THE IMPACT OF URBAN FORM ON URBAN VITALITY: COMPARATIVE ANALYSIS OF TWO CASES IN YENİKALE NEIGHBORHOOD

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ABSTRACT

THE IMPACT OF URBAN FORM ON URBAN VITALITY: COMPARATIVE ANALYSIS OF TWO CASES IN YENİKALE NEIGHBORHOOD

Urban vitality represents active street life in cities. The streets are the most important public spaces for cities. Pedestrian density and diversity of the streets, and variety of pedestrian activity on the streets are the urban vitality indicators.

It is argued that urban form components of residential areas encourage or limit urban vitality. Urban vitality studies in Turkey are mostly conducted in the the historic city centers or central business districts. The lack of the studies in the literature is the determination of the urban vitality level of an urban area in residential areas at urban block scale. The aim of the thesis is to asssess and measure the impact of urban vitality factors related to urban form on urban vitality. In this direction, it is aimed to reveal the relationship between urban form and urban vitality through a case study.

Within the scope of the thesis, two zones representing different urban forms are selected in the Yenikale neighborhood in Narlıdere District of Izmir as a case study area. Firstly, pedestrian counting is carried out in 5 different streets for each zone in order to determine the urban vitality level of the zones. Then, urban form data of the zones are collected and analyzed. Finally, the factors affecting urban vitality are evaluated by scoring method. In addition, according to the findings of the thesis, recommendations are provided to increase the urban vitality. Consequently, importance of urban form components in order to maintain urban vitality and the necessity of urban vitality for the sustainable future of the cities are revealed.

Keywords: urban vitality, urban form, urban design, İzmir

ÖZET

KENTSEL FORMUN KENTSEL CANLILIK ÜZERİNDEKİ ETKİSİ: YENİKALE MAHALLESİNDE İKİ ÖRNEĞİN KARŞILAŞTIRMALI ANALİZİ

Kentsel canlılık şehirlerdeki aktif sokak hayatını temsil eder. Sokaklar, şehirler için en önemli kamasusal alanlardır. Sokakların yaya yoğunluğu ve çeşitliliği, ve sokaklardaki yaya aktivitesinin çeşitliliği kentsel canlılık göstergeleridir.

Yerleşim alanlarının kentsel form bileşenlerinin, kentsel canlılığı teşvik ettiği veya sınırladığı tartışılmaktadır. Türkiyede kentsel canlılık çalışmaları, çoğunlukla tarihi şehir merkezinde veya merkezi iş alanlarında gerçekleştirilmiştir. Literatürdeki çalışmaların eksikliği, kentsel blok ölçeğinde, yerleşim alanlarında bir kentsel alanın kentsel canlılık seviyesinin belirlenmesidir. Tezin amacı, kentsel form ile ilişkili kentsel canlılık faktörlerinin kentsel canlılık üzerindeki etkisini ölçmek ve değerlendirmektir. Bu doğrultuda, kentsel form ve kentsel canlılık arasındaki ilişkiyi vaka çalışması ile ortaya koymayı amaçlamaktadır.

Tez kapsamında, İzmir'in Narlıdere İlçesinin Yenikale Mahallesi'nde farklı kentsel formları temsil eden iki bölge örnek vaka alanı olarak seçilmiştir. Ilk olarak, bölgelerin kentsel canlılık seviyesini belirlemek için her bölge için 5 ayrı sokakta yaya sayımları yapılmıştır. Daha sonra, bölgelerin kentsel form verileri toplanmış ve analiz edilmiştir. Son olarak, kentsel canlılığı etkileyen faktörler puanlama yöntemi ile değerlendirilmiştir. Ayrıca, tezin bulgularına göre, kentsel canlılığı arttırmak için önerilerde bulunulmuştur. Sonuç olarak, kentsel canlılığı korumak için kentsel form bileşenlerinin önemi ve kentlerin sürdürülebilir geleceği için kentsel canlılığın gerekliliği ortaya konulmuştur.

Anahtar kelimeler: kentsel canlılık, kentsel form, kentsel tasarım, İzmir

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CHAPTER 1

INTRODUCTION

1.1. Problem Definition

Creating vital urban areas has been one of the focal points for urban planners. Urban vitality is an important issue in trying to understand the relationship between space and society. It is seen as part of urban planning and design research. It is thought to contain power to foster urban development. Thus, understanding and measuring urban vitality is quite significant and need to be examined for sustainable environments.

The concept of vitality is discussed by researchers in regards to what should be the good urban form, healthy city, creative city, sustainable city, active city and quality of life in urban areas.

In the 1960s, researchers from different disciplines, other than planners and architects, began to work on the city to address the problems facing cities. Jacobs (1961) emphasizes that the basis for living in a city is the vibrant diversity that everyone should always have access at any time, providing a wide range of possible choices. Oc and Tiesdell (1997) assert that the centres of towns and cities have generally been constructed as dangerous and abnormal ennvironments, the lack of diversity directly affected people's activities in the city, social interactions of people and urban vitality and thus created insecure environments. In line with these criticisms, in the context of social life studies, the importance of the relationship between urban form and urban vitality in cities has started to be understood gradually.

After the 1960s, with the rise of social-spatial studies, the impact of the built environment on human behavior has been an important topic of discussion. Social scientist advocate that built environment is a result of the social organizations of a society. On the other hand, Hillier et al. (1993) argues that spatial configuration guides the movement of people. Physical planning and design have a nonignorable effect on urban life. The general approach in this regard is that the built environment is not determinant for human activities, but it can be supportive. It can be said that the built environment is

a setting for human activities. This setting can affect human behavior negatively or positively, but it does not determine human behaviors (Zhou, 2012). Spatial features of an urban area provide conditions for enhancing social and cultural life in the city. Rapoport (1982) claim that social and cultural situations affects human behavior, but it is the physical environment that provides cues about it. Therefore, it is generally accepted that urban form plays important role on human daily life. Urban form is a significant issue due to its effects when considering its physical and non-physical elements. The elements of urban form have direct effect on human behavior, social interaction, quality of life, urban vitality, health of a city, sustainability, travel behavior, climate change, energy consumption, resilient city (Lu et al., 2019; Sharifi, 2019; Zumelzu and Barrientos-Trinanes, 2018; Zeng et al., 2018; Zhou, 2012). Urban form creates an environment for human activities. Accordingly, urban form defined as the spatial layout of human activities at a particular point of time (Anderson et al., 1996) and it can help to understand and define urban life.

The researches on urban vitality give a broad perspective about how urban vitality can be measure quantitatively and which research tool can be used in different urban scale. In the literature, there are studies that focusing on indicators of vitality or studies that focusing assessment techniques. The existing urban vitality literature are about social interaction, discussion of safety, quality of public life, usage of public space, diversity, social and economic opportunities. However, the spatial components of urban vitality are not measured effectively. Therefore, analysing the relationship between urban form and pedestrian flow is a significant issue to understand the vitality of the urban areas.

In the literature, vitality studies mostly are conducted by choosing as the case study area of in the historic city center and/or commercial business district. On the contrary, unlike the historical center of the city, examining the vitality at urban block scale in residential areas is very important for designing self-contained urban areas.

1.2. Aim of the Study

The concept of neighborhood represents the connection between the city and the individuals. Assessment of vitality at urban block scale helps to maintain the urban vitality at the city-wide scale. Urban vitality contributes to promote sense of community, place attachment, social interactions, healthy mobility habits for residents and quality of

everyday life and ensuring security (Wu et al., 2018; Zeng et al., 2018; Zumelzu and Barrientos-Trinanes, 2018).

Urban form as the physical structure of an urban area is quite significant precondition to ensure and maintain urban vitality. Physical characteristics of a place can create opportunities for sociocultural and economic activities and thus can help diversify these activities within the place. On the other hand, physical characteristics can also destroy or limit the potential activities and relations. Therefore, urban form components are considered as factors affecting urban vitality. Understanding and measuring the relationship between urban vitality and urban form is quite significant and need to be examined to create sustainable environments.

The main objective of the thesis is to assess and reveal the relationship between urban form and urban vitality. The thesis examines the impact of urban form on urban vitality in Yenikale Neighborhood in Narlıdere/ İzmir. Accordingly, this study aims to contribute to the vitality literature by effectively measuring urban form components that affect urban vitality.

1.3. Methodology

In line with the aim of the thesis, the main research question of the study is:

- What is the impact of urban form on urban vitality?

The following sub-questions will guide the thesis to answer the main question:

- What is urban vitality?
- What are the indicators of urban vitality?
- What are the factors affecting urban vitality?
- What are urban form components?
- How to measure urban vitality?
- How to determine the impact of urban form on urban vitality?

In this thesis, qualitative and quantitative methods are used to assess urban vitality at urban block scale. This thesis is based on a case study method. The Yenikale neighborhood is chosen as the case study area. It is located in the section with the highest

economic activity intensity within the district of Narlıdere in İzmir according to Retail and Foot Index of Narlıdere and contains different urban forms (Köseoğlu, 2019). Therefore, it has the potential to study the impact of different urban forms on urban vitality. Figure 1.1. shows the main approach of this study to reveal the relationship between urban form and urban vitality.

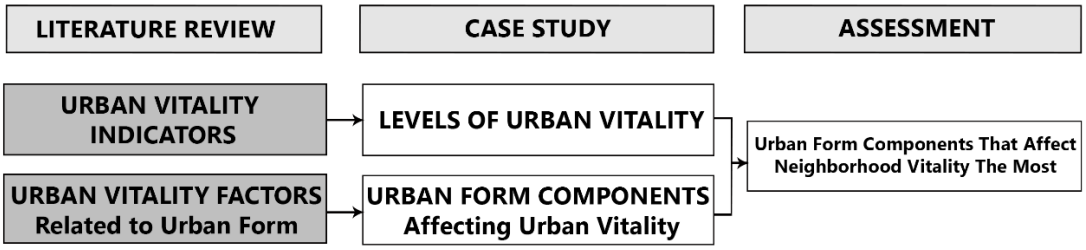

Figure 1. 1. The diagram of the study approach about the relationship between urban vitality and urban form

Data collection for Urban Vitality Level and Urban Vitality Factors consists of two main parts: literature review and site survey. Theoretical information about urban vitality and urban form is collected from the literature to create the theoretical background of the thesis. Base on this data urban vitality indicators and urban form components are clearly defined. In order to measure and assess urban vitality quantitatively, the analyses of urban vitality level and urban vitality factors are conducted in the case study area.

1. Literature Review: Firstly, to examine vitality theoretically and practically, 20 articles, theses or reports that are most cited are selected from the urban vitality literature. 15 of these researches are examined in terms of case methods and tools of their case studies to analyse the measurements of urban vitality and research tools at different scales. According to the literature review, to study the relationship between urban form and urban vitality, urban vitality indicators (density and heterogeneity of pedestrian flow and activity types) and urban vitality factors related to urban form (density, diversity, accessibility and quality of built environment) are determined. The data used for literature review are obtained from secondary data sources such as library resources and online databases.

2. Site Survey: Secondly, the analysis of urban vitality level and urban form are carried out in the case area. Yenikale neighborhood is analyzed according to the factors and indicators of urban vitality obtained from the literature review part of the thesis. Firstly, counting is carried out by direct observation techniques (Gate Method) in the ten (10) streets of the neighborhood. In addition, the activity pattern of the pedestrians is determined by using the Static Snapshot Method during the field research, and behavioral mapping is used to visualize the data. All counting results constitute the input of the study as urban vitality data. Then, urban form data of the neighborhood are determined and these are collected by using Geographic Information Systems (GIS), institutional and municipal data, archive records, interpretation of the photographs and observations made during the field research.

Finally, the results of the analyses are compared in order to assess the relationship between urban form and urban vitality. The findings are evaluated by scoring method and thus it is tested that which urban form components has more impact on urban vitality in the case area.

1.4. Structure of The Thesis

The thesis consists of two main parts as literature research and field research. Accordingly, the thesis includes 6 chapters, including the introduction.

In Chapter 1, the aims of the thesis are discussed by defining the problem. Following the introduction part, Chaper 2 consists of the results of the literature research on urban vitality that form the basis of the thesis. In the first section, the concept of vitality is revealed through literature definitions to create the theoretical background of the thesis. In the second seciton, various researches on urban vitality are examined in detail in terms of their research methods and findings.

Chapter 3 presents how to determine and measure the vitality level of an urban area and the urban vitality indicators. Measurement methods of these indicators are explained in detail.

In chapter 4, firstly, the urban form is presented conceptually. Thus, the components of urban form are being clarified. Then, urban vitality factors related to urban

form are explained. These factors are grouped under 4 main headings as density, diversity, accessibility and quality of built environment. The purpose of this section is to reveal how the effect of urban form on urban vitality will be determined with a conceptual schema as a result of the literature research.

In Chapter 5, the claims and discussions on the literature are tested through a case study. In the first section, general information about the study area is given to understand the geographic location within the city and socio demograhic structure of the study area. In the second part, analyses of the urban vitality are presented to determine the urban vitality level of the streets of two selected zones in the Yenikale Neighborhood in Narlıdere. Then, analyses of the urban vitality factors related to urban form are discussed. The aim of this chapter is to assess the urban vitality of Yenikale Neigborhood and to determine the urban vitality factor that most affects urban vitality in Yenikale Neighborhood.

Chapter 6 provides the evaluation about the relationship the urban vitality and urban form in residential areas and the recommendations to achieve urban vitality based on the findings of the thesis.

CHAPTER 2

URBAN VITALTY

To understand the relation between urban vitality and urban form, there is a need to examine the concept of vitality and indicators of urban vitality. In this chapter, concept of vitality is explained through the definitions of various researchers. Then, researches on urban vitality are examined to understand indicators of vitality and to identify what kind of methods and tools can be applied to assess urban vitality at different scales.

2.1. The Concept of Vitality

Vitality is derived from the Latin word *vita* meaning "life". It is defined in dictionary as: “exuberant physical strength or mental vigour; capacity for survival or for the continuation of a meaningful or purposeful existence; and power to live or grow” (https://www.dictionary.com/browse/vitality). The term vitality was adapted to the city by urban researchers and included in the urban design literature as *urban vitality*.

The concept of “urban vitality” is expressed and developed in the literature with different words that have the same meaning over time. In the 1960s, the environments created in the modernist era have forced urban researchers to reflect on the human factor and their needs in cities. After the 1960s, researchers began to discourse about vital urban areas. Researchers such as Jane Jacobs (1961), William H. Whyte (1980), and Jan Gehl (2011) began to emphasize the importance of creating space for people and argue the importance of presence of people in urban areas. Firstly, Jane Jacobs, an American-Canadian journalist and activist, is the first powerful sound to call for conclusive change in the way we build a city. She claimed that isolated and dead urban spaces were created devoid of people and besides, in this context, *‘eye on the street’* was recognized as a sociological concept in her book “*The Death and Life of Great American Cities*” (Jacobs, 1961). Basically, the concept of ‘*eye on the street*’ is intended to mean the presence of people on the street (Jacobs, 1961). She advocates that to create safe and successful built environments within the city can be possible by inducing the presence of people on the

street. According to Jacobs (1961), urban vitality is the intensity of pedestrian activities on city streets. The chance of a city to succeed is higher when a city produces diversity and vitality in any of its region. Intertwined human activity and living spaces constitute the diversity of city life. Vitality is the representation of diversity of city life (Jacobs, 1961).

Gehl (2011) argues that designers should address the urban place at a human scale. He conducted studies examining public life between buildings and the factors of this provide public life. He defines the vitality as a factor for people to use public space. However, according to him, vitality is not just gathering many people at the same time and same location. It is more about a good interaction between people and the space. In order to ensure this good interaction, the way people use and diversity of public space becomes important. In this direction, he classifies the activity type for people in a public space as necessary/functional, optional/recreational and social activities. Especially, the optional and social activities that perform in the public space are main focus of urban vitality. Vitality means that people are free, relaxed and comfortable for optional and social activities in a public space and the presence of other people in the environment has a positive effect on another. The vitality of any places is usually revealed with a mixture of activities that occur on ordinary days and streets. In brief, the vitality is the activity of the people on the streets (Gehl, 2011).

In the later years, Lynch (1981) noted that vitality is one of the five fundamental dimensions in the good city in his well-known book of "*Good City Form*": vitality, sense, fit, access, control. He stated that the vitality is the primary element to achieve quality of life. He defines the concept of vitality as the extent how the form of the settlement supports people's vital functions, biological needs and abilities. In addition, he described three principles for vitality: *sustenance, safety, and consonance*:

> "sustenance: the adequacy of the throughput of water, air, food, energy, and waste;
> safety: the absence of environmental poisons, diseases, or hazards;
> consonance: the degree of fit between the environment and the human requirements
> of internal temperature, body rhythm, sensory input, and body function'' (Lynch, 1981:129)

Based on Lynch's definition, a vital city is a city that can provide its residents' needs in a safe environment and it allows maximum sphere of activity. Under these conditions, it can be mentioned that people have quality of life. In the view of these information, Lynch (1981) believes that urban vitality comprises of three main dimensions: urban morphology, urban function, and urban society.

In parallel with Lynch's arguments about good city form, Montgomery (1998) made a theoretical research on how successful urban places should be. In his research, he suggested three components for good urban places; activity, image and form. Activity has two main concepts: vitality and diversity (figure 2.1.).

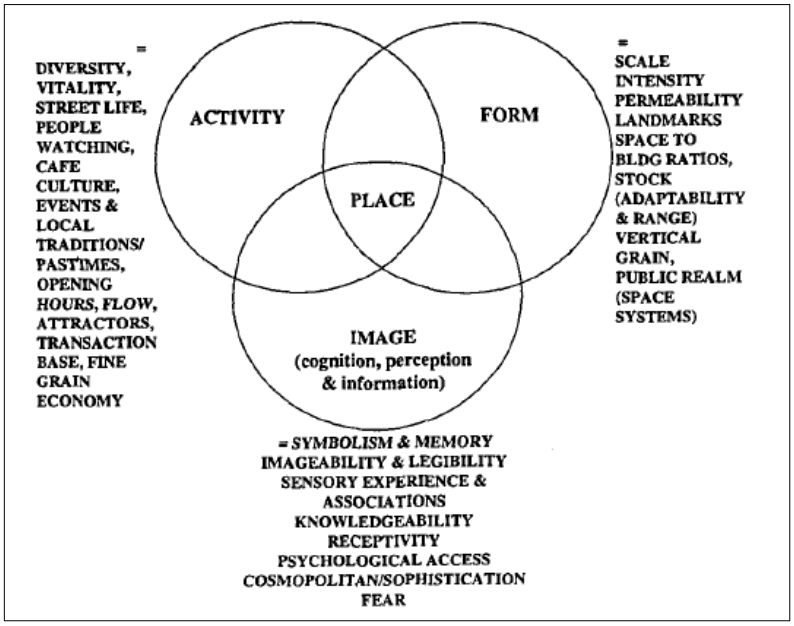

Figure 2. 1. Three main components for good urban places

(Source: Montgomery, 1998:98)

Montgomery (1998) defines vitality as the constitute of activity. In a broad sense, vitality indicates the pedestrian flow which means the number of people on the street at different times of the day, the number of opportunities and activities for people over the year, the existence of an active street life. In the light of these claims, vital places have their own active urban life and a good urban place should provide vitality. According to him, vitality is a feature to distinguishes successful urban areas from the others (Montgomery, 1998).

Moreover, Maas (1984), in his detailed research on urban vitality theory, described urban vitality in three ways. First one is people that refers the presence of people in a public space, second is people activities and opportunities, third one is the environment that where these activities occur. Accordingly, he mentions that urban vitality is a synergy. Broadly, he defines urban vitality as the synergy stemming from

heterogeneous, dense pedestrian population and a great many unique and diverse commercial and experiential activities (Maas, 1984). According to this definition, he claims that this synergy effect represents the creation of the sense of place, which seems to feature of all vital areas within the city. In addition, Maas (1984) believes that the urban vitality can be defined as consisting of social, economic, spatial, and experiential components.

On the other hand, in the UK, researchers and decision makers began to research on the transformation of town and city centers. With the increasing post-modernization of lifestyles and living environments, the changes in the form of the city and the collapse of the city centers are on the agenda. In the Planning Policy Guide prepared by Department of the Environment (1996), increasing and maintaining vitality is among the goals of the UK government. The concepts of vitality and viability have been used as a measurement to evaluate the health of town and city centers and revitalize them. These two concepts are often confused. While the concept of vitality refers to whether the city center is alive to people, viability refers to whether it has the capacity to trade to live in it (DoE, 1996). Furthermore, Landry and Bianchini (1995) clarify the difference between vitality and viability. According to them, vitality is the raw power of a city that must to be focused on in order to reach viability. Vitality includes levels of activity, use and interaction and includes how these levels are represented to people. On the other hand, viability is about long-term self-sufficiency, sustainability, adaptability and self-renewal. It is necessary to increase vitality to accomplish viability (Landry and Bianchini 1995). In addition, Landry (2000) argues that vitality is a determinant for creative cities and creativity promotes vitality in a city.

In another research that focused on vitality of town and city centers, Ravenscroft (2000) defines the vitality is that how active a town and city center is at different times and places in a day with its diverse range of uses and users. He suggests that a great variety of uses in the city center captivate significant number of people. Briefly, vitality and viability dimensions can be useful tools to assess and understand the changes of the health of city centers (Ravenscroft, 2000).

Bacon (1975) stated the vitality in an urban designer's perspective. He defines the city as an art space where people share their experiences. Accordingly, an urban designer aims to create livable places with constant vitality. A designer has to perceive the forms as expressions of organic vitality that flow through the city's structure.

Another researcher Zhou (2012) defined urban vitality as the number of people, small-sized businesses and a great variety of activities in the built environment. According to him, a vital city should provide rich choices and interesting things for people in a place in different seasons and times.

According to the broad literature on urban vitality studies that define vitality, urban vitality definition can be grouped into three main aspects. People, their activities and the place that activities occur. Table 2.1. summarizes the definitions of urban vitality by the researchers referred above.

Table 2. 1. Vitality definitions regarding the literature review

References	Vitality Definitions
Jacobs, 1961	The intensity of pedestrian activity on city streets
Gehl, 2011	The activity of the people in the streets
Lynch, 1981	One of the five dimension for good urban city form
Maas, 1984	The synergy stemming from heterogeneous, dense pedestrian population and a great many unique and diverse commercial and experiential activities
Montgomery, 1998	The pedestrian flow which means the number of people on the street at different times of the day, the number of opportunities and activities for people over the year, the existence of an active street life
Ravenscroft, 2000	How active a town and city center are at different times and places in a day with its diverse range of uses and users.
Landry, 2000	The raw power and energy of a city that must to be focused on in order to reach viability.

2.2. Researches on Urban Vitality

Urban vitality is a qualitative notion. It expresses how lively or vibrant a place within the city or all parts of the city feels. Therefore, the notion of urban vitality has always been difficult to measure. In this section, the factors that affect urban vitality will be investigated by examining the researches with case studies in the literature to understand the components of urban vitality and how to measure vitality at different scales.

According to urban vitality literature, to study urban vitality is to examine the urban life in the public space within the city. Factors affecting urban vitality should be addressed with their social, economic, cultural and spatial components (Maas 1984; Lynch 1981; Landry 2000). Other significant issue of urban vitality is its scale. As seen in the table 2.2., the selected case studies on urban vitality researches differ in their scales. Vitality scales can be grouped as street, neighborhood and city-wide scale. The research tools and the factors examined in case studies differ according to their scales and components they focus on.

Maas (1984) addressed urban vitality on a street scale in his master thesis named '*Towards a Theory of Urban Vitality'*. He examined four streets in Vancouver/ Canada using the comparative analysis method. Two of them were commercial streets in the central area and two of them were in old suburbs as case studies. He classified the factors of urban vitality as pedestrian population, the physical and social environment, experiences, sense of place, unique goods and services and examined the following factors in the fields under these headings. He measured 8 factors in four streets (Table 2.2.). Based on the results of the observations and interpretations in the fields, Maas (1984) determined that urban vitality stems from the uniqueness. According to him, this uniqueness can be as a result of geographic location or a spatial arrangement or design of buildings, but it means that a number of unique pedestrian population and unique goods and services. In brief, heterogeneity of people and physical environment is most significant factor to increase urban vitality. They include mix land use types, diversity of buildings and diversity of people. In addition, he asserts that the physical environment should be sensitive to the human scale, and the social environment should not contain fear and danger to ensure urban vitality in urban areas.

In a similar way, Mehta (2009) conducted a research examining 3 neighborhood commercial streets as behavior setting by focusing human scale. Behavior setting includes behavior pattern and built environment patterns. He claims that the physical environment must be closely examined to understand which physical features affect urban vitality in the public sphere. It means that researchers need to look from the user perspective. The main objective of the research is to designate which urban design features of the streets support urban vitality. In accordance with this objective, he firstly created a Liveliness Index by measuring the stationary activities, social activities and the length of time people stay at each street. Secondly, the physical features of the streets were examined such as *'sidewalk width, articulated building facades, street furniture, the*

number of trees, street-frontage with signs, type of activity, permeability and the number of community place'. The findings clearly show that mixed- use, micro-scale physical features (such as street furniture) and density of different small-scale businesses are determinant of urban vitality in a street. Mixed-use neighborhoods are highly important pattern of built environment to achieve a more vital urban area. Blocks without evenly distributed mixed uses are not alive and are not preferred by pedestrians. People prefer places that offer comfort and various opportunities with its physical and social features.

