies.

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APPENDIX A

QUESTIONNARIE

The questionnaire of the case study of Yüksel Street is inserted below:

Middle East Technical University

City and Regional Planning Department

Gender: woman ( ) man ( )

Education status: Primary () high school ( ) university ( ) M.sc, PHD ( )

Which one is true about you? I live in Yüksel ( ) I work in Yüksel ( ) none ( )

1. What do you use the street for? The reason?

Recreational walking □

Meeting friend □

Using cafés and restaurants □

Shopping □

Transport □

- Why didn't you prefer main streets such as Meşrutiyet ya Ziya Gökalp Street to walk through instead of Yüksel Street? Choose one of the choices below.

It is a shorter path □ It is free of automobiles noise and disturbance □

It is a green and vital street □ Other reasons such as walking for health □

2. Which parts of the street do you use more frequently?

First part from Kızılay to Mithatpaşa street □ Second Part after Mithatpaşa Street □

3. What is your idea about the below mentioned questions? Choose among the three options offered.

a) Yüksel, Sakarya and other pedestrian-oriented streets in the periphery of Kızılay square are insufficient for whole Ankara and such streets are required for each district. Do you agree with this statement?

Yes □ No □ Maybe □

b) Would you prefer the Kızılay square and its periphery to be more pedestrian-oriented and restricted for private cars?

Yes □ No □ Maybe □

c) Do you think if the second part of Yüksel Street after Mithatpaşa were also pedestrian-friendly and continuous, walkability of this Street would increase?

Yes □ No □ Maybe □

4. a) Do you find Yüksel Street an open and spacious place?

Yes □ No □ in-between □

b) Do you find the height of buildings proportional with Street width or you feel yourself in a narrow and boring space in this street?

Yes □ No □ in-between □

5. a) Is Yüksel Street an attractive place for children to spend time in?

Yes □ No □ in-between □

b) Is Yüksel Street an attractive place for the elderly to spend time in?

Yes □ No □ in-between □

c) Is Yüksel Street a comfortable, safe and secure place for people with disabilities to spend time in?

Yes □ No □ in-between □

6. Which of these options would you prefer for recreational walking?

A shopping center □ A pedestrian-oriented street such as Yüksel street □

What is your reason for choosing this option?

……

……

……

Choose among the three options offered for each statement or question.

	Yes	No	Intermediate
It is easy and comfortable to walk along the Street			
It is well-lit at night			
It is a safe Street even at nights			
I find Yüksel Street an attractive and entertaining place			
Is Yüksel Street after Mithatpaşa a walkable place?			
Facilities open until late night (restaurants, cafes,etc) make the street safe and vital at night			
There are sufficient sheltering from sun, light, rain, snow and wind provided by building canopies for pedestrians			
There are enough resting places along all parts of the Yüksel Street			

Choose one of below choices about Yüksel Street.

	Agree	Disagree	Partially agree
Serene			
Colorful and variable			
Green			
Comfortable			
Legible/clear			
Boring/monotonous			
Enjoyable			