Zarin et al. (2014) selected two streets in Tehran, Iran to investigate the factors affecting urban vitality in terms of their social and physical values. One of the streets is in old town and the other street is in the modern area within the city. They collected the data using questionnaires and field observations and used multivariate and backward regression model to analyze the level of vitality in each street. They determined the factors affecting urban vitality as: the variety of attractions, hostel activity (different uses), welfare, accessibility, people cooperation, readability, aesthetics, hygiene with their 35 sub-factors and conducted the questionnaire with 384 random sampling. As a result of this research, the findings show that diversity of attractions and accessibility is the main factors that affecting level of urban vitality in the traditional and modern street. However, aesthetics is the lowest affecting factor in traditional street. In modern street, the findings show the opposite about aesthetics. Consequently, they noted that the most important factor is accessibility to ensure urban vitality. Although readability have less impact on urban vitality in these case studies, it cannot be ignored.

In another article that tested urban street vitality, Xu et al. 2019 chose nine streets in three different urban areas of Nanjing City, China. Unlike other researchers who study on street vitality, they considered the different time dimensions. The main goal for this research is to measure the effect of selected factors on urban vitality under different time periods. For this reason, they selected the area according to their specific construction period for comparison. Three urban areas were selected as old urban area, the main urban area and the new urban area. Three streets were selected from each area. They determined three main factors and 10 subfactors that affecting urban vitality (see Table 2.2.) and defined each factor with its definition and calculation. Thus, they conducted a quantitative analysis for each subfactor in each street. After the calculation, multi-variable regression method and ranking method were used. According to the research findings, the streets which is located old and main urban area have more vitality than the streets in new urban areas. According to the correlation between urban vitality

and the factors for the nine streets, building density, continuity and street height-width ratio in terms of street form are significant factors to promote street vitality. They suggested that high building density, street continuity creates enclosure which is encouraging people to walk. In addition, the other significant factor are accessibility and function density.

Recently, Zumelzu and Trinanes (2018) researched on urban vitality in Southern Chile. In their detailed article, they selected five neighborhoods in the city of Valdivia, Chile to assess the impacts of urban form on urban vitality at a neighborhood scale. The research has been used qualitative and quantitative methods to find out the spatial elements that affect human activity. Firstly, to analyze the levels of vitality, human activity on public space and origin of users are analyzed for each neighborhood. Pedestrian movement, vehicular movement and type of activity are calculated by using the two-observation method from Space Syntax theory which are Gate method and Static Snapshot method. Secondly, population density, location, land use pattern, dimensions of street block frontages, lot size and building use are evaluated to determined morphological elements of each case area. According to the findings, mixed-use, size of blocks, lot sizes and adaptability of building use are highly significant characteristics of urban form to increase urban vitality at a neighborhood scale.

Saeidi and Oktay (2012) researched on quality of life by focusing on diversity which is one of the factors of urban vitality at a neighborhood scale. They purpose to investigate the impact of diversity on quality of life in neighborhood environments. In accordance with this purpose, four neighborhoods were selected in Famagusta, Northern Cyprus, and one of them is located in historic core, two of them are in developed residential settlements and the other one is located suburban district. They classified the factors that related to diversity in terms of form, uses and users. 16 factors were examined with 68 subfactors under the three main headings: variety of form, variety of uses, variety of users (see Table 2.2.) and data were collected with on-site analysis and from previous researches about Famagusta urban settlements. The findings corroborate that lack of variety of forms in newly developed neighborhoods, lack of variety of uses in the historic core and lack of variety of users in the suburbs of the city are significant impact of quality of life at a neighborhood scale.

In another research on the neighborhood scale, Wu et al. (2017) selected 28 neighborhoods in the Qinghe sub-districts in suburban Beijing, China. This research is separated from the others by the research tool to investigate levels of vitality. They used

the case study methodology like the other studies to understand the relationship between urban form and neighborhood vitality, but they used a GPS-based survey as a research tool. 534 people are randomly chosen according to the household address in each neighborhood and the participants recorded their activities in their daily lives by carrying a GPS tracking devices. The devices record the spatial and temporal coordinates of each participant's outdoor activity for seven days. In addition to this, the participants fill out online questionnaire about every their activities to detailed these. By doing so, Wu et al. (2017) aim to reach more detailed data about human activity in the neighborhood. Moreover, urban form index calculated by collecting the spatial data which are affecting factors of urban vitality from each neighborhood. These factors with their subfactors are inner circulation system (included blocks perimeter, the number of blocks, length of cul de sac), external traffic system (bus and metro station distance), density (house density, floor area ratio), land use mix, accessibility. They combine the five factors into one UF index. At end of the research, the findings show that high density and diversity of land use are affected the neighborhood vitality in a positive way. Surprisingly, accessibility does not significantly affect neighborhood vitality in these cases. Considering the previous literatures, the fact that accessibility has a significant impact on vitality cannot be ignored for other case studies.

A study conducted by Ravenscroft (1999), offers a different research tool for testing urban viability in an area at neighborhood scale. The research tool is a time-series model. He collected the data from three different period of the mid- 1980s, the early 1990s and the mid- 1990s for case study area. By doing so, he aims to develop a time-series model for observing changes in the health of different areas of town center. For this reason, he examined the key indicators of vitality and viability for each time period. He determined 13 different areas in Reading, UK. To evaluate the urban vitality for each area, variety of uses, pedestrian flows, environmental quality and levels of crime were determined as the key indicators of vitality. After the comparing all indicators with different time periods, the results show that diversity of usage is the most significant factor affecting urban vitality.

In the literature, urban vitality studies have been carried out on a city-wide scale in addition to neighborhood and street scale. Zhou (2012) wrote a PhD thesis on urban vitality. This thesis aims to define spatial and non-spatial factors that affect urban vitality by using comparative analysis. She selected two cities as a case studies; Almere in Netherlands and Tongzhou in China. Unlike the other researches, space syntax was used

as a research tool in this city-wide scale study. Briefly, Space Syntax theory evaluates the effects of space on people, how people know space, how space and society are connected. According to this theory, the spatial configuration of the street networks shapes the movement flows of the region and promote presence of people in the region (Hillier, 2011). In addition, Zhou (2012) used direct observation, survey and the mapping of land use and self- organized activities and small-scale businesses as research tools. In city-wide scale research, data collected in line with these spatial principles: land use, green and water system, infrastructure network, public transport, diversity and spatial pattern of public facilities and characteristics of public spaces. As the result of the research analysis, activities associated with urban land use is one of the main spatial factors affecting urban vitality. She asserts that if these activities are concentrated in one place, other areas of the city will be homogeneous and inanimate, but if it is evenly distributed and integrated into residential areas, the street life in the city will be livelier. Accessibility is the other main factor that promote urban vitality.

On the other hand, the difference in terms of the research tool used in city-wide scale studies is remarkable. Especially in case studies carried out in China, this difference is the use of the big data. The big data can be attained from mobile phone records, social media check in data, sensor data, global positioning system (GPS) data, points of interest (POIs) (Wu et al., 2017; Zeng et al., 2018; Lu et al., 2019; Li et al., 2019). Since these data are high volume, accessible and real-time, the use of these data is a very effective method for measuring human movements based on location in urban vitality researches at a city-wide scale. One of these researches belongs to Zeng et al. (2018). This research aims to examine the decentralized urban texture and take measures to urban decline by assessing urban vitality with big data. They selected two cities (Chicago, US and Wuhan, China) for comparative analysis. They assessed the urban vitality based on diversity, density, accessibility and livability. All four factor have several subfactors (see table 2.2.). Data on human activities was collected from different open data platforms for each city. In line with these data, selecting POIs refers urban pattern in terms of the location of different sectors and facilities. The findings show that most significant spatial factors are population density, roads, building density and land use diversity.

Lu et al. (2019) conducted a research that showed s strong correlation between built environment and urban vitality. They selected Cities of Beijing and Chengdu in China as the case studies. Beijing central area has 6 districts with 113 regulatory planning management units and Chengdu has 5 districts with 76 regulatory planning management

units. They determined the five factors to evaluate the built environment: accessibility, density, mixed use, shape compactness and landscape quality. The data which is represent urban vitality collected from social media platforms as a check in data and socio-economic data such as resident population data and housing price data were collected from open platforms. In addition, urban vitality and urban built environment factors are compared with using the linear regression model. The results support that there is a strong relationship between built environment and urban vitality. According to the results, public transport accessibility, diversity of function are most significant factors that affecting urban vitality. In addition to this, green coverage index and compactness are significant impact on the urban vitality at a city-wide scale.

In another city-wide scale research, Liu et al. (2019) aim to gauge urban vitality quantitatively and to identify urban vitality areas within the city from the perspective of time and space. They selected the city of Nanjing in China as a case study. To gauge the vitality with considering time, they use the data from mobile phone stations. The data collected for a week day and night. After raw data is processed, they correlate land use characteristics of the area and vitality level. The results of the research show that the most significant factor that achieve urban vitality is density of functions. To achieve this, mixed land use is highly significant urban form factor for urban vitality. In addition, spatial concentration of land use and construction of roads and presence and distribution of small-scale business.

On the other hand, place-based approaches have been on the agenda in recent years regardless of a certain scale. Place Standard Tool has been launched in 2015 by the Scottish Government, NHS Health Scotland, and Architecture and Design Scotland (figure 2.2.). The purpose of the Place Standard tool is to create a basis to assess the quality of place by revealing the relationship between physical and social elements of a place and thus, this tool enables to create a platform for decision-makers and residents to evaluate the current and future potentials or areas where a place could improve of the place together (Place Standard Tool, 2020-2023 Strategic Plan Report). In this way, the assessment of a place supports the sense of belonging, urban vitality and improvement local economy and helps to produce solutions from a local perspective.

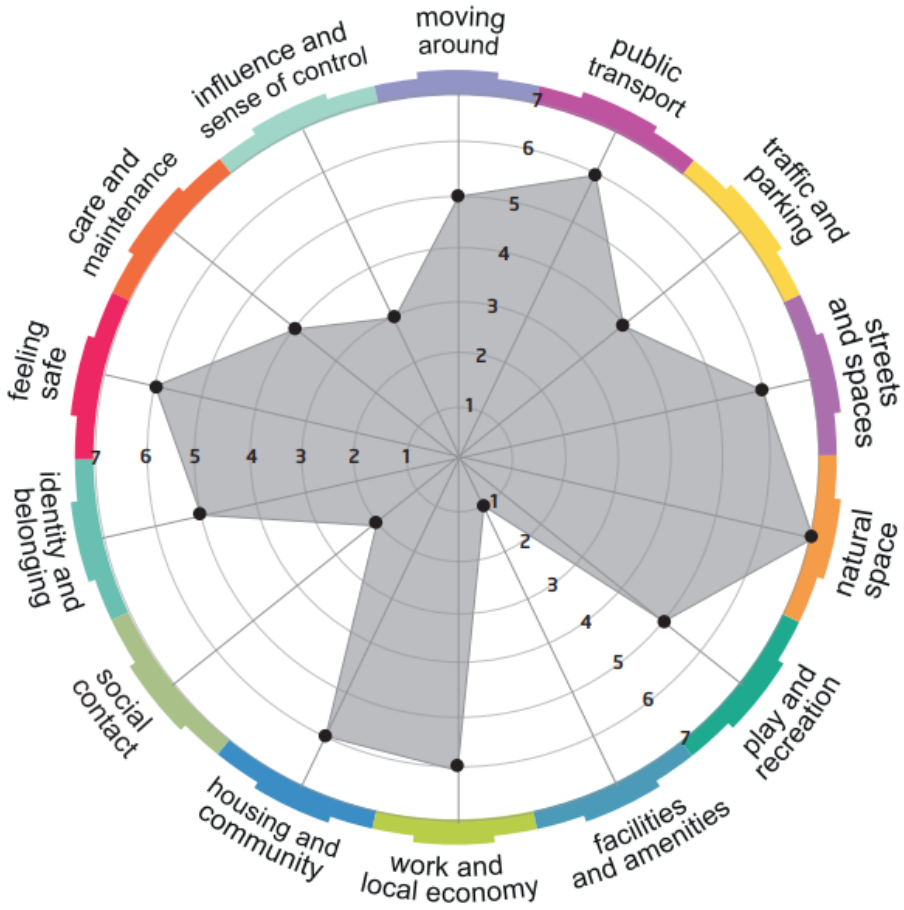

Figure 2. 2. Place Standard Tool
(Source: Place Standard Tool, 2020-2023 Strategic Plan Report)

In the table 2.2, the 15 urban vitality researches with case studies are summarized and classify the factors affecting urban vitality according to the scale. Of the 15 case studies, four explored urban vitality at a street scale, 8 of them studied at a neighbourhood scale and 3 of them are at city-wide scale. Then, 10 researches which are most related to the purpose of this thesis are selected to determine the most important factors on urban vitality. As a result of the findings, it can be said that researches with case studies have highlighted that density, diversity, accessibility and quality of built environment as urban vitality factors related to urban form have profoundly impact on urban vitality.

Table 2. 2. Summary of urban vitality researches with case studies

	References	Aim of the Study	Case Studies	Method and Tools	Factors and Measures
Street scale	Maas, 1984 *'Towards a Theory of Urban Vitality'*	To identify the major characteristics of Urban Vitality To determine the processes and major determinants of the phenomenon	Four areas within the city of Vancouver, Canada - Two commercial streets in the central area Two streets in old suburbs	comparative analysis was used. A survey questionnaire (random sampling) On-site analysis - Observation Techniques - Photo-interpretation	- Density of pedestrians - Ethnic characteristics of pedestrians - Employment characteristics of pedestrians - Age characteristics of pedestrians - Available goods and services - Trip purpose - Trip origins Residential locations of pedestrians (local, hinter, tourist)
	Xu et al., 2018 *'The Cause and Evolution of Urban Street Vitality under the Time Dimension: Nine Cases of Streets in Nanjing City, China'*	To assess street vitality considering the different time dimensions in different year-built streets in old, main and new urban areas.	Nine streets in three different urban areas of Nanjing City, China	Quantitative analysis for each sub-factor - Ranking method with ten sub-factors and street vitality - Multi-factor analysis and correlation with street vitality Data collection; Field measurement Google street map Traffic application	Street Form - Building density - Continuity - Height-width ratio Street Business Type - Store density - Function density - Permeation rate Street Accessibility - Location - The number of entrances/ exits - Transportation - Walkability
	Zarin et al., 2014 *'Physical and Social Aspects of Vitality Case Study: Traditional Street and Modern Street in Tehran'*	To analyze their social values and effects on urban life quality To study vitality improvement criterion in order to reach permanent vitality	Two streets in Tehran, Iran	Comparative analysis A survey questionnaire was used (384 random sampling). Multivariate and Backward regression method were used to analysis the level of vitality and the effect of each index in vitality are determined.	-The variety of attractions - Hostel activity - Welfare - Availability and contact - People cooperation - Readability - Aesthetics - Hygiene

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Table 2.2. (cont.)

	References	Aim of the Study	Case Studies	Method and Tools	Factors and Measures
Street scale	Mehta V., 2009 *'Look Closely and You Will See, Listen Carefully and You Will Hear: Urban Design and Social Interaction on Streets'*	To analyze the commercial street of the neighborhood as a behavioral setting that creates the behavioral patterns and the pattern of the physical order of the environment	Three commercial streets in Boston Metropolitan Area, US	Comparative analysis Observation Technique -Behavioral Mapping -Walk-by observations -Structured observations -Unstructured observations -Photo-interpretation Survey and interview (51 people)	-Sidewalk width -The number of seats -Articulated building facades -Street furniture -The number of trees -Street-frontage with signs -Type of activity -Permeability -The number of community places
Neighborhood Scale	Saeidi S. and Oktay D., 2012 *'Diversity for Better Quality of Community Life: Evaluations in Famagusta Neighborhoods'*	Exploring the possible impact of diversity on quality of life within neighborhood environments and to highlights its significance in achieving a successful neighborhood	Four neighborhoods in Famagusta, Northern Cyprus - 1 historic core - 2 rapidly developed residential settlements - 1 suburban district	On-site analysis - Observation Techniques - Photo-interpretation - Sketches - Maps Users' profile information (data were obtained from previously carried researches about Famagusta urban settlements)	<u>Diversity of Forms</u> - Topography and Greenery - Urban Blocks - Street Network - Buildings <u>Diversity of Uses</u> - Residential - Commercial/ Recreational - Public Facilities - Public Open Spaces - Agricultural Uses <u>Diversity of Users</u> - Gender - Marital Status - Age - Educational Attainment - Income Level - Employment Status - Family Type
	Ravenscroft, 2000 *'The Vitality and Viability of Town Centers'*	Using the key indicators of town center viability and vitality, to develop a time-series model for tracking changes in the health of different areas of town center	13 different areas in the town center of Reading, UK	Benchmarked indexation was undertaken for the indicators Time series model was used. (the mid-1980s, the early 1990s and the mid-1990s)	* Commercial yield and rent * Occupancy rates * Diversity of current usage * Pedestrian flows * Environmental quality * Incidence of crime

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Table 2.2. (cont.)

	References	Aim of the Study	Case Studies	Method and Tools	Factors and Measures
Neighborhood Scale	*Zeng et al., 2018* *'Spatially Explicit Assessment on Urban Vitality: Case studies in Chicago and Wuhan'*	To address the increasing decentralized urban pattern and take precautions to urban decline by assessing urban vitality with big data	Two city core areas: Chicago in the US and Wuhan in China	Comparative analysis was used. The "location-based service (LBS) cloud" on the Baidu open platform The spatial TOPSIS method (Technique for Order Preference by Similarity to Ideal Solution)	Density -population density -road density -building density Livability -number of banks, food service sites, site for leisure and other services Accessibility -the distance to schools, hospitals, shops Diversity POI data
	Wu J. et al., 2017 *'Urban Form Breeds Neighborhood Vibrancy: A Case Study Using a GPS-based Activity survey in suburban Beijing'*	To measure quantitatively neighborhood vibrancy based on a GPS-based activity survey	The Qinghe sub-district in suburban Beijing (It contains 28 neighborhoods)	The GPS-based activity survey - In each neighborhood, 534 residents were randomly chosen based on the household address and the participants carry GPS tracking devices in their daily lives. GIS (Geographic Information System) analysis	-Inner circulation system - External traffic system - Density - Land use mix - Accessibility Urban Form Index (They combine the five measures into one UF index to underline the fact that all dimensions contribute to neighborhoods. Neighborhood Vibrancy (dependent variables) -The percentage of out-of-home non-work activities in which individuals participate within a distance of 500 m from the boundary of the neighborhood.

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Table 2.2. (cont.)

	References	Aim of the Study	Case Studies	Method and Tools	Factors and Measures
Neighborhood Scale	Meng and Xing, 2019 *'Exploring the relationship between landscape characteristics and urban vibrancy: A case study using morphology and review data'*	To examine the relationship between landscape characteristics and urban vitality	Futian district, Shenzhen, Guangdong Province in China	Regression analysis Social media check in data	Place; -Density of POIs -Entropy of POIs Land use; -the percentage of service and public land -residential land -industrial land -commercial land Single landscape elements; -Total area of buildings -Number of buildings -Density of buildings -Landscape shape index of building Multiple landscape elements; -the ratio of POIs and buildings -the ratio of POIs and other areas -the ratio of roads and buildings -the ratio of roads and other areas
	Zumelzu A. and Barrientos-Trinanes, 2018 *'Analysis of the Effects of Urban Form on Neighborhood Vitality: Five Cases in Valdivia, Southern Chile'*	To analysis effects of urban form on neighborhood vitality	Five neighborhoods in Valdivia, Southern Chile	Qualitative and Quantitative methods were used. - Observation Techniques (Gate method and Static Snapshot method) - Photo-interpretation -Geographic Information System analysis (GIS)	-Local population density - Location - Dimensions of street block frontages - Building use - Plot size - Pedestrian movement - Vehicular movement - Type of activity Land use pattern

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Table 2.2. (cont.)

	References	Aim of the Study	Case Studies	Method and Tools	Factors and Measures
Neighborhood Scale	*Tepe, 2019* *'Kamusal Mekan Özelliklerinin Sosyal Yaşam Aktiviteleri Üzerindeki Etkisi- Karşıyaka-Bostanlı örneği'* *(The effects of public space characteristics on social life activities)*	To investigate the effects of public space charecteristics on social life activities	Bostanlı district, Karşıyaka in İzmir/ Turkey	Case study method Field research - Direct observation - Counting pedestrian flow Space syntax analysis	User profile Land use characteristics Urban image analysis Accessibility Pedestrian flow Type of social activities Landscape characteristics
	Oruç G. And Giritlioğlu C., 2008 *'The evaluation of urban quality and vitality of the Istanbul historical peninsula-Eminönü district'*	To investigate the urban vitality level in the Eminönü district of Istanbul for further revitalization projects	Eminönü District in Istanbul/ Turkey	Benchmarked indexation was undertaken for the indicators Time series model was used. (the 1985-1988 and 2002-2004) Public survey (616 questionnaires)	- User profile - Population - Number of dwellings - Building colors and facades - Quality of city furniture - Leisure area rate - Crime rate - Functional variation - Services - Parking lots
City-wide Scale	*Zhou, 2012* *'Urban Vitality in Dutch and Chinese New Towns'*	To explore the spatial and non-spatial factors that foster the development of urban vitality in new towns	Two cities. Almere in the Netherlands and Tongzhou in China.	Comparative analysis was used. Field research -direct observation Surveys -face-to-face interviews, -online surveys Space syntax analysis -static snapshots of activities -flows of human beings The mapping of space appropriation and self-organized activities and small-scale businesses	Land use composition Green and water system Infrastructure network; car traffic and bike route Population density Educational, social-cultural, medical facilities and commercial facilities (supermarkets) The spatial pattern of the facilities Characteristics of public spaces

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Table 2.2. (cont.)

	References	Aim of the Study	Case Studies	Method and Tools	Factors and Measures
City-wide Scale	Lu S. et al., 2019 *'Impacts of Built Environment on Urban Vitality: Regression Analyses of Beijing and Chengdu, China'*	To assessment the effect of built environment factors on neighborhood vitality	Two cities in China (Beijing and Chengdu) *113 unit in 6 districts in Beijing *76 unit in 5 major districts in Chengdu	Quantitative methods and comparative analysis were used. Regression analysis and spatial autocorrelation -Social media check-in data -Socio-economic data -Point of interest (POI) Building vector data and road network data	Neighborhood vibrancy measurements (dependent variables) -The number of people who check-in at each neighborhood Social-economic indicators -Residents population density -Average housing price Accessibility indicators -The density of bus stations -The road density Density and construction strength -Floor area ratio (FAR) -The building density index Mixed function -POI diversity index Shape indicators -The Richardson compactness index Landscape quality indicator -Green coverage index
	Liu S. et al., 2019 *'Urban Vitality Area Identification and Pattern Analysis from the Perspective of Time and Space Fusion'*	To gauge urban vitality in terms of time and space quantitatively	Nanjing City, China	GTS Data analysis and Clustering method The Self-organizing map (SOM) model	Land use characteristics Population density Social media check-in data

CHAPTER 3

URBAN VITALITY INDICATORS

Urban vitality is based on people who are in a certain time period in a certain place and their activities (Gehl, 2011; Montgomery, 1998; Maas, 1984; Ravenscroft, 2000). Accordingly, urban vitality can be demonstrated by the number of people, the number of different users and the variety of their activities in a certain place and time period. Based on the findings in previous chapters, urban vitality indicators are explained in two main categories as density and heterogeneity of pedestrian flow and pedestrian activity types. In the following section, these two main indicators are described in detail within the scope of this thesis.

3.1. Density and Heterogeneity of Pedestrian Flow

Vitality is defined as synonymous with vital power (Agnes, 1997). Accordingly, urban vitality is represented by the people who live and use the built-up area. One of the main features that distinguishes a vital urban area from other areas is the size, density and heterogeneity of the pedestrian presence in that area (Maas, 1998). Therefore, urban vitality depends on the number and characteristics of people in an environment.

Pedestrian movement is one of the two most reliable parameters for measuring urban vitality. In measuring the vitality of an area, an estimate can be made with the number of people in that area. On the other hand, measuring only the number of pedestrians is not enough. Heterogeneity of pedestrian is also important (Jacobs, 1961; Maas, 1998). Different age groups, different genders, and different socio-cultural characteristics constitute the pedestrian heterogeneity. People in a public space attract other people and people with different characteristics attract larger groups of people. Thus, pedestrian heterogeneity increases the possibility of more users using the space (Gehl, 2010).

In his famous book *'A Pattern Language'* Alexander (1977) suggested a measurement rule based on pedestrian density to define lively areas. According to him,

it can be said that the public spaces between 14 square meters per person and 28 square meters per person have the characteristics of vital urban areas. He argues that the areas that are more than 46 meters per person are dead areas. For example, if 35 people are walking or lingering on a pedestrian street, it is expected that the street define an area of at least 490 square meters in order to be considered as a vital urban area.

In public life studies, different methods have been applied to measure the density and heterogeneity of pedestrian flow. Observing people and counting is the most basic and necessary method. The content and scale of a study determine the detail and the techniques of observation in the study. In recent years, different techniques have been applied with the integration of the opportunities offered by the developing technology. Some of these include tracking people's movement via GPS (Global Positioning System), gathering information about users and the venue through social media reviews, and monitoring from the city's security cameras. The most basic of these is direct observation. Direct observation can be performed with The Gate Method, which is one of the observation techniques of Space Syntax Theory. The Gate Method is used to count the pedestrian flow within the area by dividing the area into the observation points called '*Gate*'. By doing this, it enables large amounts of data to be collected. The method is used to observe moving people and vehicles only (Vaughan and Grajewski, 2001).

3.2. Pedestrian Activity Types

The second main indicator is the pedestrian activity types for measuring the degree of urban vitality. The most important distinguishing feature of describing an area lively rather than crowded is the variety of activities performed by the people in that area in addition to the number of people. Undoubtedly, different activity possibilities in a space always encourage more people to use that space. Instead of using a public space only as a passageway, if people perform different activities at different times of the day, vitality can be mentioned in that area. Besides the walking activity, how people use the public space is very important to create of public life. To exemplify, duration of stay for people, number of grouping people or the number of people interacting with each other is the important factors for the vitality research of a public space (Gehl, 2011; Maas, 1984; Montgomery, 1998).

Urban space is not only a physical phenomenon but also a socio-spatial phenomenon. Therefore, human interactions and activities are the most basic features that define the urban area and provide public life. Montgomery (1998) made a statement that supports this idea as: *'Without activity, there can be no urbanity'*. In brief, urban public space are the areas where social interaction and different activities takes place in the city and accessible to all people. People become a part of public life from the moment they leave their homes or private spaces.

Every activity that people perform in the public space determines the quality of that space by creating public life. For instance, at neighborhood scale, people who leave their homes and go to school or work, people who greet or chat with their neighbors in the street, children playing in the park and people who shop for their daily needs are part of public life (Gehl, 2011). All these social, cultural and economic activities take place in the public spaces inform us about the level of urban vitality of the area.

Researchers define and classify the activity types taking place in the public space that constitute public life to measure the quantitatively and to comment on the levels of urban vitality. To examine the relationship human behavior and the quality of physical environment, Gehl (2011) categorized the outdoor activities of people in the public sphere as: '*necessary activities, optional activities and social activities.*'

According to him, necessary activities are the activities that have to take place under all conditions, regardless of the physical environment. The majority of these activities take place via walking (figure 3.1.).

Optional activities are the activities that can be carried out only under suitable conditions (figure 3.2.). It means that if the weather condition, time or place is suitable to perform this kind of activity. These activities will only take place, if the place invites people to stop, play or sit, even if it is not necessary. Therefore, these activities are highly dependent on the physical design of the space. The physical features of the space allow for the variety of optional activities (Gehl, 2011).

Figure 3. 1. Necessary activities
(Source: Gehl Architects, 2004)

Figure 3. 2. Optional activities, Karaköy/ İstanbul
(Source: Taken by the author, 2019)

Social activities can take place in different ways in different places. In neighborhood scale, people encounter, greet and chat with each other on the street, or

these activities can even take place between the street and the balcony under conditions permitted by the physical space. Chatting in front of the shop, playing games with the neighbor shop owner are also examples of social activities in the neighborhood (figure 3.3.). The greater variety of social interactions at this scale results from the fact that people are more likely to get to know each other with the people they see on the street. In the city center, social activities such as greetings, talking evolve into the activities such as looking at, hearing, observing unknown people. Even social activities as hearing and seeing can be enough to attract people to a public space (Gehl, 2011).

Figure 3. 3. Social activities
(Source: Gehl Architects, 2004)

In addition, Whyte (1980) studied the public space by focusing on social activities take place in urban areas. He investigates what attracted people to urban space by observing behavior of people in plazas and small parks in New York City in his book and he noticed that watching other people, natural object, or artwork in the public space as a social activity is the important activity to attract people to a public space. He states that presence of other people attracts the most people. The most interesting of these is the girl watchers. The figure 3.4. shows men sitting next to each other to watch girls passing by.

Figure 3. 4. Girl watchers
(Source: Whyte, 1980)

Carr et al. (1992) identifies five reasons to describe people's behavior in public space: *'comfort, relaxation, discovery, passive engagement and active engagement'*. In addition to comfort, a sense of discovery and relaxation, people can be in the urban space passively or actively. *Passive engagement* is the experience urban space that users can enjoy without actively taking part. It is similar to relaxation with this aspect, but what distinguishes passive participation from relaxation is not disturbed by the presence of other people, and on the contrary, it is a pleasure to watch them. Accordingly, they define hearing, looking, and watching activities as a passive engagement in a public space. In addition, Gehl (2011) argues that the importance of passive contacts as the social activities in public life studies has been ignored. He claims that passive engagement such as hearing and see described as simple and uncertain are an important part and starting point of social activities. Places that invite people to stop and look increase the likelihood that other activities will occur. People stop, watch and start interacting.

On the other hand, planned or unplanned, a direct experience with a place and users indicates *active engagement*. Chatting with a stranger while waiting or attending an event in the public space are some of the examples of the active engagement (Carr et al., 1992).

Besides, community activities or collective meetings such as non-profit, semi-public organizations can be included in the social activity category (figure 3.5.). Especially in the neighborhood scale, these types of activities bridge over the local

government and inhabitants and these organizations take place in between places with the direct participation of the neighborhood, and redefine public spaces with a different use. It plays an important role for social gatherings with different social groups and strengthens public participation in the neighborhood.

Figure 3. 5. Non-profit organizations and community activities in the neighborhood (Source: San Francisco Bay Area Planning and Urban Research Association n.d., London community tree planting, 2019)

Necessary, optional and social activities are in a connected with each other. Gehl (2011) argued that social activities are dependent on necessary and optional activities, and generally occur as a result of these two activities. Public life studies on street vitality focuses on necessary or optional activities, but vitality in an urban space can only be observed with a mixture of all of the three activities. Since the necessary activities will take place in all conditions, when appropriate physical conditions are provided for optional activities in a place, social activities begin to occur in that place. Gehl (2011) shows the relationship between activities and physical environment in figure 3.6. He asserts that only optional activities and social activities increase when the quality of the place is good. Necessary activities are not affected by the quality of the place.

Beside other activities, social activities in public spaces are seen as a measure of vitality, and this vitality is an indicator of a successfully designed urban space, because these activities occur only when people are satisfied with their physical environment. (Jacobs, 1961; Alexander, et al., 1977; Whyte, 1980; Gehl, 2011). Observing what kind of activities people do in the public space for a day helps us to understand how that public space is used by users. To achieve this, Static Snapshot Method which is one of the observation methods of Space Syntax theory, can be used. This method is carried out on a controllable scale within a certain period of time by the observer recording people and how they use space. Both stationary and moving activities are recorded by the observer to analyze pattern of use in the area (Vaughan and Grajewski, 2001).

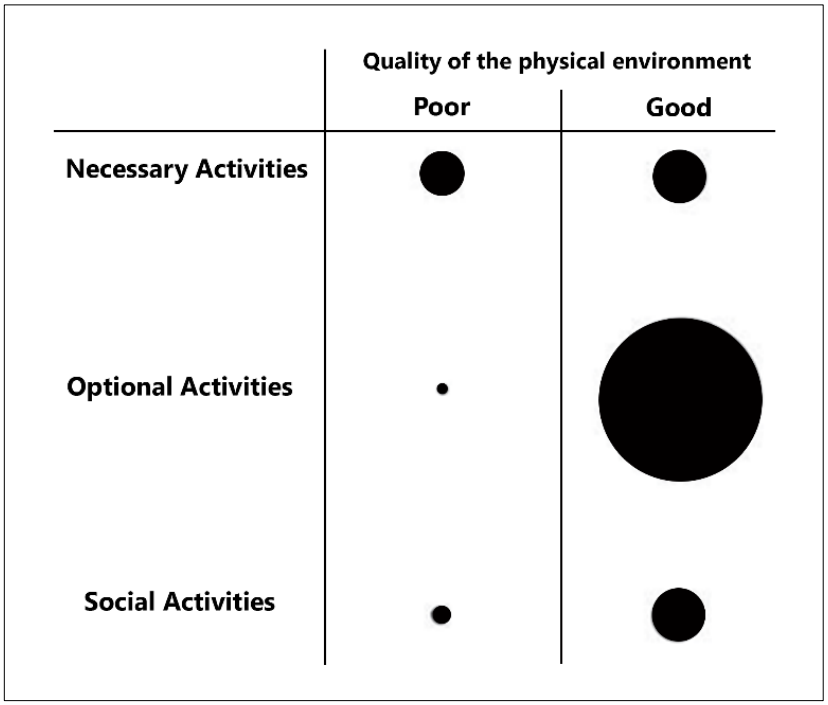

Figure 3. 6. The relationship between the quality of physical environment and the type of activities in public spaces (Source: Gehl, 2011:11)

Consequently, the principles for urban vitality indicators are not clearly specified in the literature. However, for the purpose of this thesis, a summary of the details of urban vitality indicators determined according to major findings of the urban vitality literature is presented (Table 3.1.).

Table 3. 1. Urban Vitality and Design Principles

Urban Vitality Indicator	Measured Variable	Literature Findings /Principles
Density and Heterogeneity of Pedestrians	Number of people on the street	- between 14 square meters per person and 28 square meters per person (Alexander, 1977)
	Number of vehicles	- The low density of vehicles on the street increases the walkability of that street and the demand for active transportation types (Frank and et al. 2006).
	Number of people on the street by different age groups and genders	- Different age groups, different genders, and different socio-cultural characteristics increases the possibility of more users using the space (Gehl, 2010).
Pedestrian Activity Types	Number of people walking, standing, sitting, talking etc.	- Vitality in an urban space can only be observed with a mixture of necessary, optional and social activities. -However, social activities are determinant for vitality. If there is social interaction such as talking, greetings etc., the level of vitality of that area is higher than others (Jacobs, 1961; Alexander, et al., 1977; Whyte, 1980; Gehl, 2011).

CHAPTER 4

URBAN FORM AND VITALITY

4.1. The Concept of Urban Form

In the most general sense, the concept of urban form defines as the physical character of the city. The early definition of urban form was made by the German geographer Schlüter (1899). He described urban form as a trace created by human activities on the surface. Anderson et al. (1996) define the urban form as a spatial configuration of stationary elements within a city. The physical features of the city include size, shape, scale and configuration of the settlements within the urban area. In addition to this, urban form also includes the non-physical characteristic of the city, such as density. Density refers to how many people live in a particular area. According to Lang (1987), urban form is a combination of the geographical and cultural environment. It includes the physical elements and also human's relationships with these elements in the area. Therefore, human activity in a given area is closely related to the urban form. Consequently, urban form can be defined as a spatial representation of human flow in the city area that includes social, geographical, physical and cultural relationships.

The elements of the urban form have been classified and asserted with different approaches by many scholars. Conzen (1960) who the founder of English school of morphology, divided the elements of urban form into three headings: town plan (street, plots, and building), building type and land use. He suggests a framework to analyses the urban form morphologically on different scale by using layers. His morphological analysis includes street; streets and plots; streets, plots and buildings (Figure 4.1.).

On the other hand, Lynch (1960) defined the components of urban form with the perceptual approach in his inspirational book. These components are paths, edges, nodes, districts and landmarks. Another important theorist Caniggia (1979) classified the urban form elements hierarchically as structures, systems and organisms. In addition, urban form elements can classify in terms of their features. The size, shape, scale and configuration of the elements determine the spatial pattern, density, land use, accessibility and housing characteristics in the urban area as considered the elements of urban form.

Dempsey et al., (2010) classified the elements that make up urban form in five groups in terms of feature based. These are density, land use, housing/building type, layout, infrastructure (figure 4.2).

Figure 4. 1. Basic elements of settlements
(Source: Conzen, 1960)

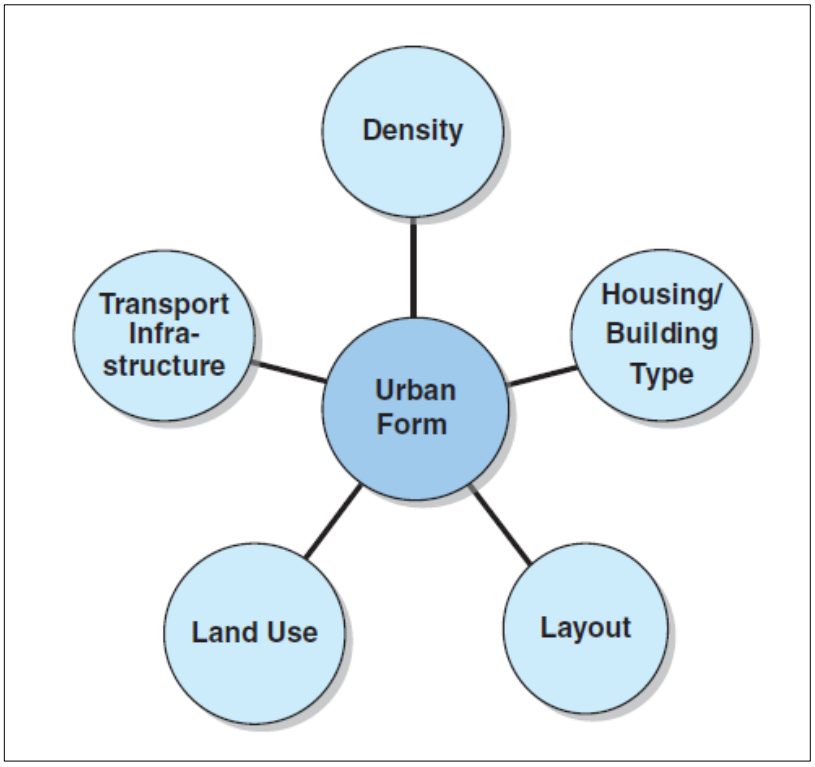

Figure 4. 2. The components of urban form
(Source: Dempsey et al., 2010:22)

After the 1960s, with the rise of social-spatial studies, the impact of the built environment on human behavior has been an important topic of discussion. Social scientist advocate that built environment is a result of the social organizations of a society. On the other hand, Hillier et al. (1993) argues that spatial configuration guides the movement of people. Physical planning and design have a nonignorable effect on urban life. The general approach in this regard is that the built environment is not determinant for human activities, but it can be supportive. It can be said that the built environment is a setting for human activities. This setting can affect human behavior negatively or positively, but it does not determine human behaviors (Zhou, 2012). Spatial features of an urban area provide conditions for enhancing social and cultural life in the city. Rapoport (1982) claim that social and cultural situations affects human behavior. However, it is the built environment that gives clues about it. Therefore, it is generally accepted that urban form plays important role on human daily life.

Urban form is a significant issue due to its effects when considering its physical and non-physical elements. The elements of urban form have direct effect on human behavior, social interaction, quality of life, urban vitality, health of a city, sustainability, travel behavior, climate change, energy consumption, resilient city (Lu et al., 2019;

Sharifi, 2019; Zumelzu and Barrientos-Trinanes, 2018; Zeng et al., 2018; Zhou, 2012). Urban form creates an environment for human activities. Accordingly, urban form described as the spatial order of human activities at a particular point of time (Anderson et al., 1996). It can be said that urban form can help to understand and define urban life. Therefore, analyzing the relationship between urban form and pedestrian flow is a significant issue to understand the vitality of the urban areas. In the light of this information, the main objective of this thesis is to reveal the relationship between urban form and urban vitality.

Besides, urban form can be explored at different scales. These scales are region, city, neighborhood, urban block, street and individual building. These can be hierarchically divided into three main groups as macro (region and city), meso (neighborhood and urban block) and micro scale (street and individual building). The components of urban form include different details according to the scales. The scales also determine how urban form is analyzed and measured. To exemplify, while building façades and materials or openings in buildings as the features of urban form are considered at a street scale, housing and street spatial layout and types are considered at a larger scale (Tsai, 2005). This thesis will focus on meso scale with considering the effects of the micro scale to explore urban vitality. Generally, the meso scale includes the structure and layout of plots, blocks, public areas, streets within the neighborhood. The meso scale components related to the form are the neighborhood design and shape, building type and features, neighborhood density, land use, layout and size of plots and blocks, street design and pattern of public open spaces (Sharifi, 2019).

4.2. Urban Vitality Factors Related to Urban Form

Considering the definitions about urban vitality and urban form in the previous chapters, the factors of urban vitality are classified into four main headings as density, diversity, accessibility and quality of built environment. While making this classification, within the scope of the purpose of this thesis, the factors that are directly related to the urban form are taken into consideration in this section. All factors are divided into subheadings within themselves according to case study characteristics of the thesis.

4.2.1. Density

In urban planning, density is a confusing concept to understand and define. However, density as a spatial term, is the quite significant component of urban form in terms of being a useful tool to estimate and control land use. There are many different density definitions. When defining the density, the most important determinant feature is which subject is research. The subject and scale of the research determines what the variables are used in density calculation and thus and density definitions differ depending on the researchers' concerns. For example, density is defined and used differently in the researches by different disciplines such as architecture, planning, urban design, phycology, social studies, economics, geography (Churchman, 1999).

Density has been a major concern for many researchers, planners, architects, decision makers. It is considered a significant factor in understanding how cities work or develop. In addition, it gives the information about the urban form. Accordingly, Martin and March (1966) are the first to review some relations between urban form and density in their book named ‘Land Use and Built Form’. In the study carried out for the redevelopment of the Whitehall region of London, they examined three different urban forms: *pavilion, street, court* (figure 4.9). According to the findings of this study, the court building form provides more land efficiency than a tower.

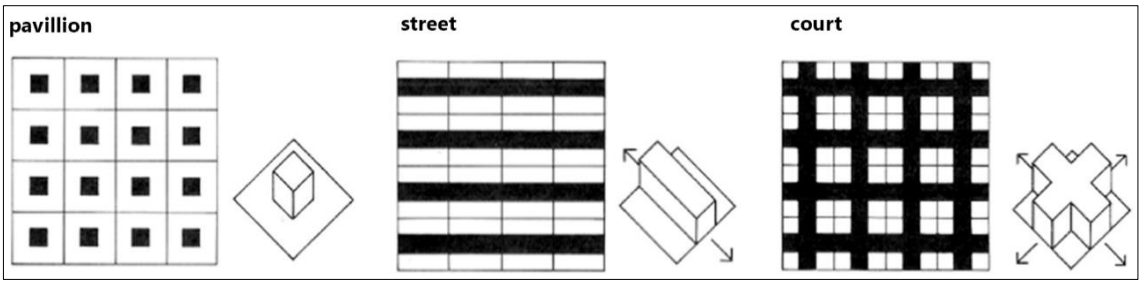

Figure 4. 3. Built forms
(Source: Martin and March, 1966)

Moreover, the density has been addressed in many different topics by researchers such as sustainability, walkability, travel, energy consumption, social interaction, quality of life, social equity, and vitality (Aquino and Gainza, 2014; Maas, 1984; Heng and Malone-Lee, 2010). Density has an advantages or disadvantages in every aspect such as

low density or high density. Although increasing density is a desired target in planning, how this density is used is much more important. Density alone is not meaningful to understand and interpret the urban form. As seen in the figure 4.10., the same density can be represented with different architectural form in the limited area. Therefore, density should be always considered with other physical and social characteristics of the urban area.

Besides, density is considered as a key element for urban sustainability. It is very important for the correct use of urban resources, as it represents how land is used. Therefore, high-density design is proposed as solutions to ensure sustainability (figure 4.10). Sustainability studies show that high-density urban forms have many advantages in terms of social, economic and environmental. Some of these advantages are reduced energy consumption, reduced emissions, creating walkable areas by reduced crime, reduced travel time, improved access the services and time and financial benefits to reach all urban facilities (Heng and Malone-Lee, 2010).

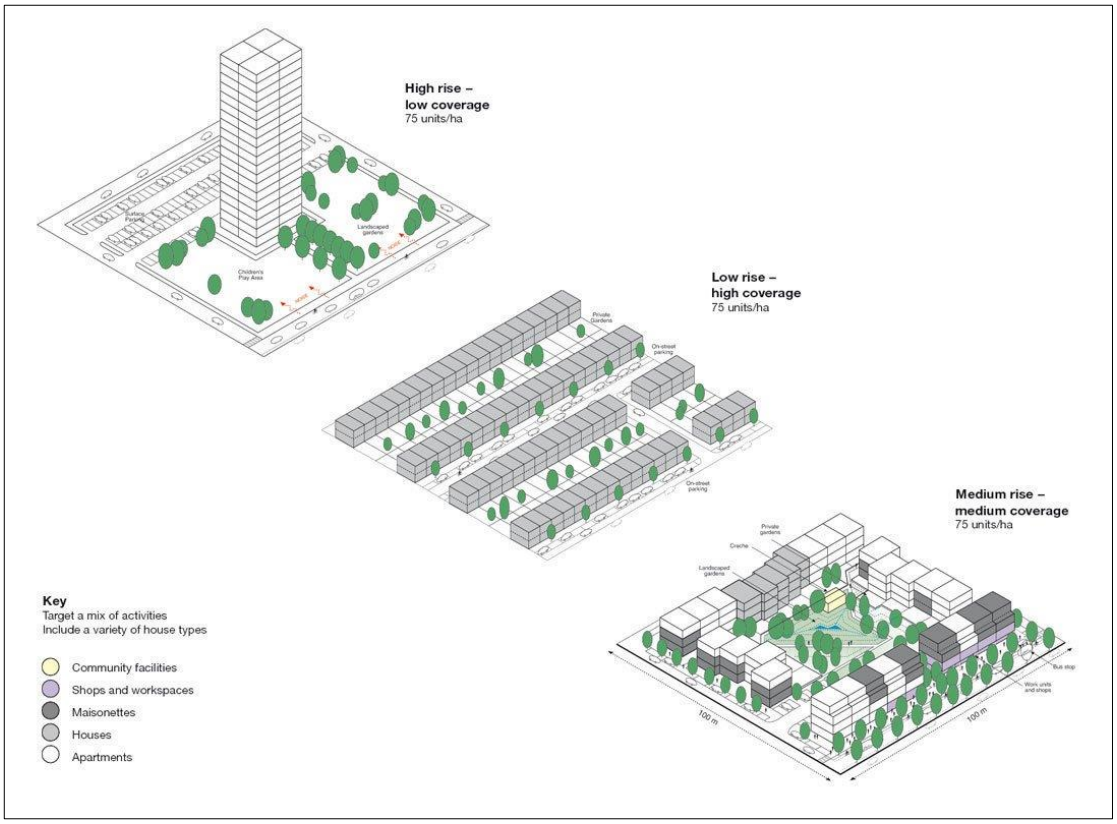

Figure 4. 4. Example of High-Density Design
(Source: Kiang Heng et al., 2010, 44)

In social aspects, density as a component of urban form is one of the factors of urban vitality. High density design promotes urban vitality. According to Talen (1999), in neighborhood scale, high density creates more opportunities for social interaction, face to face communication, and increase sense of community. In addition, it facilitates more activities, creates safer environment by increasing physical activity such as pedestrian activity, and thus contribute the urban vitality (Jacob, 1961; Cadman and Payne, 1989; Williams et al., 2000).

In the most general sense, density may be defined as a term that refer the number of people or physical unit in a specific area. Besides, Rapoport (1975) argues that density is not only a physical phenomenon, but also is a perceptible phenomenon. Besides, Alexander (1993) divides the density into three categories when defining the density: *physical, perceived and measured density*. Physical density is the density that determined by the character of the built environment. Measured density consists of quantitative concepts that can be measured such as the number of dwellings, the number of users. Besides, perceived density is related to physical density of an area, sociocultural and individual factors of users.

The other controversial issue about density is how to measure density. Density represent a ratio. The numerator and denominator that constitute this ratio may represent different quantities. Considering all cases, while the numerator represents the number of people or households, jobs, and features related to built form, the dominator represents a particular land base according to the research concern and scale such as total area or residential area; dwelling, street, neighborhood, city or metropolitan area. Square meter, Kilometers hectares can be used as a unit of measure for the dominator of density calculation. Therefore, density measures differ according to the subject to be investigated and the characteristics of the study area. In this direction, there are many ways to measure density in urban areas: floor area ratio, building site coverage, residential density, population density, employment density, gross density, net density, block density, street density, neighborhood density, city density and metropolitan density (Boyko and Cooper, 2011; Williams et al., 1996). In the early planning literature, different density measurements are used to control the urbanization. Unwin (1912), who is a British town planner, claimed that overcrowding can be limited by using dwelling density. For this claim, he suggested dwelling density to 30 dwellings per hectare. On the other hand, Garden City Plan by Ebenezer Howard suggested 55 dwellings per hectare (Mumford, 1946). In addition, after 1961, FAR (or FSI), coverage (GSI) and population density are

used as the indicators of density in New York City's Zoning Regulation (New York Department of City Planning, 1990).

Cheng (2010) claims that people density and building density is usually used as density measurements in urban planning studies. People density also known as population density is the number of people or inhabitants in the given area. Building density also called residential density represents the number of dwelling units per given area. In addition, urban features affect people's perception of density, such as building height-street width ratio, pavement and street widths, street furniture and trees. As a result, density has been accepted in different ways in different geographies with a different concern.

Considering the vitality literature and the purpose of the thesis, density will be measured as residential density and coverage in the case study area:

- **Residential density;** represents the number of dwelling units per hectare. It is calculated the number of dwelling units divided by total residential area of the neighborhood. While Montgomery (1998:103) proposed 125 dwellings per hectare as a minimum residential density, 175 dwellings per hectare (public streets area are included) is proposed by Jacobs (1961) to achieve vital urban areas.
- **Coverage;** represents the relationship between built and non-built areas in the neighborhood. It can be examined with the method of figure-ground analysis used by Colin Rowe and Fred Koetter in 1978, or it can be calculated as a ratio called Ground Space Index (total footprint divided by total area of the neighborhood) (Berghauser and Haupt, 2009; Jong, 2011). Some scholars advocate that high lot coverage helps to achieve urban vitality. Jacobs (1961:214) suggested minimum 60 and maximum 80 percent for the building blocks as a high lot coverage. She argued that high lot coverage allows people to go out to the streets, parks or public spaces, thereby creating vibrant urban areas. In addition, Amick and Kviz (1975) claimed that social interaction is increasing by preferring low-rise buildings with high lot coverage instead of high-rise buildings with low lot coverage.

4.2.2. Diversity

Diversity, as a concept in urban planning, is based on the types of activities, uses and users that exist in an urban space, and the physical variety in the built environment. Lack of diversity is one of the most significant criticisms about contemporary cities after 1960's. Especially, mixed-use developments that started to decline in the modern period started to be emphasized again. In general, criticisms were expressed by conducting studies on walkability, physical activity levels, travel demand and time, quality of life, vitality, active street life, social interaction, economic growth and sustainability (Jacobs, 1961; Maas, 1984; Montgomery, 1998; Landry, 2000; Frank et al. 2006; Gehl, 2011; Saeidi and Oktay, 2012).

Diversity is one of the essential factors of urban vitality. According to definitions of vitality, the number of heterogeneous pedestrian and different activity types as the indicatives of vitality are positively affected by the diversity provided in urban areas. Jacobs (1961:150), one of the pioneers who mentioned the important of diversity in urban planning, proposed four conditions to indicate how diversity can be achieved in cities as; mixed primary functions, small blocks, different ages and types of building, and density of people and housing. She explained the conditions as follows,

- an urban district should have at least two or more uses such as living, working, shopping, education etc.
- more access to the street should be provided with short blocks.
- an urban district should offer different types of buildings in terms of their ages, sizes and design features.
- the urban district should have the high density of both inhabitant and pedestrian.

As a result, the neighborhood with these conditions offers more options for people to walk, talk or social interaction with each other and thus, urban vitality can be obtained by providing these conditions. On the other hand, Montgomery (1998) mentioned that secondary uses are also important when providing the mixed uses for achieving vital urban areas. It means that variety of small businesses in an urban block nourishes the neighborhood both economically and socially. Besides, he illustrated the good street design to explain mixed use both vertically and horizontally (figure 4.11.).

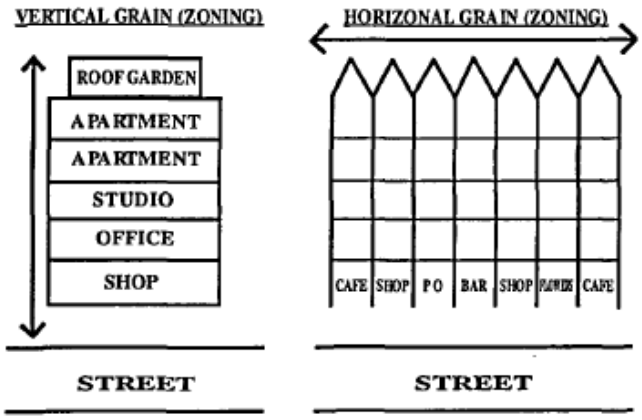

Figure 4. 5. Designing a good street
(Source: Montgomery, 1998:110)

According to the literature examined above, diversity measurements related to urban form can be carried out with analysis of housing typology and land use analysis.

- **Housing typology;** represents the type of the housing. Housing types are classified according to the physical properties of the housing such as the relationship with the environment and site, scale, size, and structure. The type of housing can be classified as detached house, semi-detached house, row house and small rise apartment blocks, mid-rise apartment blocks and high-rise apartment blocks to analyses. Diversity of the housing types increases diversity of the people in the residential area (Wheeler, 2015).
- **Land use analysis;** basically, helps to understand how the land is used by classifying the categories as residential, commercial, industrial, institutional, agricultural, open and green public areas etc. In addition, Ground floor land use analysis is a useful tool to analyze mixed use developments.

4.2.3. Accessibility

Accessibility is defined the convenience and possibility of reaching the desired place from a particular location by different transportation modes such as private vehicle, public transportation, cycling or walking (Sten Hansen, 2009). A successful public space must be accessible to all by its definition. Therefore, accessibility can be examined in two ways. One of these are the transportation network of the area with its environment. It

depends on the different transportation modes that exist to access the area. The other aspect is about the internal links in the area. The streets of the area must be designed considering easy access for everyone (included elderly or disabled people), and any time of the day. The fact that an urban area is easily accessible to everyone indicates that more people are likely to access and interact each other in that area. Accessible streets and the other public spaces in a meso scale positively affect the social and economic interactions between residents and other people. For this reason, considering the urban vitality in public spaces, accessibility is one of the most important factors (Maas, 1984; Ravenscroft, 2000; Landry, 2000).

The accessibility of an urban block depends on some of its physical characteristics. In the context of the thesis, the accessibility measurements will be considered as the location, public transport distance, retail distance, open and green area distance, size of blocks.

- **Location;** represents the geographic location of the neighborhood within the city and its connections with its environment.
- **Public transportation distance;** represents the distance of the public transportation stations within the neighborhood. The shorter distance to public transportation stations provides higher accessibility. According to the researchers, considering walking distance, the distance of public transportation stations should be between 400 meters and 800 meters (Southworth, 2005; Wu et al., 2017).
- **Retail distance;** represent distance of the nearest retail site in the neighborhood.
- **Open and green area distance;** represents the distance of the nearest park, playground in the neighborhood.
- **Size of blocks;** represents the length of the street block frontages. Jacobs (1961) suggested that the length of the blocks should be maximum 90 meters and she stated the reason as follows: '*Shorter blocks would facilitate more encounters and interactions between people*' (Jacobs, 1961:150). As the turns increase with the shortening of the block lengths, people increase in the edges of the street, and thus the possibility of the interaction with each other is increased (figure 4.12.). According the literature, the length of block has been accepted up to 100 meters, but 60 and 70 m street blocks length has been suggested as ideal for pedestrian mobility (Jacobs, 1961; Gehl, 2010).

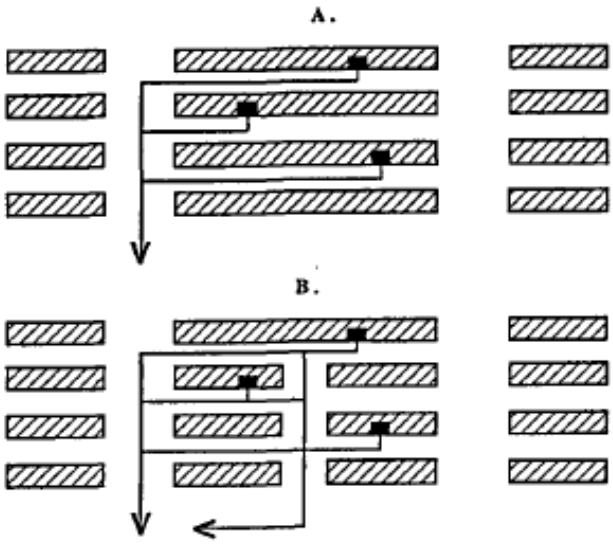

Figure 4. 6. Urban blocks: a) long blocks; the less possibility to encounter b) shorter blocks create more street life (Source: Montgomery, 1998:108)

4.2.4. Quality of The Built Environment

Quality of the built environment is another important factor of urban vitality. The neighborhoods should be designed or reorganized to support walkability, people's social life, and interaction with others. Accordingly, urban vitality is affected by the aesthetic and functional features of the urban areas and their quality positively affects the level of urban vitality.

Considering the objective of the thesis, number of floors, building ground floor façade features, street width, pavement width and materials, street landscape, street furniture will be considered to evaluate the quality of the built environment.

- **Number of floors;** affects the connection that people establish between indoor and outdoor spaces. Gehl et al. (2006) asserted that considering people's visual angle, people interact more with each other in the streets with low-rise buildings than in the streets with high- rise buildings. As seen in the figure 4.13., they measured effective viewing distances for people according to street width. on the other hand, due to the high number of people living in the area with high-rise buildings, more people can be seen in the street, but this can only be seen within the scope of necessary activities. As the visual contact with the street is poor for

people living in upper floors, the possibilities of interactions that are important for urban vitality are decreasing for that streets (Gehl, 2011).

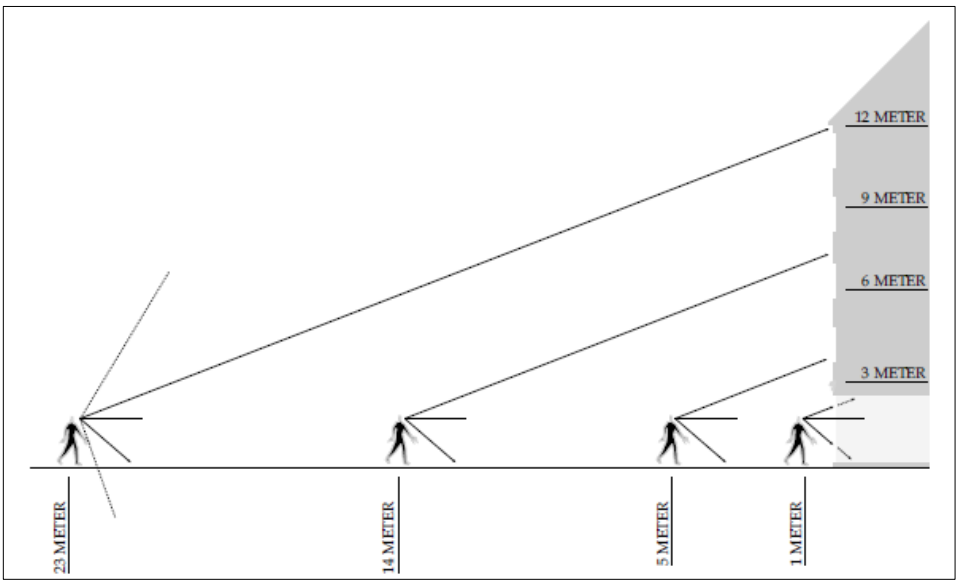

Figure 4. 7. Effective viewing distances
(Source: Gehl et al., 2006:33)

- **Building façade activation analysis;** includes the evaluation of the ground floor frontage of buildings in a street in terms of their openings and design. The physical design feature of the building such as entrances, openings, or niches, help to increase the permeability of the building, and thus it creates new possibility to diversify and density of the activities of people by strengthening the communication between the street and the interior. Gehl et al. (2006) conducted a study in Copenhagen in 2003 in order to explore the relationship between the facades and public life. They selected the different streets in terms of their ground floor design and classified the facades into five categories; *vibrant, active, dull, inactive and blind* (figure 4.14). Their findings showed that small units with many doors and horizontal design variations promote more activity and thus have more public life rather than the blind frontages.

Figure 4. 8. Façade evaluation scale
(Source: Gehl et al., 2006:41)

On the other hand, Gehl et al. (2006) are mentioned an example about the renovation the blind facade for a ground floor of a hotel complex that destroyed street environment in Melbourne, Australia. After the renovation in the façade, the street environment has affected positively (Figure 4.15.).

Figure 4. 9. a) a hotel complex with a blind façade b) after the façade reopened
(Source: Gehl et al., 2006:43)

- **The width and materials of street and pavement;** One of the most important features that affect people to use the street is the pavement widths or materials that encourage them to walk. According to literature, pavement width varies depending on the location of the street, service capacity and usage. The minimum acceptable value for pavement widths according to Turkish Standards Institution (2012) is 1.5 m. On the other hand, pavement widths should be large (about 3-4 meters) for sidewalk cafes that have a major impact on urban vitality in commercial streets.

  In addition, pavement material is very significant in terms of encouraging people who have walking difficulties to walk (disabled people or strollers etc). As seen in the figure 4.16., In New York, with the temporary study carried out by changing the street material in Times Square, and how people use the space were

observed and then the area was permanently transformed into a plaza with different street materials and street elements.

Figure 4. 10. Transformation of Times Square, New York in 2009
(Source: NYC Department of Transportation, 2012)

- **Landscape analysis;** represents the varieties and locations of plants on the street. Vegetation in the public space contributes the public life by providing comfort for people in terms of functional and aesthetical aspects. To exemplify, the tree in a public space can act as a canopy on a sunny day or define space for people to stop and chat (Montgomery, 1998). In addition, while designing a street landscape, the location, size, type and suitability for climate conditions of the plant should not be ignored.
- **Street furniture;** is important to promote to spend more time for people in the public space by supplying their physical needs (seating, relaxing and so on). In addition, sculptures, painted walls etc. in the public space contribute the street life.

As a result, considering the purpose of the thesis and the characteristics of the field of study, the principles for urban vitality factors related to urban form are determined. Table 4.1. provides the detailed definition of the measured variables of the factors and principles according to the major findings of literature review.

Table 4. 1. Urban Vitality Factors and Design Principles

Urban Vitality Factors		Measured Variable	Literature Findings/ Principles
Density	Residential Density	The number of dwelling units per hectare	- 125 dwellings per hectare as a minimum residential density (Montgomery, 1998). - 175 dwellings per hectare (public streets area are included) to achieve vital urban areas. (Jacobs, 1961)
	Coverage	Built-up areas and non-built-up areas	- Min. 60 and max. 80 percent for the building blocks as a high lot coverage (Jacobs, 1961).
Diversity	Housing Typology	The type of the housing	- An urban district should offer different types of buildings in terms of their ages, sizes and design features.
	Land Use Analysis	Classification of land in terms of use (as residential, commercial, industrial, institutional, agricultural, open and green public areas etc.)	- An urban district should have at least two or more primary uses such as living, working, shopping, education etc. - Mix use is essential for vitality (Jacobs, 1961).
	Ground Floor Land Use Analysis	Classification of ground floor land use	- The Variety of ground floor use offers more options for people to walk, talk or social interaction with each other (Montgomery, 1998).
Accessibility	Location	The distance to city center of the neighborhood	- The shorter the distance, the greater the vitality
	Public Transportation Distance	The distance of the public transportation stations within the neighborhood	- Considering walking distance, the distance of public transportation stations should be between 400 meters and 800 meters (Southworth, 2005; Wu et al., 2017).
	Retail Distance	The distance of the nearest retail site in the neighborhood	- The closer to the retail site, the greater the intensity of economic activity (Maas, 1984).
	Open and Green Space Area Distance	The distance of the nearest park in the neighborhood.	- There should be a small green area of 2 ha within 400 m walking distance of every houses in the neighborhood (Zuniga-Teran, 2015).
	Size of Blocks	The length of the street block frontages	- 60 and 70 m street blocks length has been suggested as ideal for pedestrian mobility. It should be max. 90 and 100 meters (Jacobs, 1961; Gehl, 2010).
Quality of Built Environment	Number of Floors analysis	Number of floors of the buildings on the street	- Maximum 3 or 4-storey buildings on an average 12-14-meter street (Gehl et al. 2006).
	Building Façade Activation Analysis	The evaluation of the ground floor frontage of buildings in a street in terms of their openings	- Small units with many doors and horizontal design variations promote more activity and thus have more public life rather than the blind frontages (Gehl et al. 2006).
	The Width of Street and Pavement	The Width of Street and Pavement	- Pavement widths should be at least 1.5 m. (Turkish Standards Institution, 2012)
	Landscape Analysis	Number and location of plants on the street	- The tree in a public space can act as a canopy on a sunny day or define space for people to stop and chat (Montgomery, 1998).
	Street Furniture	The Presence of Street Furniture	- Street furniture should be designed to supply the needs of people (seating, relaxing and so on) and to reflect the urban identity of the space (Güneş, 2005).

CHAPTER 5

CASE STUDY: THE IMPACT OF URBAN FORM ON URBAN VITALITY IN THE NEIGHBORHOOD OF YENİKALE

The purpose of the thesis is to determine and assess the impact of urban form on urban vitality in residential areas. For this purpose, Yenikale Neighborhood in Narlıdere/ İzmir is chosen as the case study area for the assessment of the urban vitality.

5.1. Research Method and Tecniques Of The Case Study

The case study is conducted in two main parts. The first part of the research is conducted by gathering detailed information about urban vitality and urban form components and the second part of the research includes data analysis about urban vitality level of Yenikale Neighborhood and urban vitality factors related to urban form in Yenikale Neighborhood.

In order to carry out comparative analysis, zoning method is used. In terms of urban form characteristics two different zones are selected within the neighborhood. Zone 1 has a gated community and residential use. Zone 2 has mixed use with attached buildings. Accordingly, urban vitality indicators (density and heterogeneity of pedestrian flow and pedestrian activity types) are analysed separately on the five streets of each selected zone. As a result of the analyses, the urban vitality level of each selected street in two zones are determined by the scoring method. Besides, urban vitality factors related to urban form are analysed on each street. According to result of urban form analyses, each street is scored to evaluate which factor has an impact on urban vitality. Finally, the data obtained from urban form analyses are compared with the urban vitality level for selected two zones in Yenikale (figure 5.1).

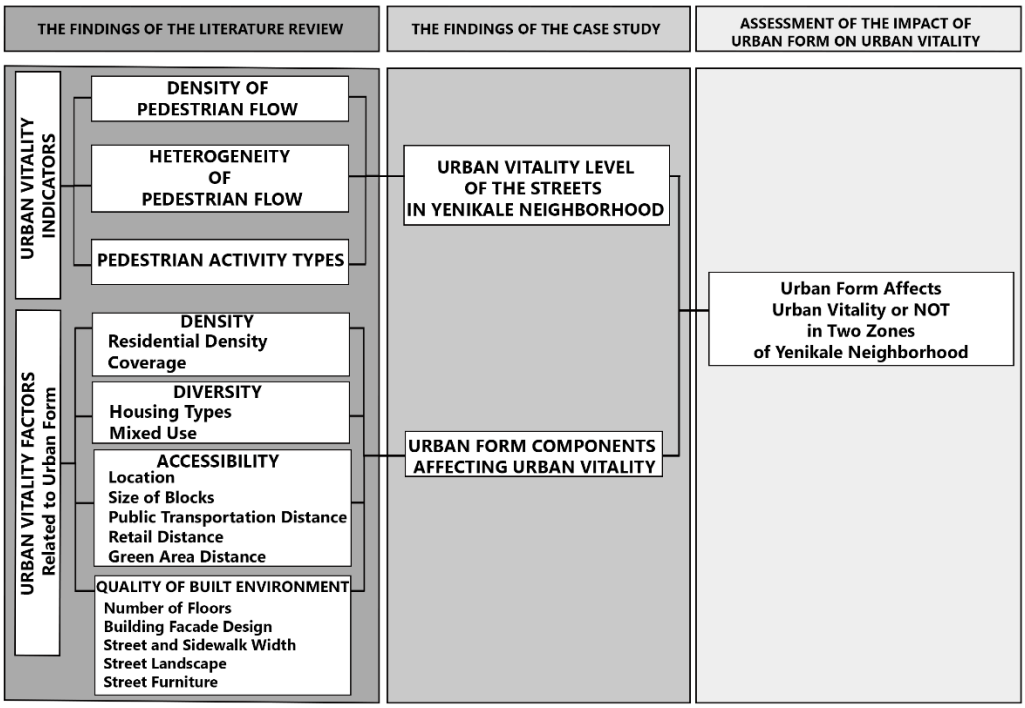

Figure 5. 1. The method of the case study

Data collection and analysis for urban vitality level: For the collection of the quantitative data of each urban vitality indicator, direct observation tool is used (Table 5.1). In direct observation, the researcher collects the data about the field by watching rather than participating. The data of density and heterogeneity of pedestrian flow is conducted by counting the number of people and writing down the user profile on the street. The counts were conducted on the first week of the March in 2020. Different time intervals for the counts were determined for the weekend and weekdays according to rush hour;

- 08.00- 09.00 for the weekday morning
- 17.00- 18.00 for the weekday evening
- 12.00- 13.00 for the weekend morning
- 18.00- 19.00 for the weekend evening

- For pedestrian density the Gate Method which is one of the most effective methods is used in this study. The researcher stops at a point where she/he can see the entire street where she/he counts, and this point is called Gate. She/he creates

an imaginary line. Every moving people and vehicles count that passes through this line is counted.

- For pedestrian activity types, the Static Snapshot Method which is one of the observation methods of space syntax theory is used. Each 1-hour time interval mentioned above is divided by four parts and a view of the street is taken in 15 minutes. This means marking the types and locations of the activity carried out in the street on the map. Thus, the behavior map of the area is created.

Table 5. 1. Method of Data Collection and Analysis for Urban Vitality Level

Urban Vitality Indicators	Data to be collected	Data collection from	Analysis Method	Analysis Technique
Density of Pedestrian Flow	Number of people on the street	Direct Observation	Gate Method	Table
	Number of vehicles	Direct Observation	Gate Method	Table
Heterogeneity of pedestrian flow	Number of people on the street by different age groups and genders	Direct Observation	Gate Method	Table
Pedestrian activity types	Number of people walking, standing, sitting, talking etc.	Direct Observation	Static Snapshot Method	Table and Behavioural Mapping

Data collection and analysis for urban vitality factors related to urban form: Institutional data, web- based data, and the data collected from direct observations and photo interpretations are used (Table 5.2). As the analysis technique Mapping was used for all analyses, except street furniture. The presence of street furniture is indicated using the Checklist Method with the table. Residential density, location, public transportation distance, open and green space area distance, and size of blocks are calculated through the GIS (Geographic Information System) analysis methods and tools. Housing typology, number of floors Analysis, building façade activation analysis, street and sidewalk width and landscape analysis are carried out using classification by scaling according to their subjects.

Table 5. 2. Method of Data Collection and Analysis for Urban Vitality Factors

Urban Vitality Factors		Data to be collected	Data collection from	Analysis Method	Analysis Technique
Density	Residential Density	Number of dwelling units per hectare	Institutional data Web based data	Table	GIS-based analysis
	Coverage	Building footprint	Web based data	Map	Figure-ground analysis method
Diversity	Housing Typology	Type of the housing	Direct Observation	Map	Classification
	Land Use	Land use (residential, commercial, industrial, institutional, open and green public areas, agricultural etc.)	Observation, institutional data	Map	Land Use Analysis
	Ground Floor Land Use	Ground floor land use information	Observation, institutional data	Map	Ground Floor Land Use Analysis
Accessibility	Location	Distance to city center of the neighborhood	Web based data	Map	GIS-based analysis
	Public Transportation Distance	Distance to the public transportation stations within the neighborhood	Web based data	Map	GIS based analysis
	Retail Distance	Distance to the nearest retail site in the neighborhood	Web based data	Map	GIS-based analysis
	Open and Green Space Area Distance	Distance to the nearest park in the neighborhood.	Web based data	Map	GIS-based analysis
	Size of Blocks	Length of the street block frontages	Web based data	Map	GIS- based analysis
Quality of Built Environment	Number of Floors analysis	Number of floors of the buildings on the street	Direct Observation, Photography	Map	Classification
	Building Façade Activation	Openings and design of the ground floor frontage of buildings on the street	Direct Observation, Photography	Map	Classification
	Street and Sidewalk Width	Width of Street and Sidewalk	Observation, institutional data	Table	Checklist
	Landscape	Number and location of the plants on the street	Direct Observation, Photography	Table	Checklist
	Street Furniture	Presence of Street Furniture	Direct Observation, Photography	Table	Checklist

5.2. General Information About Yenikale Neighborhood

In this part, firstly, the geographic location of the case area within the city of İzmir is introduced and general information is given about the district of Narlıdere in which the case area is located. Secondly, socio-demographic and economic structure of Yenikale Neighborhood are elaborated.

5.2.1. Location and Street Network of The Study Area

The case study area is located in Narlıdere District in İzmir. Narlıdere District is located to the south of İzmir Bay. It borders with Balçova district on the east, Güzelbahçe district on the west and Karabağlar district on the south. It is naturally bordered by İzmir Bay in the north and the Çatalkaya Mountain in the south (figure 5.2.). The Narlıdere District is 16 km away from İzmir city centre. The area of the district is 64,03 square kilometers. 20 percent of the area is built-up area, 10 percent is agricultural area, 70 percent is nursery and woodland (Narlıdere Municipality 2020-2024 Strategic Plan Report, 2020).

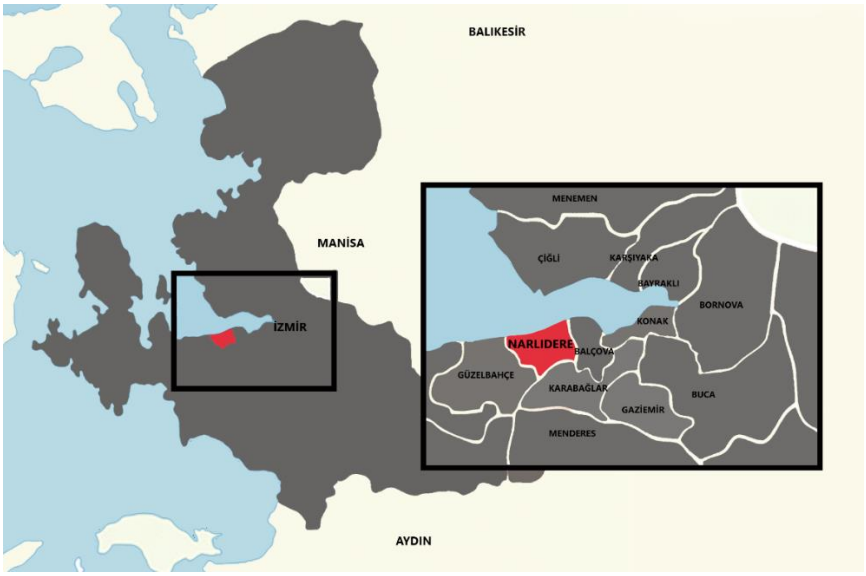

Figure 5. 2. The location of the Narlıdere in İzmir
(Source: Prepared by the author based on Narlıdere Municipality 2020-2024 Strategic Plan Report, 2020)

11 neighborhoods is located within the boundaries of Narlıdere district (figure 5.3). These are Limanreis, Huzur, Narlı, Çatalkaya, Çamtepe, Yenikale, Atatürk, Ilıca, 2. İnönü, Altıevler and Sahilevleri Neighborhood.

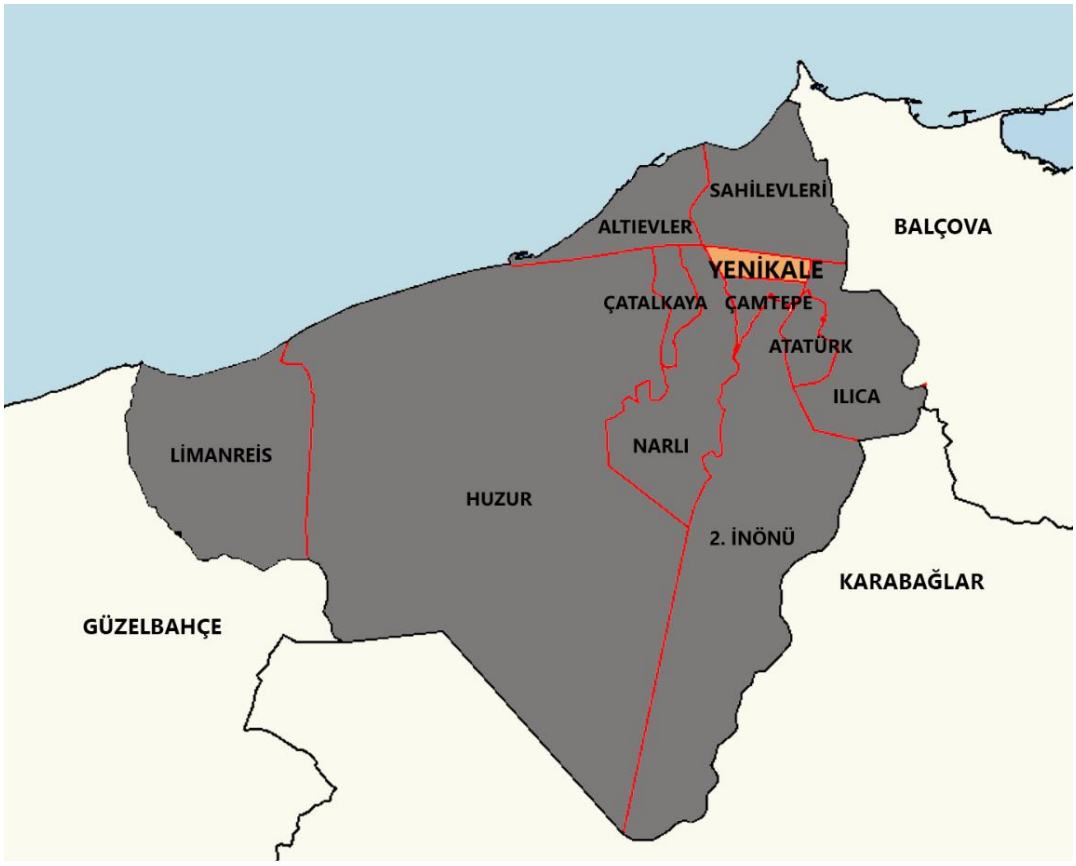

Figure 5. 3. Boundary of Neighborhoods in Narlıdere
(Source: Prepared by the author based on Narlıdere Municipality 2020-2024 Strategic Plan Report, 2020)

Yenikale Neighborhood has an area of 0,39 square kilometers. It is surrounded by İzmir- Çeşme Highway and Mustafa Kemal Sahil Boulevard in the north and Mithatpaşa Street in the south. General land uses around the study area are residential and agricultural uses (figure 5.4.). Public transportation to the area is provided by buses along the Mithatpaşa Street. Another option for public transportation to the area is minibus. Mustafa Kemal Coastal Boulevard to the north of the area is on the minibus route running between Fahrettin Altay and Urla. Additionally, the area will be directly connected to the Bornova District via Narlıdere- Fahrettin Altay metro line which is currently under construction.

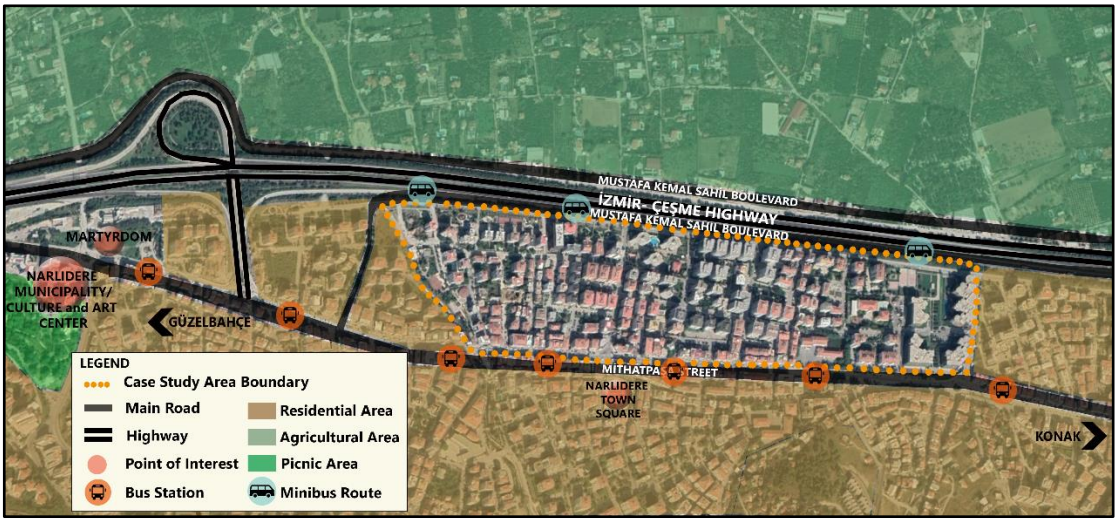

Figure 5. 4. Boundary of The Case Study Area
(Source: Prepared by the author based on satellite image, 2020)

One of the reasons for choosing the Yenikale neighborhood as a case area is that the built environment with different morphological features can be observed in the area.

Another reason for determining the Yenikale neighborhood as a case study area is the location within the district. The neighborhood is located in the important axis within the Narlıdere District. Mithatpaşa Street is the main transportation axis for the connection between Güzelbahçe and Konak. It has a commercial function in terms of its ground floor land uses. According to retail and foot index calculated between the commercial streets in neighborhoods of the Narlıdere District, the section of Mithatpaşa Street in Yenikale (23,35/ 100) and Çamtepe Neighborhoods (28,93/100) has the highest score (figure 5.5). Retail index are calculated within the framework of a certain formula, taking into account the number of workplaces data and their impact areas in the commercial streets of the neighborhood (Köseoğlu, 2019). Considering the contribution of economic vitality to urban vitality, the high economic activity intensity of the Mithatpaşa Street section on the border of Yenikale Neighborhood has been evaluated as another potential data to select the Yenikale Neighborhood as a case study area.

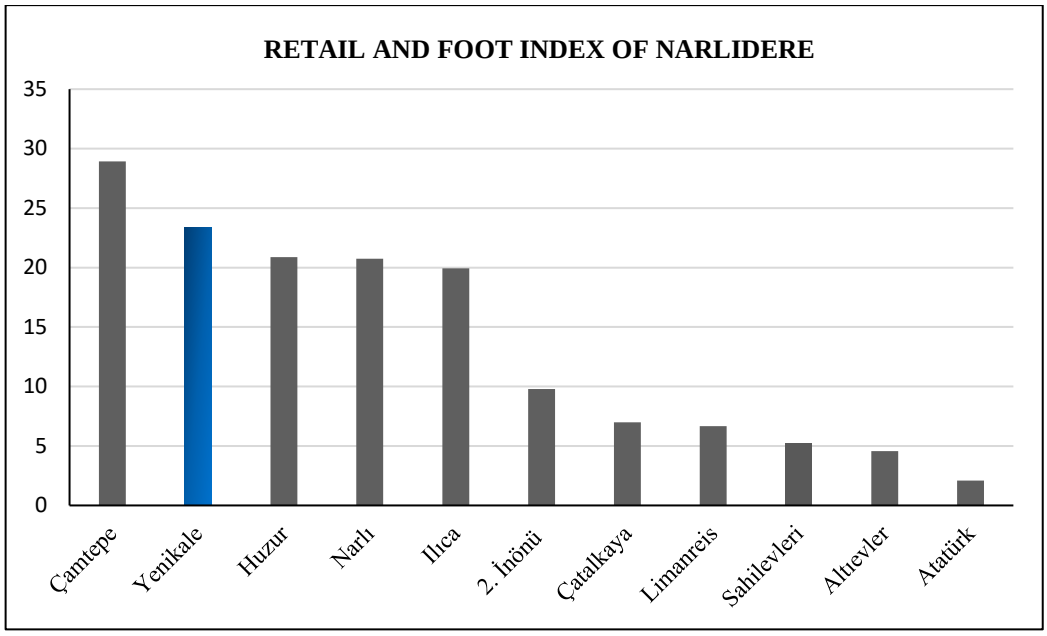

Figure 5. 5. Retail and Foot Index of Narlıdere
(Source: The data are adapted from Köseoğlu, 2019)

Accordingly, two different zones are selected to compare the impact of urban form on urban vitality. Figure 5.6 shows the location of two zones within the Yenikale Neighborhood.

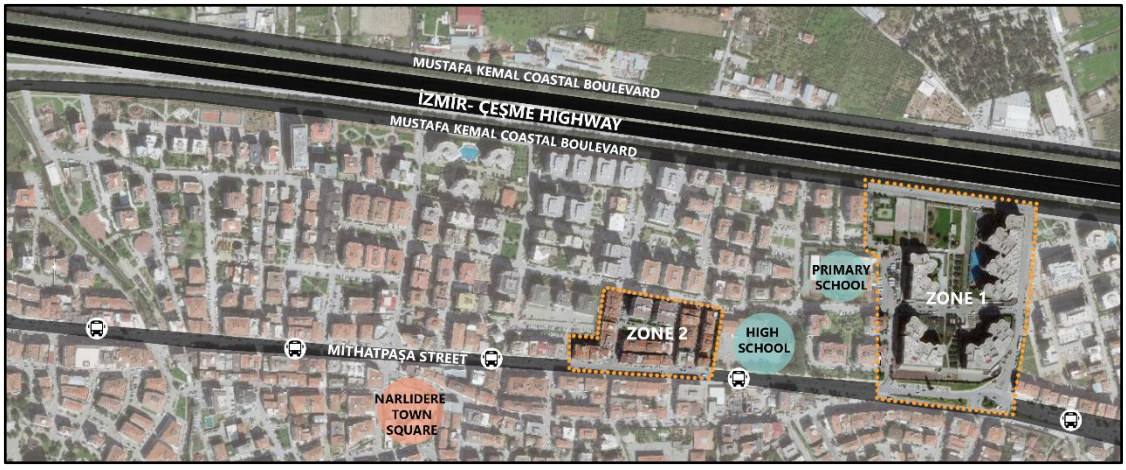

Figure 5. 6. Location of the Zone 1 and Zone 2

Zone 1 is located on the east part of the neighborhood. It has a residential use with high-rise apartment blocks within a private residential site (figure 5.7). Zone 1 is surrounded by Mithatpaşa Street and Mustafa Kemal Coastal Boulevard.

Zone 2 is located in the area where the economic activity is higher in the neighborhood. It has mixed use with attached buildings (figure 5.7). In addition, a high school (Mehmet Seyfi Eraltay Anatolian High School) is located near the Zone 1.

Figure 5. 7. Boundary and General Urban Form Characteristics

5.2.2. Socio-demographic and Economic Structure of The Study Area

Socio- demographic characteristics of residents should be taken into consideration when evaluating the urban vitality data of the area. Table 5.3. gives information about the socio-demographic characteristics of residents in Yenikale Neighborhood. Total population of the neighborhood is 5606. The distribution of the population is almost equal

according to gender. 46, 98 percent of the population consists of adult (35-64) people. In addition, half of the population is employed. The level of education of the neighborhood is high. 39,07 percent of the population has the university level of education. 60 percent of the population has at least high school education or higher. Average household income is quite high. Another important data is car ownership. 81,71 percent of the population owns a car. Considering that 19 percent of the total population is over the age of 18, it can be said that a household has more than one car. This can give an information about the transportation preferences of the residents.

Table 5. 3. Socio-demographic Characteristics of Residents in Yenikale Neighborhood (Source: The data are adapted from MAPTRIKS Databank and TUIK, 2020)

Total Population		**5606**	
Household Size		**2,69**	
Household Income (TL/ Month)		**18800**	
Population Characteristics		Number (person)	Percent (%)
Gender	Male	**2638**	**47,06**
	Female	**2968**	**52,94**
Age Group	Children (0-14)	**829**	**14,79**
	Youth (15-34)	**1323**	**23,6**
	Adult (35-64)	**2634**	**46,98**
	Elderly (65+)	**820**	**14,63**
Educational Level	Elementary school	**1600**	**28,54**
	Secondary school and High school	**1816**	**32,39**
	University	**2190**	**39,07**
Marital Status	Married	**2904**	**60,79**
	Single	**1099**	**23,01**
Occupation	Unemployed	**304**	**5,42**
	Employed	**2878**	**51,33**
	Student	**260**	**4,63**
	Retired	**431**	**7,68**
Car Ownership	Number of cars	**4581**	**81,71**

In addition, different small-scale businesses that are determinant of economic vitality is quite significant to achieve urban vitality. Figure 5.8 shows retail store types in Yenikale Neighborhood. A total of 22 bank or ATM on Mithatpaşa Street provided financial service. The second most common retail type is hairdresser. Unlike other retail types, it is observed that hairdressers are equally located in the neighborhood area. The third most common type of food and beverage places are located mainly on Mithatpaşa Street. Apart from that, it is seen that it is concentrated on Şehit Onur Akarsu Street.

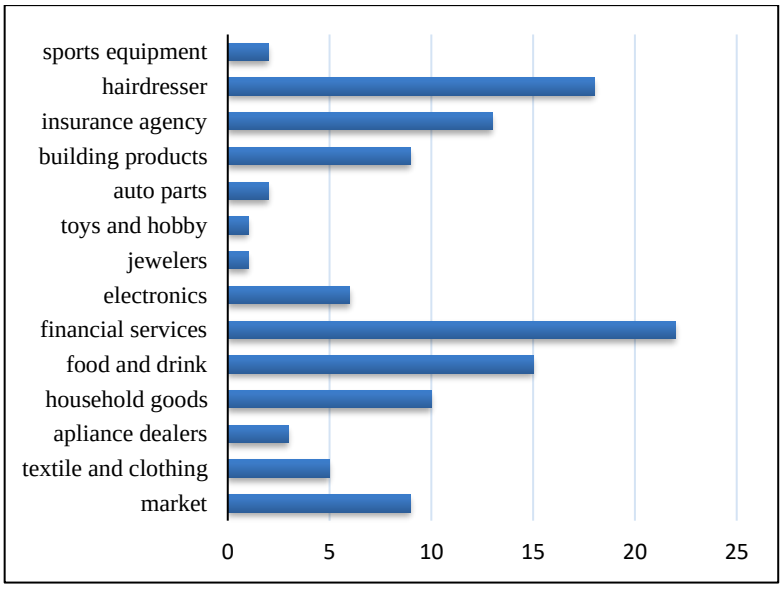

Figure 5. 8. Retail Store Types in Yenikale Neighborhood

Consequently, when the monthly expenditure distributions of the inhabitants are analysed, it is seen that expenditures are made for transportation, household goods and holidays, except for mandatory needs such as housing/water/gas/electricity and food/drink (figure 5.9).

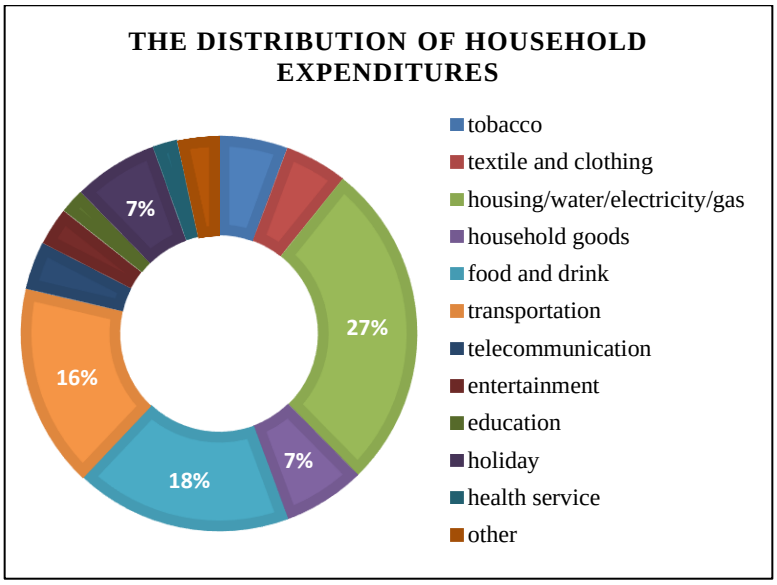

Figure 5. 9. The distribution of Household expenditures
(Source: The data are adapted from MAPTRIKS Databank, 2020)

5.3. Urban Vitality Level of The Selected Zones

As described in the previous chapters, urban vitality analyses are carried out by determining the urban vitality indicators. These are the number of people on the street, user profiles according to age and gender, and the types of activities they perform on the street. Therefore, pedestrian density, pedestrian heterogeneity and types of pedestrian activity were analysed on the streets of the selected zones. To measure the urban vitality quantitatively, counting is carried out on selected streets in each zone using Gate Method which is one of the spatial observation techniques. 5 streets in Zone 1 and 5 streets in Zone 2 are selected.

İsmail Cem Street, the section of Mustafa Kemal Coastal Boulevard located on the boundary of Zone 1, Çeltek Street, Gazeteci Fevzi Yılmaz Street, and the section of Mithatapaşa Street located on the boundary of Zone 1 are selected in Zone 1 (figure 5.10).

Figure 5. 10. General views of the observed streets in Zone 1

Şehit Onur Akarsu Street, Mehmet Seyfi Eraltay Street, Cüneyt Street, Filiz Street, and the section of Mithatapaşa Street located on the boundary of Zone 2 are selected in Zone 2. General views of the selected streets are shown in the figure 5.11.

The analyses are carried out by counting and observation on the first week of March, one day on weekdays between 08.00- 09.00 in the morning and 17.00-18.00 in the evening, one day on weekends between 12.00-13.00 and 18.00- 19.00 in the evening. The observer carried out counting by standing at the *Gate* which is determined as an observation point according to the observer's view distance. In cases where the street is longer than the viewing distance, observers made observations at two different Gates at the same time.

Figure 5. 11. General views of the observed streets in Zone 2

5.3.1. Pedestrian Density Analysis of The Streets

Pedestrian density, as one of the indicators of urban vitality, is important in determining the routes that pedestrians prefer and use the most. Pedestrian density is obtained by counting people walking on the street during the observation period. The observations and counting in each Zone are conducted on Friday between 08.00 -09.00 and 17.00-18.00 and on Saturday between 12.00-13.00 and 18.00-19.00. Additionally, the vehicle density of the streets is determined by counting the moving vehicles for each street.

According to the results of pedestrian density analysis in Zone 1, the maximum number of pedestrians are observed on the Çeltek Street, both on weekday and on weekend (table 5.4.). The minimum number of pedestrians are observed on M. Kemal Coastal Boulevard, both on weekdays and on weekends. Considering the whole streets of Zone 1, the number of pedestrians observed on weekday is higher than the weekend. No significant difference is observed between weekdays morning and evening hours. On the other hand, for the weekend, relatively more people are observed in the evening hours.

Table 5. 4. Number of Pedestrians observed in Zone 1

Observation Period / Streets	**Weekday (08.00- 09.00)**	**Weekday (17.00- 18.00)**	**Total Weekday**	**Weekend (12.00- 13.00)**	**Weekend (18.00-19.00)**	**Total Weekend**
G. Fevzi Yılmaz Street	63	45	**108**	43	45	**88**
İsmail Cem Street	54	40	**94**	32	39	**71**
Mithatpaşa Street	30	48	**78**	35	32	**67**
Çeltek Street	79	69	**148**	61	78	**139**
M. Kemal Coastal Boulevard	19	40	**59**	14	19	**33**
Total people observed	**245**	**242**	**487**	**185**	**213**	**398**

Table 5.5 provides the results of the pedestrian density analyses in the Zone 2 in detail. The maximum number of pedestrians are observed in Mithatpaşa Street both on weekday and weekend. The minimum number of pedestrians are observed in Filiz Street.

Generally, it can be said that the pedestrian density of each street observed increases in the evening hours on weekday and weekend. the highest number of pedestrians are observed in the evening hours on weekdays. Considering the whole streets of Zone 2, the total number of pedestrians observed on weekday is higher than the weekend.

Table 5. 5. Number of Pedestrians observed in Zone 2

Observation Period / Streets	**Weekday (08.00- 09.00)**	**Weekday (17.00- 18.00)**	**Total Weekday**	**Weekend (12.00-13.00)**	**Weekend (18.00-19.00)**	**Total Weekend**
Ş. Onur Akarsu Street	148	200	**348**	141	178	**319**
Mithatpaşa Street	164	232	**396**	156	195	**351**
Cüneyt Street	49	94	**143**	67	96	**163**
Mehmet Seyfi Eraltay St.	106	126	**232**	107	90	**197**
Filiz Street	58	46	**104**	63	75	**138**
Total people observed	**525**	**698**	**1223**	**534**	**634**	**1168**

When the weekday and weekend counts of both zones are compared, the pedestrian density of the Zone 2 is greater than the pedestrian density of the Zone 1. The ratio between them is almost 3 times (Table 5.6.).

Table 5. 6. Total Number of Pedestrians observed in Zone 1 and Zone 2

Observation Period / Streets	**Weekday** (08.00-09.00)	**Weekday (17.00- 18.00)**	**Total** Weekday	**Weekend (12.00-13.00)**	**Weekend** (18.00-19.00)	**Total** Weekend
Zone 1	245	242	487	185	213	398
Zone 2	525	698	1223	534	634	1168

Table 5.7. details the number of vehicles observed of Zone 1 according to observation time period. The highest vehicle density of the Zone 1 is observed in Mithatpaşa Street. İsmail Cem Street has the minimum vehicle density in Zone 1.

Table 5. 7. Total number of vehicles observed in Zone 1

Number of vehicles *Zone 1*	**Weekday (08.00- 09.00)**	**Weekday (17.00- 18.00)**	**Total Weekday**	**Weekend (12.00- 13.00)**	**Weekend (18.00-19.00)**	**Total Weekend**
G. Fevzi Yılmaz Street	117	268	**385**	121	224	**345**
İsmail Cem Street	21	32	**53**	12	39	**51**
Mithatpaşa Street	451	567	**1018**	572	569	**1141**
Çeltek Street	41	39	**80**	18	28	**46**
M. Kemal Coastal Boulevard	109	242	**351**	130	198	**328**
Total vehicles observed			**1887**			**1911**

The highest vehicle density of the Zone 1 is observed in Mithatpaşa Street as seen in the table 5.8. The minimum number of vehicles of Zone 2 is observed in Cüneyt Street. In addition, due to the fact that Mithatpaşa Street is the main transportation route, its sections in both zones have a high density of vehicles compared to other streets. When both zones are compared, the total number of vehicles observed in the Zone 1 is higher than the Zone 2.

Table 5. 8. Total number of vehicles observed in Zone 2

Number of vehicles *Zone 2*	**Weekday (08.00- 09.00)**	**Weekday (17.00- 18.00)**	**Total Weekday**	**Weekend (12.00- 13.00)**	**Weekend (18.00- 19.00)**	**Total Weekend**
Şehit Onur Akarsu Street	152	193	345	172	185	357
Mithatpaşa Street	482	598	1080	560	614	1174
Cüneyt Street	10	18	28	13	15	28
Mehmet Seyfi Eraltay St.	21	14	35	24	22	46
Filiz Street	23	13	36	12	20	32
Total vehicle observed			**1524**			**1637**

5.3.2. Pedestrian Heterogeneity of The Streets

Pedestrian heterogeneity is another indicator of urban vitality. Pedestrian heterogeneity is analyzed by categorizing of people using the streets according to their age and gender. Table 5.9. gives information about the pedestrian heterogeneity on the observed streets of Zone 1. According to gender, 53,5 percent of the pedestrians on the weekday and 56.2 percent of them on the weekend are male. According to age groups, it is observed that people of all ages use the streets in Zone 1. In addition, one of the remarkable values is the difference between children's weekdays and weekend uses. Children are observed more frequently during the week compared to the weekend. The reason is that there is a primary school in Çeltek Street. On the other hand, although there is a children's playground especially in Zone 1, the low number of children at the weekend indicates that children do not spend time on the public spaces. They prefer the private spaces in the gated community.

Table 5. 9. Number of Pedestrians According to Gender and Age in Zone 1

Observed Ped. / Streets	Categories	Weekday Morning	Weekday Evening	Total Weekday	Weekend Morning	Weekend Evening	Total Weekend
G. Fevzi Yılmaz Street	Male	34	30	**64**	23	26	**49**
	Female	29	15	**44**	20	19	**39**
	Children (0-14)	24	12	**36**	9	11	**20**
	Youth (15-29)	10	9	**19**	15	16	**31**
	Adult (30-64)	26	22	**48**	15	15	**30**
	Elderly (65+)	3	2	**5**	4	3	**7**
İsmail Cem Street	Male	32	19	**51**	21	19	**40**
	Female	22	21	**43**	11	20	**31**
	Children (0-14)	18	12	**30**	6	9	**15**
	Youth (15-29)	11	14	**25**	9	10	**19**
	Adult (30-64)	21	11	**32**	12	16	**28**
	Elderly (65+)	**4**	**3**	7	**5**	**4**	9

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Table 5.9. (cont)

Mithatpaşa Street	**Male**	**18**	**28**	46	**23**	**16**	39
	Female	12	20	**32**	12	16	**28**
	Children (0-14)	5	4	**9**	6	3	**9**
	Youth (15-29)	11	14	**25**	13	12	**25**
	Adult (30-64)	12	26	**38**	10	13	**23**
	Elderly (65+)	2	4	**6**	6	4	**10**
Çeltek Street	Male	42	25	**67**	37	46	**83**
	Female	37	44	**81**	24	32	**56**
	Children (0-14)	21	16	**37**	10	12	**32**
	Youth (15-29)	19	16	**35**	16	25	**41**
	Adult (30-64)	26	28	**54**	23	26	**49**
	Elderly (65+)	13	9	**22**	12	15	**27**
M. Kemal Coastal Boulevard	Male	11	22	**33**	2	11	**13**
	Female	8	18	**26**	12	8	**20**
	Children (0-14)	2	9	**11**	-	3	**3**
	Youth (15-29)	3	12	**15**	3	5	**8**
	Adult (30-64)	11	10	**21**	11	8	**21**
	Elderly (65+)	3	9	**12**	-	3	**3**

Table 5.10 gives information about the number of pedestrians according to gender and age in the observed streets of Zone 2. According to gender, 52,1 percent of the pedestrians on the weekday and 53,2 percent of them on the weekend are male. Similar with the Zone 1, gender distributions were observed equally. According to age groups, the total number of adults is higher than other age groups. In addition, it is observed that the observed number of elderly people in the Zone 2 is higher than the Zone 1. Unlike the Zone 1, coffeehouses located in Zone 2 explain this situation.

Table 5. 10. Number of Pedestrians according to Gender and Age in Zone 2

Observed Ped. / Streets	Categories	Weekday Morning	Weekday Evening	Total Weekday	Weekend Morning	Weekend Evening	Total Weekend
Şehit Onur Akarsu Street	Male	85	102	**187**	98	112	**210**
	Female	63	98	**161**	43	66	**109**
	Children (0-14)	16	19	**35**	11	13	**23**
	Youth (15-29)	32	72	**104**	25	51	**76**
	Adult (30-64)	77	67	**144**	66	71	**137**
	Elderly (65+)	23	42	**65**	39	43	**82**
Mithatpaşa Street	Male	85	133	**218**	58	89	**147**
	Female	79	99	**178**	98	106	**204**
	Children (0-14)	34	22	**56**	29	27	**56**
	Youth (15-29)	22	33	**55**	26	31	**57**
	Adult (30-64)	72	134	**206**	55	106	**161**
	Elderly (65+)	36	43	**79**	46	31	**77**
Cüneyt Street	Male	37	56	**93**	35	52	**87**
	Female	12	38	**50**	32	44	**76**
	Children (0-14)	9	14	**23**	15	12	**27**
	Youth (15-29)	12	16	**28**	10	14	**24**
	Adult (30-64)	15	53	**68**	32	55	**87**
	Elderly (65+)	13	11	24	10	15	25
Mehmet Seyfi Eraltay St.	**Male**	42	44	86	44	50	94
	Female	64	82	**146**	63	40	**103**
	Children (0-14)	16	12	**28**	13	9	**22**
	Youth (15-29)	29	39	**68**	32	18	**50**
	Adult (30-64)	47	62	**109**	44	52	**96**
	Elderly (65+)	14	13	**27**	18	17	**35**
Filiz Street	Male	32	22	**54**	41	43	**84**
	Female	26	24	**50**	22	32	**54**
	Children (0-14)	9	8	**17**	10	5	**15**
	Youth (15-29)	15	13	**28**	12	26	**38**
	Adult (30-64)	29	19	**48**	29	35	**64**
	Elderly (65+)	5	6	**11**	12	9	**21**

5.3.3. Pedestrian Activity Types

The most important indicator that distinguishes a vital space from other areas is the variety of activities. Therefore, in addition to pedestrian density and heterogeneity analyses, types of activities are analysed in the selected streets for each zone. In analysis of activity types, observations are made based on the activity types as necessary, optional and social activities defined by Gehl. According to Gehl (2010), especially social activities are an important indicator for the level of urban vitality. Social activities represent the relationship of people with other users, such as children playing games, meeting, greeting, stopping and chatting. While analysing the types of activities, activities other than the walking activity are analysed. The walking activity is considered separately since it represents the pedestrian density of the area. During the observation time period, the activities taking place in the observed streets every 15 minutes are determined by Static Snapshot method. The data collected for each street are combined for the whole Zone area and the behaviour map of each zone are created.

Table 5.11. shows the types of activities and the number of people for each activity in each zone, according to time period. Activities observed in Zone 1 are standing, sitting, talking/interaction, cycling, shopping, waiting for transportation, play/exercise and dog walking. The activities observed in Zone 2 are standing, sitting, talking/interaction, cycling, shopping, waiting for transportation, and peddler. In the Zone 2, unlike the Zone 1, dog walking and play/exercise is not observed. In addition, the peddler are observed.

Although almost the same number of activity types are observed when the two zones are compared, the number of people who perform these activities is quite different. The number of people observed in the Zone 1 is lower than the Zone 2 in all observation time periods. While the numbers observed in the Zone 1 decrease during the weekend, the number of people observed increases in the Zone 2. This is due to the diversity of retail stores in the Zone 2 and especially the coffee houses that people use to socialize and relaxing in weekends.

Furthermore, talking/interaction activity, should be considered for the level of urban vitality, is observed quite low in Zone 1. It is observed that there are very few street encounters and social interaction among people. Another observed significant data is the presence of peddlers in the Zone 2. This situation indicates that Zone 2 has more user potential.

Table 5. 11. Pedestrian Activity Types in Zone 1 and Zone 2

Observed Ped. / Streets	Activities	Weekday Morning	Weekday Evening	Total Weekday	Weekend Morning	Weekend Evening	Total Weekend
Zone 1	Standing	32	20	**52**	5	8	**13**
	Sitting	1	1	**2**	1	1	**2**
	Talking/ Interaction	9	9	**18**	8	4	**12**
	Cycling	-	-	**-**	4	3	**7**
	Shopping	-	1	**1**	1	-	**1**
	Waiting for transportation	11	10	**21**	7	11	**18**
	Dog Walking	2	3	**5**	2	4	**6**
	Play/ Exercise	3	2	**5**	2	5	**7**
Total people observed		**58**	**44**	**104**	**30**	**36**	**66**
Zone 2	Standing	51	44	**95**	25	42	**67**
	Sitting	22	44	**66**	41	42	**83**
	Talking/ Interaction	18	56	**74**	46	59	**105**
	Cycling	1	3	**4**	4	2	**6**
	Shopping	65	67	**132**	91	75	**166**
	Waiting for transportation	14	20	**34**	18	28	**46**
	Peddler	1	2	**3**	2	1	**3**
Total people observed		**171**	**234**	**405**	**227**	**249**	**476**

Determining the location of the activities in the street is quite significant to reveal the relationship with the urban form on a micro scale. Therefore, the behaviour mapping technique is used to determine in detail how the streets is used by people and what parts of the streets are used or not.

Figure 5.12 provides the location of the activity types in Zone 1 on weekday morning and weekday evening. One of the remarkable data on the locations of the activities is the location preferences of the standing people. Standing activity is observed in front of the primary school in Çeltek Street and in front of the gated community entrance in İsmail Cem Street on weekday. In addition, standing people are observed to use the corner of the İsmail Cem Street to wait for the student and personnel service buses or to meet a friend.

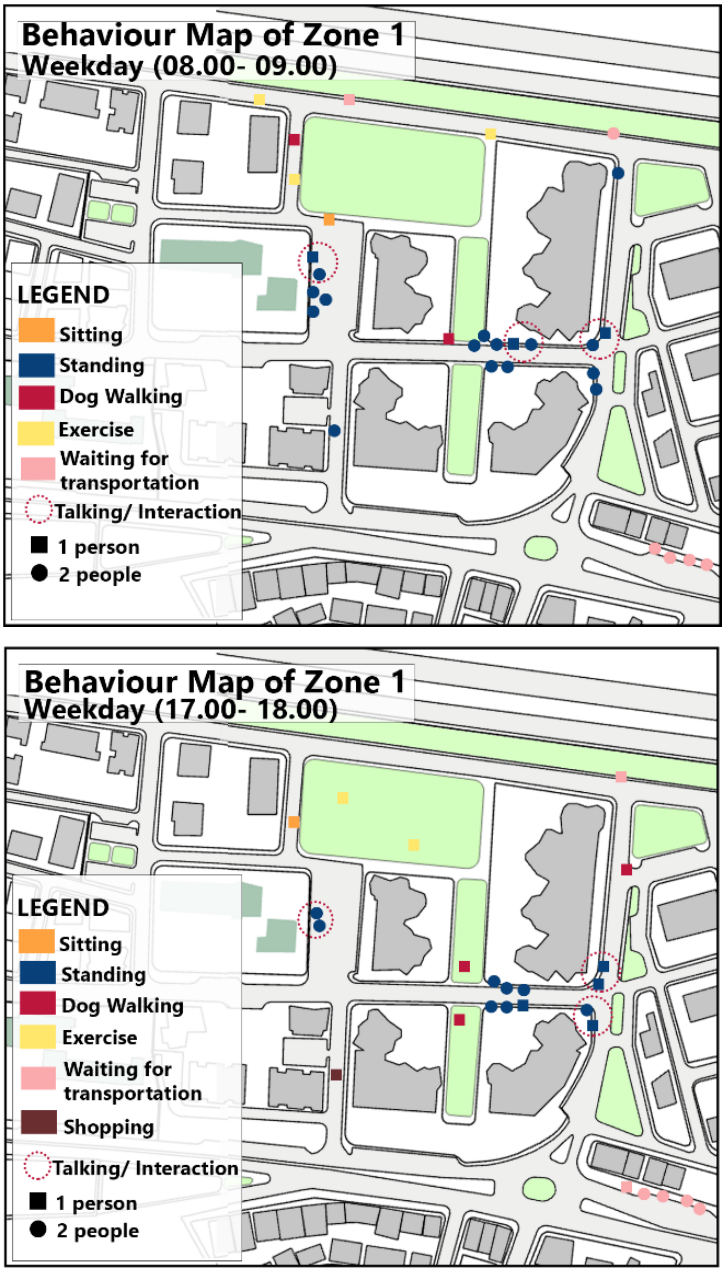

Figure 5. 12. Pedestrian Activity Types in Zone 2 (Weekday/morning-Weekday/evening)

Generally, standing activity is observed in front of the gated community entrance İsmail Cem Street on weekend in Zone 1 (figure 5.13). However, the number of people standing is very low compared to the weekday in Zone 1. The reason is that the majority of people standing are observed as the parents of school students or workers working on the gated community. Another differences between weekday and weekend observations in Zone 1 is the location of talking activity. The talking/interaction activity is observed in front of the hairdresser in Çeltek Street on the weekends.

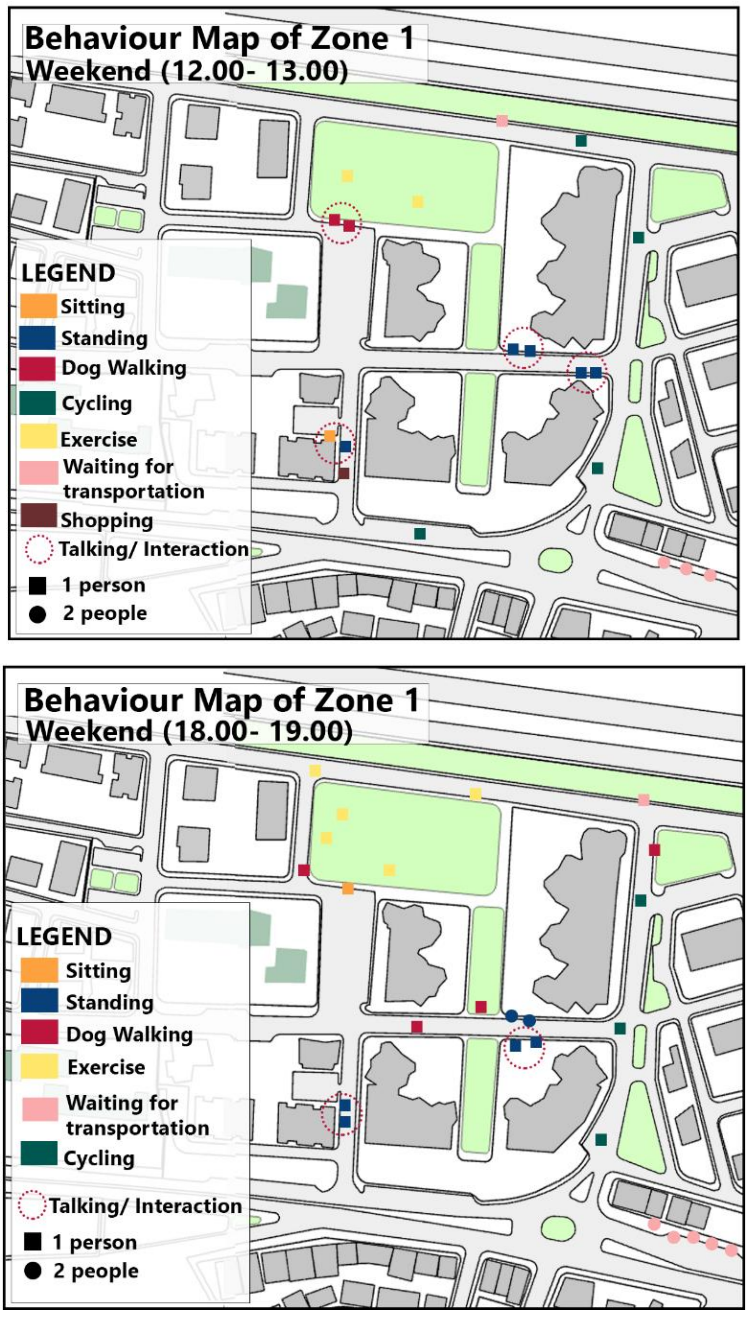

Figure 5. 13. Pedestrian Activity Types in Zone 1 (Weekend/morning-Weekend/evening)

Figure 5.14 shows the daily activity pattern in the streets of Zone 2 on weekday morning and evening. Firstly, mostly standing activity is observed in front of the high school entrance in Mithatpaşa Street on weekday morning. Apart from this, other standing activities are dispersedly observed in Şehit Onur Akarsu Street, Cüneyt Street and Filiz Street. Talking/interaction activity is observed in front of the coffee houses or retail store in Şehit Onur Akarsu Street and Mehmet Seyfi Eraltay Street. In addition, while the

peddler is chosen the front of the high school to stand for selling on weekday morning, he/she prefers the front of coffee houses in the Şehit Onur Akarsu Street in the evening (figure 5.15).

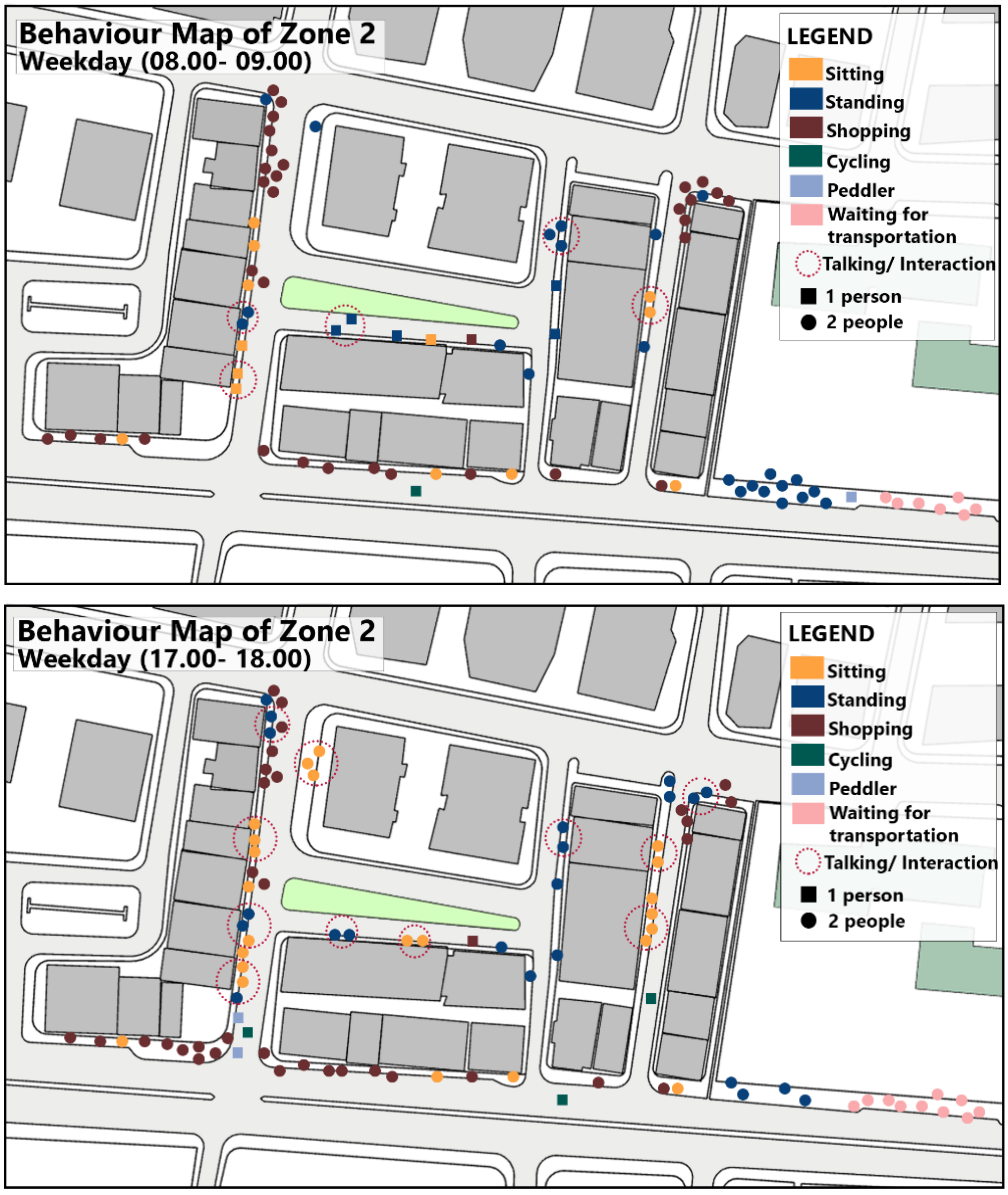

Figure 5. 14. Pedestrian Activity Types in Zone 2 (Weekday/morning-Weekday/evening)

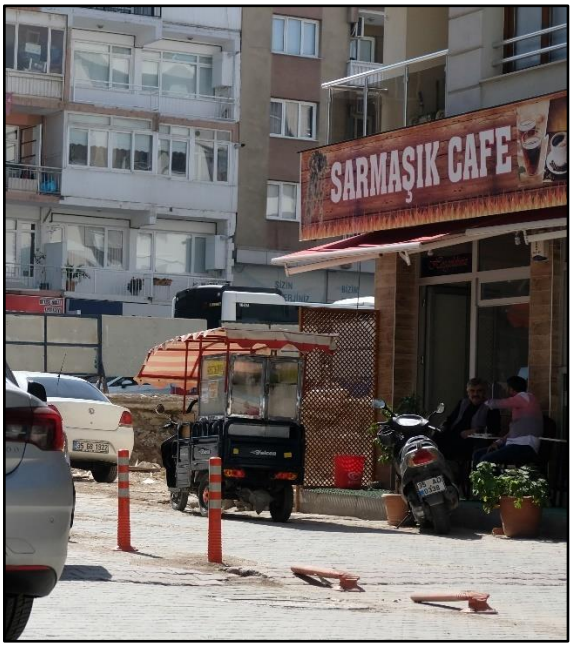

Figure 5. 15. The peddler in Şehit Onur Akarsu Street

In addition, although there is no bike path in Zone 2, the people who cycling are observed on weekday in Mithatpaşa Street and Mehmet Seyfi Eraltay Street (figure 5.16).

Figure 5. 16. Cycling activity in Mithatpaşa Street (left), in Mehmet Seyfi Eraltay Street (right)

On the other hand, there is not much difference in weekend daily activity pattern compared to weekdays (figure 5.17). Besides increasing in density, location preferences

of people are the same. Only density of people for each activity increased over the weekend, location preferences are the same. The remarkable data is that Cüneyt street has one-sided usage for both weekday and weekend observation period. No type of activity is observed on the north side of the Cüneyt Street.

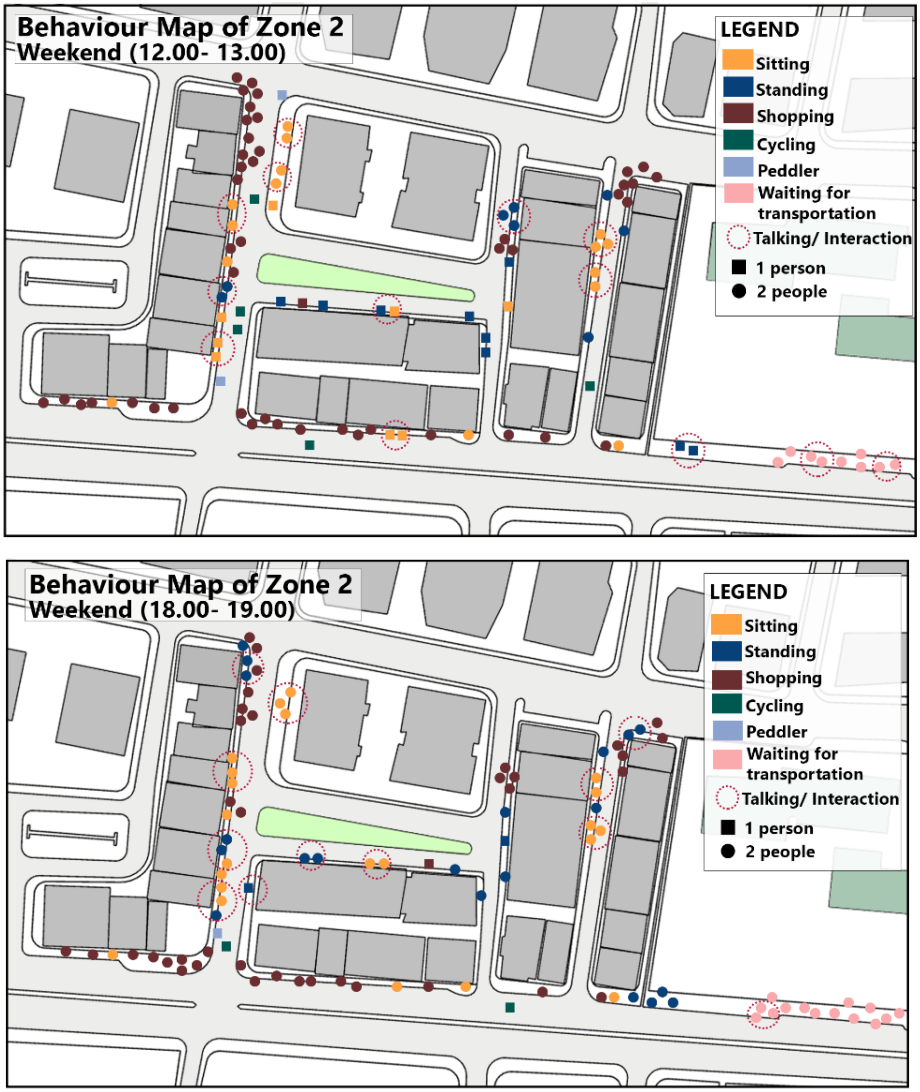

Figure 5. 17. Pedestrian Activity Types in Zone 2 (Weekend/morning-Weekend/evening)

Consequently, the results of the urban vitality indicator analyses are evaluated by scoring method to determine the level of urban vitality (Table 5.12). The design principles of vital areas specified in the literature are considered as measures for scoring (as seen in chapter 3). The features that increase urban vitality are coded as 1 and the features that

decrease urban vitality are coded with 0. As a result of the scoring, the urban vitality level of Zone 2 is higher than Zone 1. Considering the streets separately, İsmail Cem Street, Çeltek Street have higher urban vitality level than the other streets in Zone 1 and Mehmet Seyfi Eraltay Street, Cüneyt Street and Filiz Street have higher urban vitality level than other streets in Zone 2.

Table 5. 12. Urban Vitality Level

Urban vitality indicators	**Measures (observed in 5 streets in Zone 1 and Zone 2)**	**Coding (1: features that increase the urban vitality 0: decrease)**	**Zone 1***					**Zone 2****				
			1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Density of pedestrians	Is the density of pedestrian greater than 14 square meters of person?	Yes: 1 No:0	1	0	1	1	0	1	1	1	1	1
Total Score (out of 5)			**3**					**5**				
Number of vehicles	Is there a high vehicle density?	Yes: 0 No:1	1	0	1	0	0	0	1	1	1	0
Total Score (out of 5)			**2**					**3**				
Heterogeneity of pedestrians	Are there people of different ages and genders?	Yes: 1 No:0	1	1	1	1	1	1	1	1	1	1
Total Score (out of 5)			**5**					**5**				
Activity types	Are there social activities among other activities?	Yes: 1 No:0	1	0	1	0	0	1	1	1	1	1
	Is there a long duration stay for activity types on the street?	Yes: 1 No:0	0	0	0	0	0	1	1	1	1	1
Total Score (out of 10)			**2**					**10**				
Urban Vitality Level for each street (Total Score)			**4**	**1**	**4**	**2**	**1**	**4**	**5**	**5**	**5**	**4**
Urban Vitality Level for each zone (Total Score) (out of 25)			**12**					**23**				

*Zone 1: 1) İsmail Cem St., 2) M. Kemal Coastal Boulevard, 3) Çeltek St., 4) G. Fevzi Yılmaz St. 5) Mithatpaşa St.

**Zone 2: 1) Ş. Onur Akarsu St., 2) M. Seyfi Eraltay Boulevard, 3) Cüneyt St., 4) Filiz St. 5) Mithatpaşa St.

5.4. The Relationship Between Urban Form and Urban Vitality in Yenikale Neighborhood

In this part of the thesis, firstly, urban vitality factors related to urban form which are explained in Chapter 4, are analysed in the selected zones of Yenikale Neighborhood. Secondly, urban vitality level of the zones is evaluated together with the results of the analyses of urban vitality factors related to urban form to reveal the relationship between urban vitality and urban form.

5.4.1. Residential Density, Coverage and Vitality

Density is one of the urban vitality factors related to urban form. High density environments and how these high-density environments are designed with other urban form components is a significant issue for urban vitality. Creating high density-built environment contributes the encounters for residents in daily life and offers different activity types and, thus promotes urban vitality (Talen, 1999).

In this part of the thesis, density is examined into two parts: residential density and coverage. Accordingly, residential density was calculated for both zones and lot coverage is analyzed.

Residential Density

Residential density represents the number of dwelling units per hectare. The residential density is calculated by dividing the number of dwellings in each zone into the total area size of each zone.

In zone 1, there are 380 dwelling units. 168 of them are in *Folkart Narlıdere* which is a gated community. Total area size of the zone is 7 hectares and the residential density of Zone 1 is 54,2 dwelling units per hectare. In Zone 2, the total dwelling units is 256 and total size of zone is 2 hectares. The residential density of Zone 2 is 128 dwelling units per hectare. It can be said that the Zone 2 is much denser than Zone 1. The minimum residential density to achieve vital urban areas should be 125 dwelling units per hectare (Montgomery, 1998). The residential density of Zone 1 complies with this principle.

When the urban vitality levels of the two zones are compared, it is seen that urban vitality level of Zone 2 is higher. Accordingly, it is found out that the residential density has an effect on the urban vitality in the case study area.

Coverage

Coverage represents the area occupied by the buildings in the land. Calculating the lot coverage is significant for understanding the relationship between built-up areas and non-built up areas. Therefore, firstly, the built-up areas are analyzed by using figure-ground analysis method at first. Secondly, percentage of lot coverage for every plot are calculated in each zone.

Figure 5.18 shows the built areas and non-built up areas within Zone 1 and percentage of the lot coverage of each plot. Lot coverage is calculated by dividing the area of the building into the total area of the plot where they are located. The results are expressed as a percentage. The highest lot coverage is in the north of the Folkart Narlıdere residential site. When evaluated in terms of streets, the area surrounding the İsmail Cem Street has the highest percentage lot coverage.

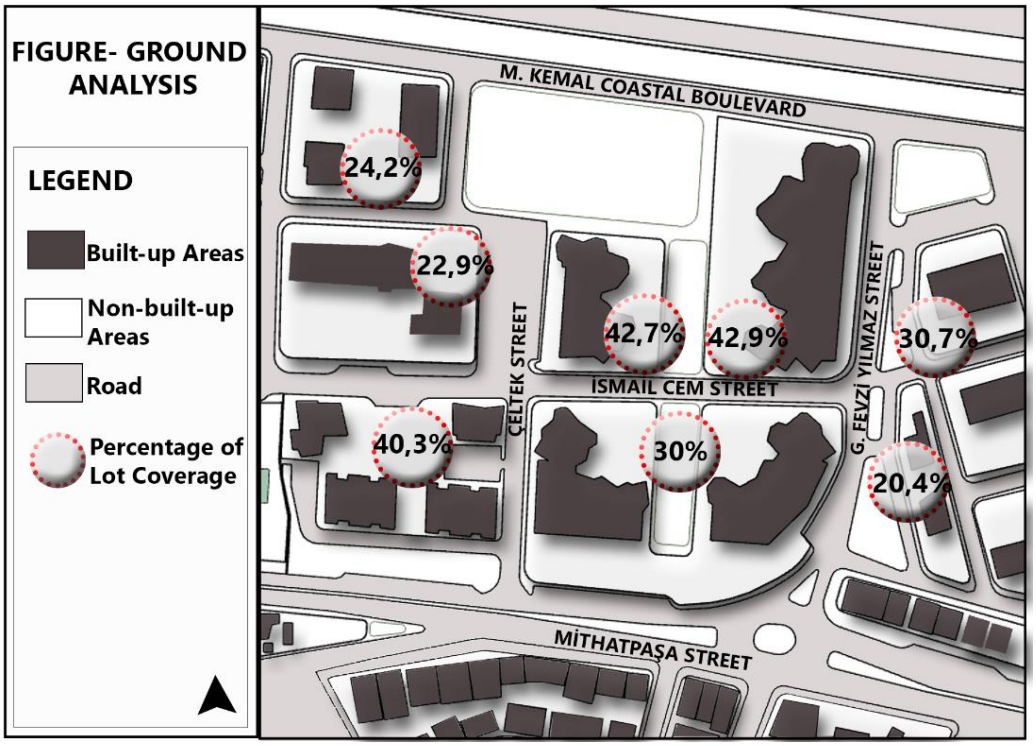

Figure 5. 18. Figure-ground analysis of Zone 1

On the other hand, the built areas and non-built up areas within Zone 2 and percentage of the lot coverage of each plot are seen in Figure 5.19. Mehmet Seyfi Eraltay Street has the highest lot coverage in Zone 2.

Figure 5. 19. Figure-ground analysis of Zone 2

According to the result of the figure-ground analysis, Zone 2 is denser than Zone 1. The suggested lot coverage to achieve vital urban areas is minimum 60 percentage for the building blocks (Jacobs, 1961). In this direction, the Zone 2 has over sixty (60%) percent lot coverage in all its blocks, except for the northern part of Cüneyt Street. In zone 1, all areas are less than sixty (60%) percent lot coverage. When these coverage values are compared with urban vitality data of each zone, it can be said that coverage has an impact on urban vitality in the case study area. Considering the results of the analysis in more detail, another remarkable finding supporting this impact can be seen. This finding is that the lot coverage of the north of the Cüneyt Street is lower than the minimum value (60 percent), less urban vitality is observed in the northern part of the Cüneyt Street compared to the whole street.

5.4.2. Diversity and Vitality

The second urban vitality factor examined is diversity. Diversity is one of the important factors that creates urban vitality. Diversity of the urban form promotes pedestrian heterogeneity and different activity types, which are indicators of urban vitality. In order to ensure diversity in urban form in an urban area, the area must be having mixed use and different housing types (Jacobs, 1961). Accordingly, in the case study, diversity is elaborated on housing typology and land use analysis.

Housing typology

Housing typology represents the type of the buildings in the selected area. The residential buildings are classified as single-family housing, row house, multi-family housing, small rise apartment blocks, mid-rise apartment blocks and high-rise apartment blocks according to building structure and building's configuration on the street. Zone 1 has mostly high-rise apartment blocks (figure 5.20). In addition, there are multi-family housing in Mithatpaşa Street and mid-rise apartment block in M. Kemal Coastal Boulevard. All high-rise apartments are located in a residential area separated by a garden fence.

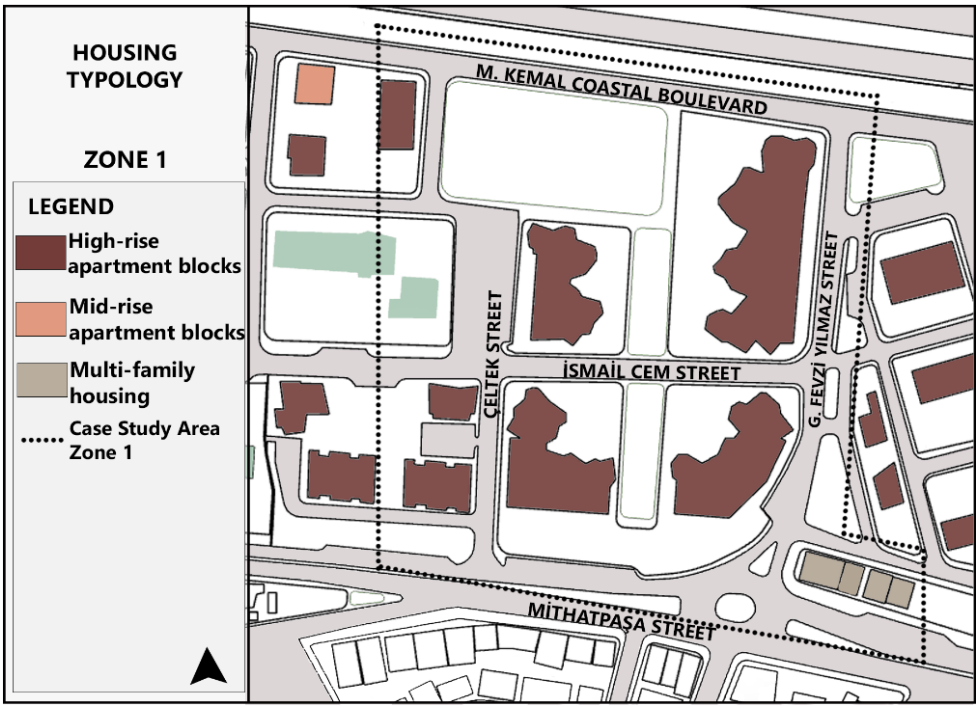

Figure 5. 20. Housing Typology in Zone 1

Figure 5.21 shows the type of housing in the Zone 2. There are two types of housing in the area, high-rise apartment blocks and multi-family housing. The high-rise apartment block is located in a residential area surrounded by a garden fence. The all multi-family housings are attached buildings in the area.

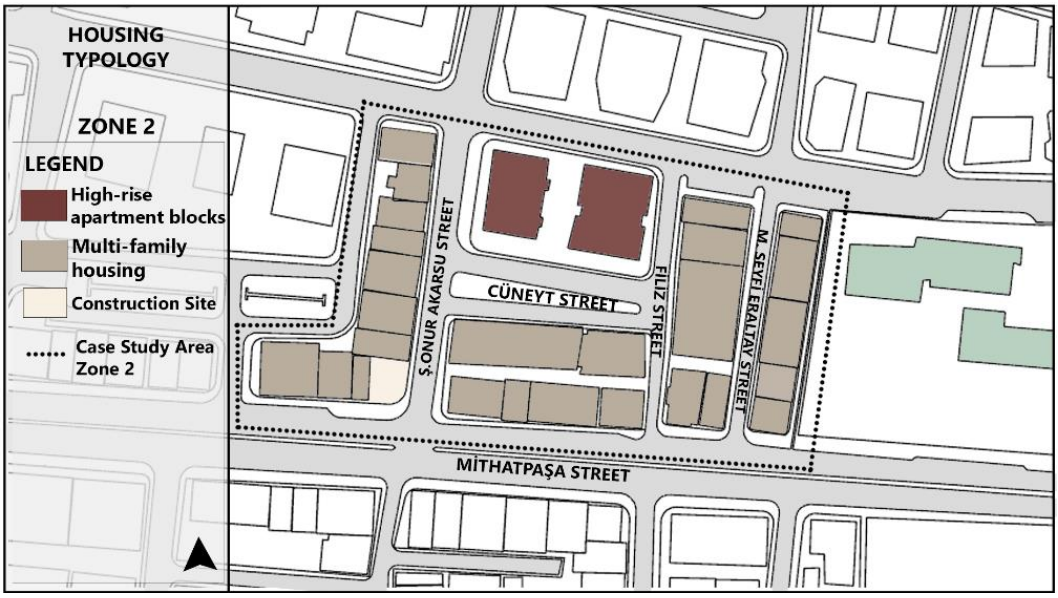

Figure 5. 21. Housing Typology in Zone 2

Figure 5. 22. High-rise apartment blocks in Zone 1

Figure 5. 23. Multi-family housing in Zone 2

Ground Floor Land Use

Mixed-use is a design principle for creating vibrant urban spaces. The diversity of land uses in an area allows people to coexist for different purposes there and thus, it offers diversity of activity types for people and the opportunity to social interaction with other residents. Accordingly, ground floor land use analysis is conducted to determine land use in both regions.

In Zone 1, fifteen (15%) percent of total ground floor usage have commercial function (figure 5.24). The types of these commercial functions are the driving school, hunting materials, electronics in mixed-use buildings on Mithatpaşa Street. In addition, hairdresser and car rental service are located in Çeltek Street. In terms of the quality of

the commercial functions in Çeltek Street, the street allows more people to socially interact daily in the street. Besides the residential and commercial use, there is an education area and parks/ playgrounds in Zone 1.

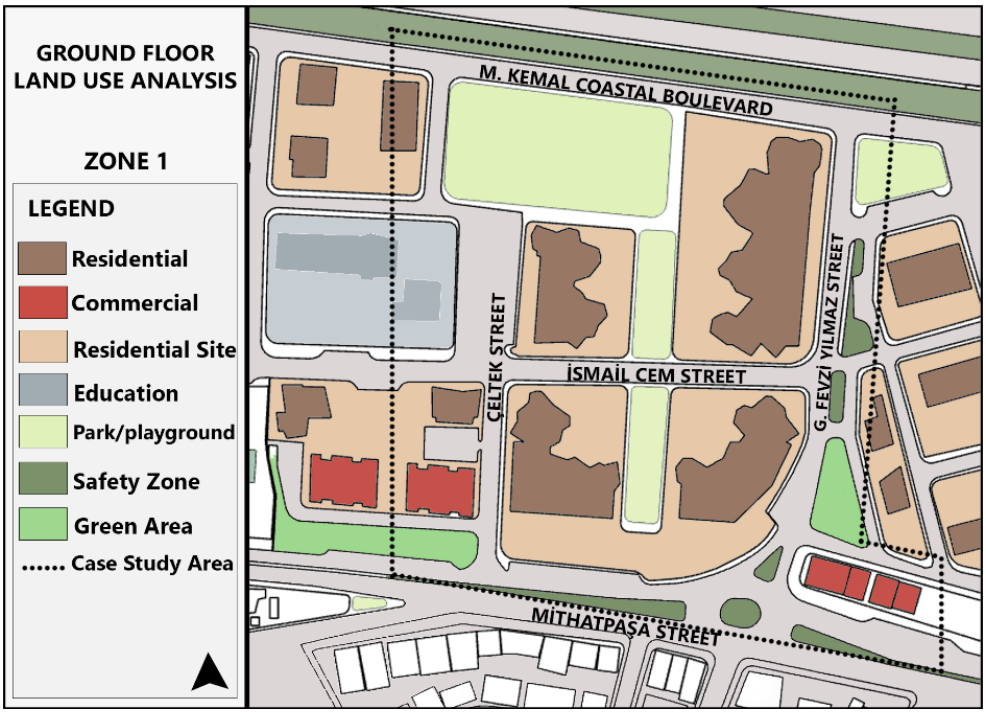

Figure 5. 24. Ground Floor Land Use Pattern of Zone 1

Figure 5.25 gives the current ground floor land use pattern of Zone 2. The eighty-five (85%) percent of ground floor usage is commercial function in Zone 1. The type of commercial functions mostly consists of food and beverage places on Şehit Onur Akarsu Street. On the other streets of Zone 1, hairdressers, tailors and real estate agencies are currently located. There is no neighborhood park or playground within the boundaries of the area. There is only one green area in the large median area on Cüneyt Street.

Consequently, when the two zones are compared, the mixed-use ratio of Zone 2 is higher than Zone 1. Mixed-use settlements have the potential for more people and activity diversity in the streets than other urban areas. Considering the urban vitality data of the zones, it can be said that the high amount of mixed use in Zone 2 has a positive impact on the urban vitality level.

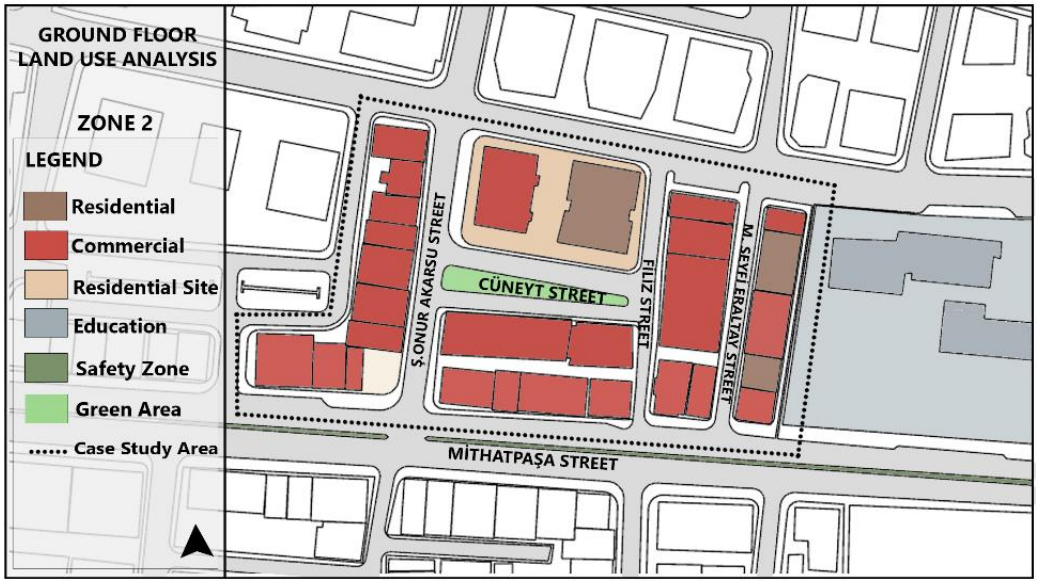

Figure 5. 25. Ground Floor Land Use Pattern of Zone 2

5.4.3. Accessibility and Vitality

The third urban vitality factor examined is accessibility. An accessible neighborhood means that everyone can easily access the different opportunities that the neighborhood offers. Considering the urban vitality, an accessible neighborhood provides more opportunity to people to meet and interact socially in the street. In this case study, accessibility is examined into five parts as the location, public transport distance, retail distance, open and green area distance, size of blocks for each zone.

Location

Figure 5.26 represents the geographic location of the Yenikale neighborhood within the city of İzmir and its connections to the points of interest around. In order to show the connections between the points of interest on the map, distances are analyzed as walking distance and vehicle distance. Within walking distance, there are coastal recreation areas, the hospital and shopping malls. In terms of accessibility, Yenikale Neighborhood is located on the main transportation axis between the Konak and Güzelbahçe and it is very easy to access by car due to the highway and Mithatpaşa Street that form the boundaries of the neighborhood. Public transport is provided by buses and

minibuses. In addition, Fahrettin Altay transport hub and Üçkuyular Ferry Dock are 9-minute drive away for the connections with different modes of transportation.

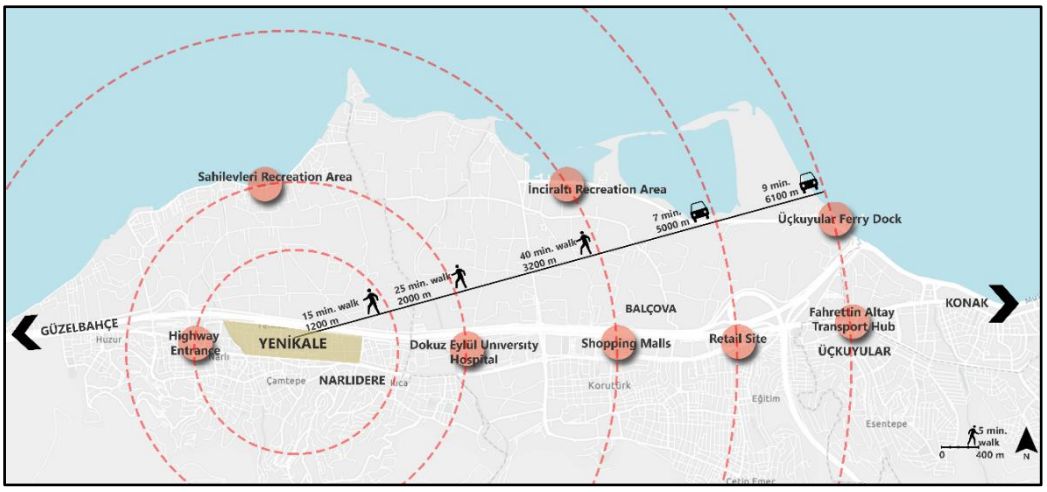

Figure 5. 26. The location of the Yenikale neighborhood within the city and the main point of interests around the neighborhood

Public Transport, Retail and Green Area Distance

Figure 5.27 shows the distance to retail area, green area and public transportation for Zone 1. There are small green areas, the playground and basketball and tennis courts within the area boundary of Zone 1.

Figure 5. 27. Distance of the Zone 1 to Neighborhood retail area, green area and public transportation

On the other hand, the retail area of the neighborhood is 10-minutes' walk from Zone 1. Moreover, there are two bus stops in Mithatpaşa Street within 5 minutes walking distance, and the minibus route is on Mustafa Kemal Coastal Boulevard in the north of the area and on Mithatpaşa Street.

The difference of the Zone 2 from the Zone 1 is that there is no park or playground area within the boundaries of the zone. In addition, it is closer to the retail area than the Zone 1. It has similar features with the Zone 1 in terms of proximity to public transport stations (figure 5.28).

Figure 5. 28. Distance of the Zone 1 to Neighborhood retail area, green area and public transportation

Size of Blocks

Length of street blocks is significant for pedestrian mobility in the streets. Short street block length increases pedestrian mobility. Increased pedestrian mobility contributes to urban vitality. The suggested minimum value for ideal pedestrian mobility is 60 and 70 m street blocks length and it should be maximum 90 and 100 meters. (Jacobs, 1961; Gehl, 2010). Within the scope of accessibility analysis, size of blocks of each zone are calculated with the help of Geographical Information Systems (GIS). The lengths are analyzed by divided into 3 classes as 0-60m, 61-90m, and 91m and above considering the minimum and maximum value of street blocks length in the literature.

Figure 5.29 shows the streets block lengths of Zone 1. İsmail Cem Street and the northern part of Çeltek Street have ideal block length for pedestrian mobility. The longest block length is 239 meters in Mustafa Kemal Coastal Boulevard. This value is much higher than the ideal values. Considering the urban vitality level data, Mustafa Kemal Coastal Boulevard has the lowest pedestrian density in Zone 1 and in addition, the northern part of Çeltek Street and İsmail Cem Street has the a high value in terms of the number of people standing and talking. In line with these findings, it can be said that the street block length has an effect on urban vitality in Zone 2.

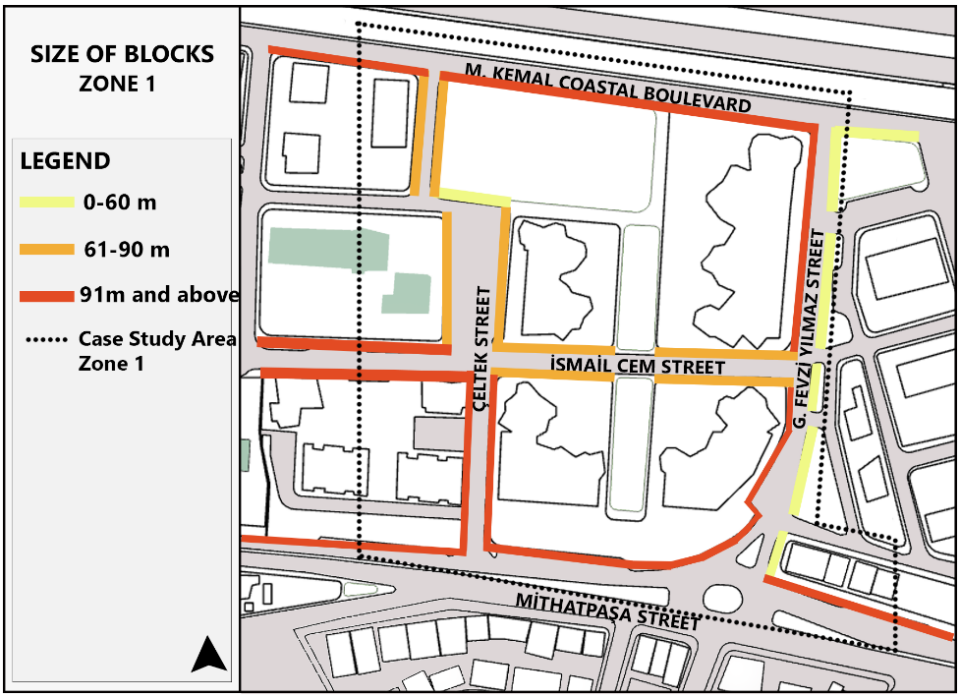

Figure 5. 29. The Length of street blocks of Zone 1

On the other hand, Mehmet Seyfi Eraltay Street, Filiz Street and Cüneyt Street has the ideal value for street block length in Zone 2 (figure 5.30). Considering the whole Zone 2 area, the area usually consists of short and ideal street blocks, except one façade of Şehit Onur Akarsu Street and in front of the high school in Mithatpaşa Street. Nevertheless, Şehit Onur Akarsu Street with 93m block length is in the ideal value range for the street block length. As a result, when the two zones are compared, it is seen that the street block length clearly has an impact on the urban vitality.

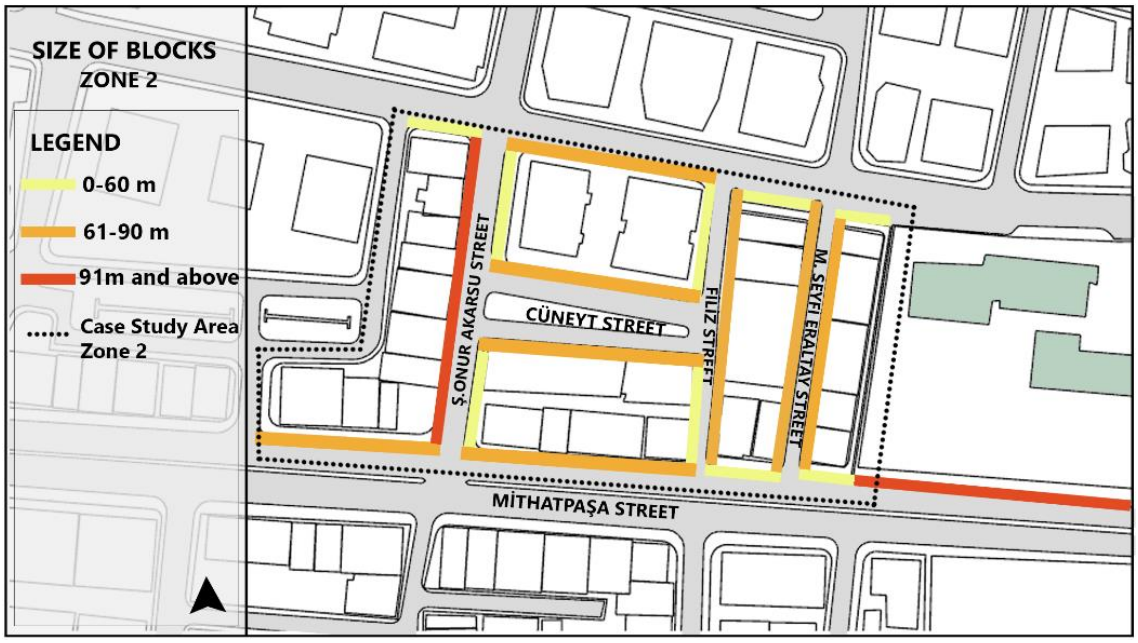

Figure 5. 30. The Length of street blocks of Zone 2

5.4.4. Quality of Built Environment and Vitality

The aesthetic, architectural and environmental features of the built environment affect urban vitality. In this case study, the quality of built environment of each zone in Yenikale Neighborhood is examined by analyzing the number of floors, the ground floor facade design, the width and materials of street and pavement, street trees, and street furniture.

Number of Floors

The number of floors is very important in terms of affecting the connection of the residents with the street. Also, when considered with the concept of *'eyes on the street'*, it increases the presence of people on the street by providing a safe environment.

Figure 5.31 shows the number of floors of buildings in the Zone 1 area. The area has mostly 8-storey buildings. On the other hand, the number of floors is decreasing in the buildings in Mithatpaşa Street.

When the number of floor analysis results of the Zone 2 is evaluated, it is seen that the area has various floor numbers. However, it can be said that 5-storey buildings are more than others in the whole area (figure 5.32).

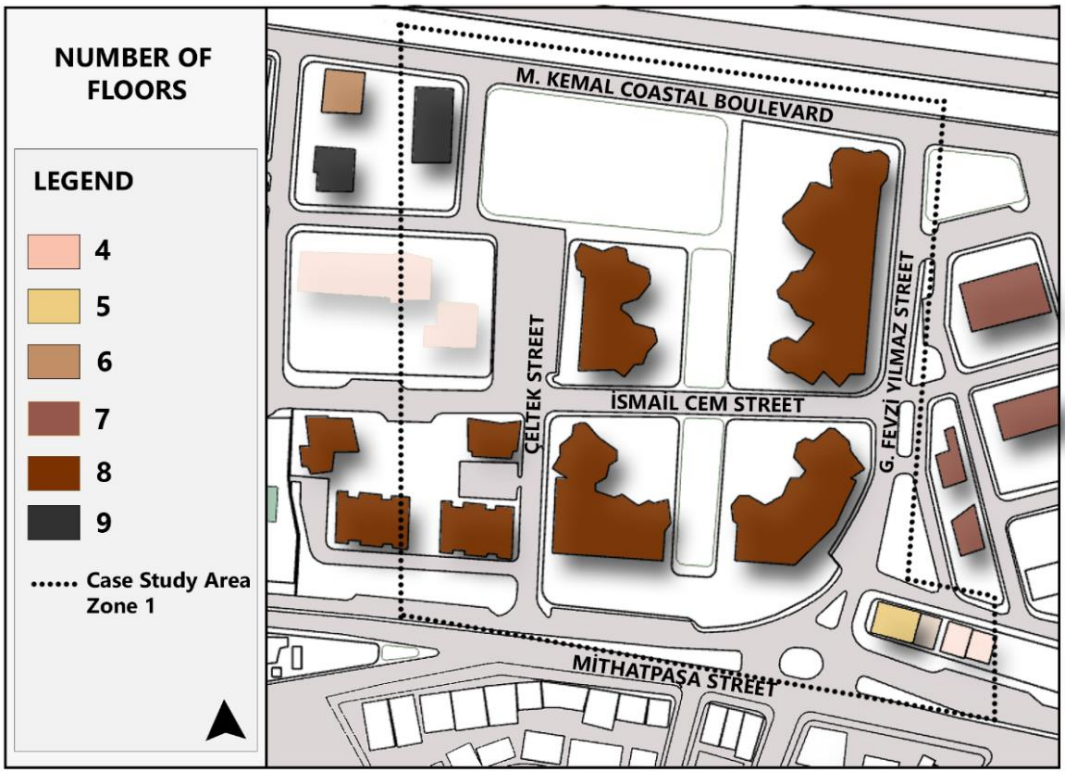

Figure 5. 31. Number of Floors in Zone 1

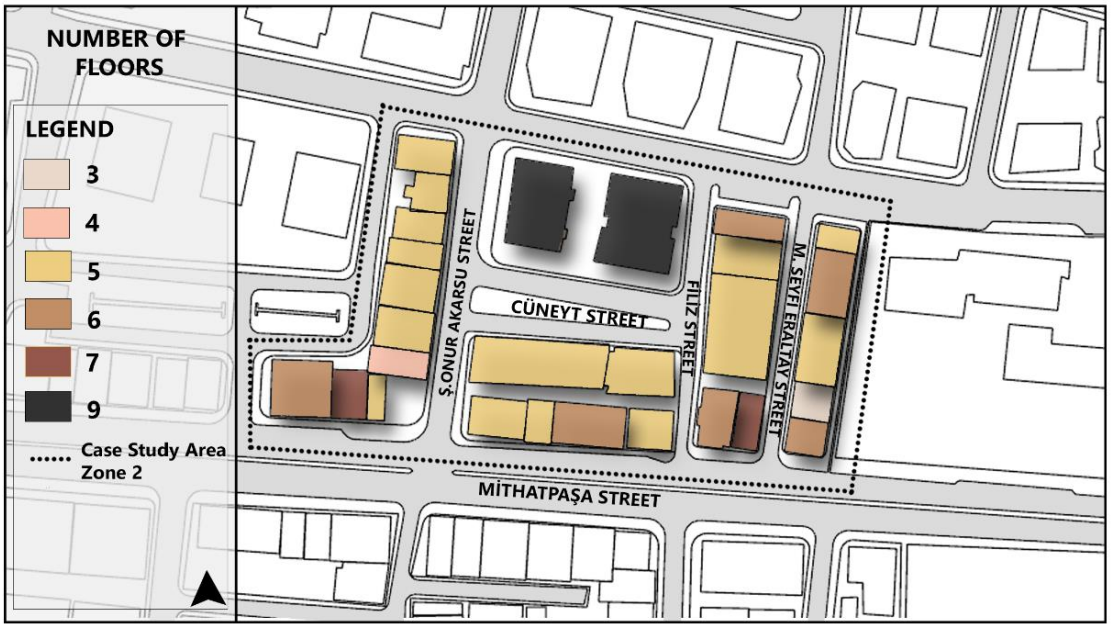

Figure 5. 32. Number of Floors in Zone 2

The suggested number of floors to achieve urban vitality is maximum 3 or 4-storey buildings on an average 12-14-meter street (Gehl et al. 2006). When the two zones are compared in this direction, it can be said that the Zone 2 complies with this criterion. Hence, urban vitality level of Zone 2 is higher than the Zone 1. As a result, the impact of the number of floors on urban vitality can be seen in the case study area.

Ground Floor Façade Design

Ground floor façade design characteristics is quite significant for promoting the activities in the streets. Since the ground floor of buildings establish a connection between the indoor and the outdoor spaces, it provides the opportunity for activities and social interaction such as standing and talking activities on the sidewalks. Accordingly, the building facades are analyzed, taking into account the design features of the building ground floor facade. Facade classification is made according to the permeability of the facades or the level of connection with the interior space, such as number of openings of each unit.

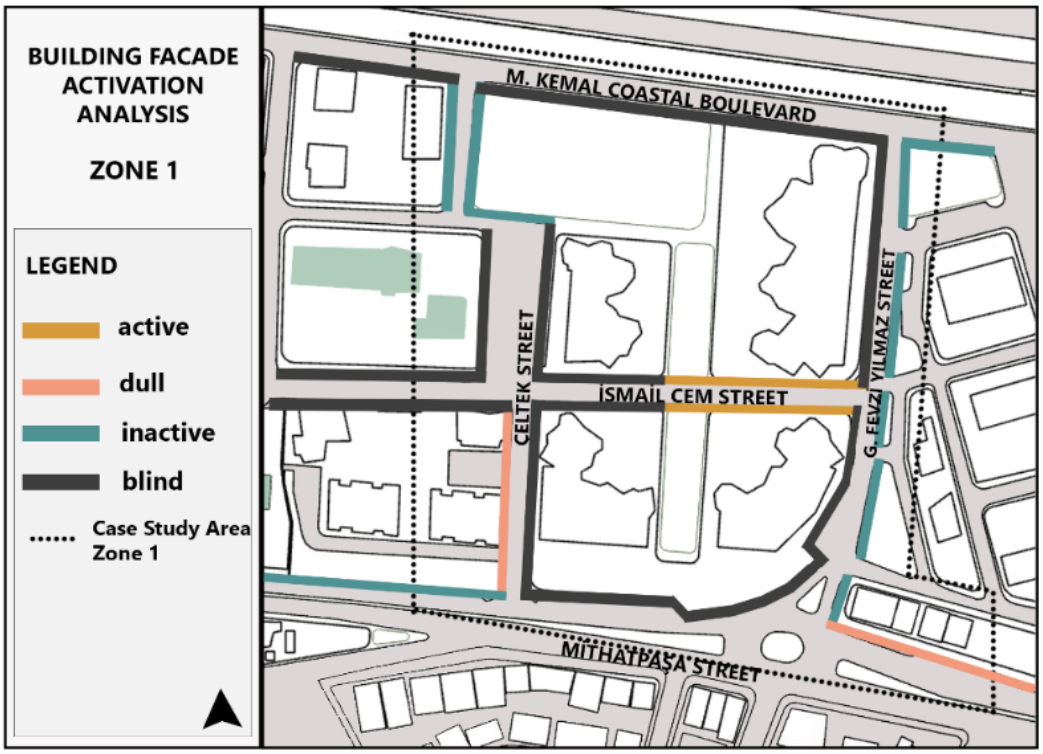

Figure 5. 33. Building Façade Activation Analysis of Zone 1

Figure 5. 33 represents the façade evaluation of the Zone 1 according to the ground floor façade design. There is no vibrant façade in Zone 1. On the other hand, the active facades of Zone 1 are just only located in entrance of Folkart Narlıdere residential site in İsmail Cem Street. In this part of the street, planting is used instead of a garden fence and more interaction is provided with the interior space compared to other places of the street. Considering the whole area, the blind facades are more than the other type of facades. Figure 5.34 shows the examples of the façade evaluation scale of Zone 1.

Blind façade (left) and Inactive façade (right) in G.Fevzi Yılmaz Street

Dull façade (left) in Çeltek Street and Active façade (right) in İsmail Cem Street

Figure 5. 34. The example of Façade Evaluation Scale in Zone 1

When the results of the analysis are compared to the urban vitality data, especially staying and talking activities in front of the blind facades is never observed. In this case, the exception is observed only in front of the school entrance in the Çeltek Street during

entrance hours on weekdays. The families of the children stayed in front of the school for a very short time.

In Zone 2, all facade types are observed (figure 5.35). Mostly vibrant and active façades are dominant in the whole area. The blind façade is just only located in a part of the Filiz Street. Compared the urban vitality data with the results of building façade activation analysis of Zone 2, the activity types such as staying, sitting and talking are observed in front of the only vibrant and active facades. Figure 5.36 shows the examples of the façade evaluation scale of Zone 2.

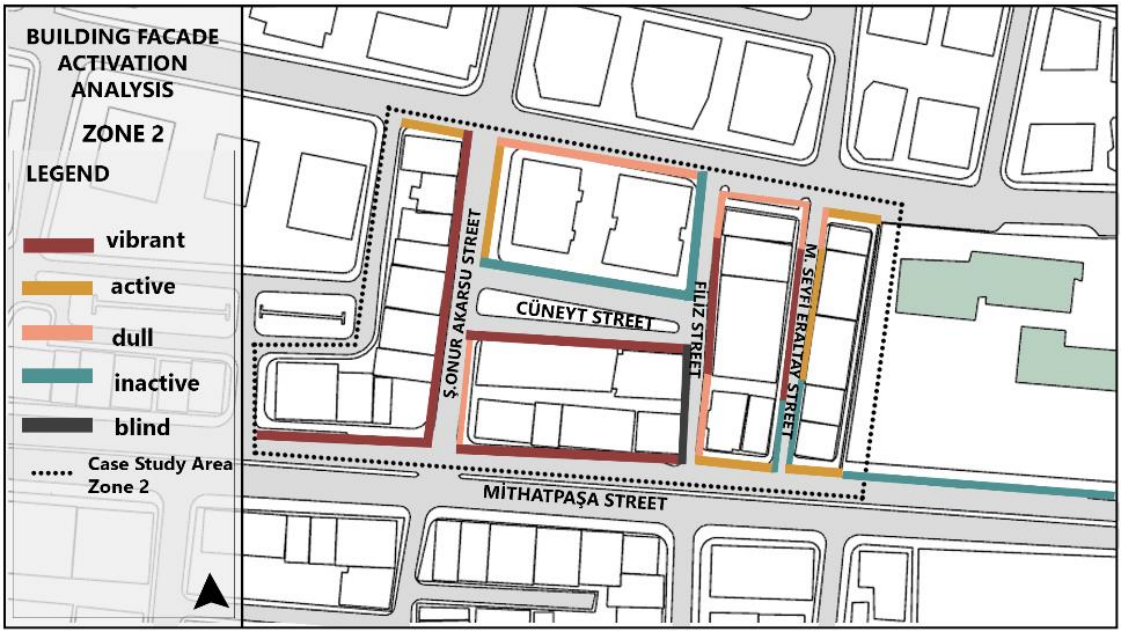

Figure 5. 35. Building Façade Activation Analysis of Zone 2

As a result of the evaluation, it is seen that the ground floor façade design has an impact on urban vitality in the case study.

Vibrant façade (left) in Filiz Street and Active façade (right) in M. Seyfi Eraltay Street

Dull façade (left) in Filiz Street and Inactive façade (right) in Filiz Street

Figure 5. 36. The example of Façade Evaluation Scale in Zone 2

Street and Sidewalk Width

Figure 5.37 shows street and sidewalk width each streets in both zones. As a result of street measurements, the width of the streets are at their minimum size according to their qualities in the area. To exemplfiy, while Mithatapaşa Street is 25 meters long as a main arterial road, G.Fevzi Yılmaz Street is 12 meters long as a collector road.

Figure 5. 37. Street and Sidewalk Widths of Zone 1 and Zone 2

Sidewalk width is very important for pedestrian mobility and safety in the residential area. In Zone 1, all streets, except for Çeltek Street, comply with sidewalk width standards (minumum 1.5 meters). Besides, the width is increasing in the Mithatpaşa Street and M. Kemal Coastal Boulevard. Similarly, in Zone 2, all streets, except for Filiz

Street, comply with sidewalk width standards. In addition, Mehmet Seyfi Eraltay Street has one-sided wide sidewalk and this allows commercial use on the street as well as use as a sidewalk cafe. It is seen that the activity of sitting and talking concentrates in this part of the street. When the sidewalks are evaluated in terms of their physical properties, the continuity of the sidewalks in Zone 1 is not cut along the street. In Zone 2, the sidewalk continuity is cut due to its damaged structure and/or commercial usage occupying the sidewalk for the pedestrian. Additionally, according to the observations, there are streets without sidewalk on one side in Zone 1 (Gazeteci Fevzi Yılmaz Street and Çeltek Street).

Street Landscape and Street Furniture

Street landscape and street furniture are evaluated by making a checklist for the streets of both zones (table 5.13). The streets are scored according to the presence of street trash can, seating, and street trees. There is usually a trash can on all streets, only Mithatpaşa Street and Mustafa Kemal Coastal Boulevard have no trash can on the observed parts (figure 5.38).

Figure 5. 38. Street Trash Cans in Zone 1 (left) and Zone 2 (right)

According the observation, there is no seating in the streets of both zones. Nevertheless, sitting people on the sidewalks are observed in Zone 2 which has a higher degree of urban vitality than Zone 1 (figure 5.39).

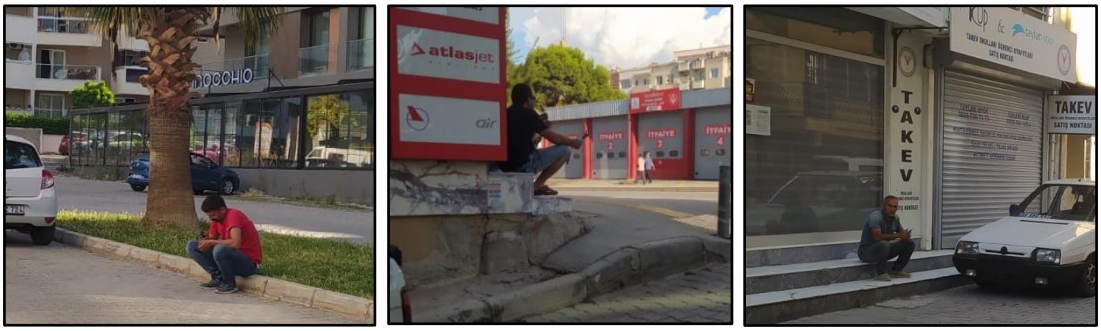

Figure 5. 39. Sitting people in the Zone 2

Besides, all streets have the street trees in Zone 1. İsmail Cem Street and M. Kemal Coastal Boulevard has a proper street landscape. There are trees and plants placed at certain intervals in these streets. According to observations, the majority of waiting/standing and chatting activities take place next to the vegetation on the corner of ismail cem street. (figure 5.40). On the other hand, in Zone 2, there are street trees in only Cüneyt Street, Mehmet Seyfi Eraltay Street and Mithatpaşa Street.

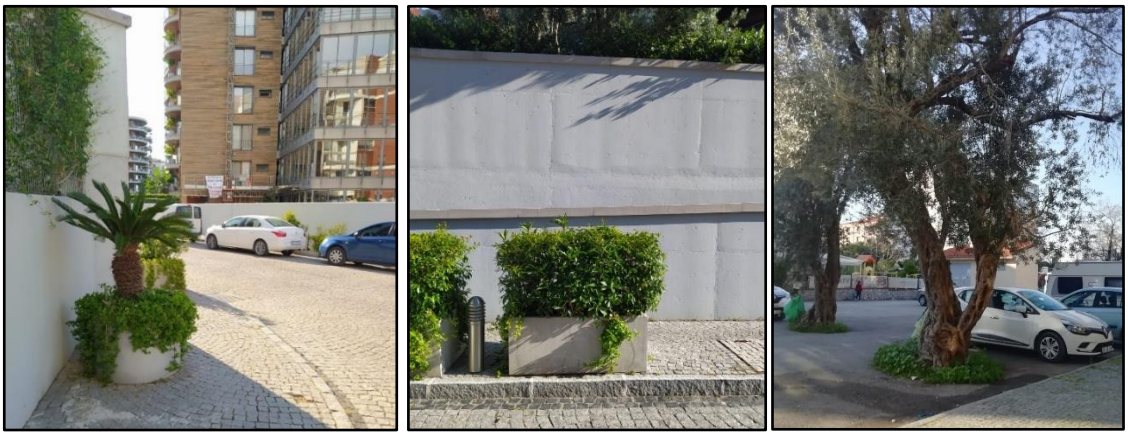

Figure 5. 40. Street Landscape in İsmail Cem Street (left, middle) and Çeltek Street (right)

As a result of the comparison of the two zones, although there is no significant difference between them, the ranking of Zone 1 is higher than Zone 2 (table 5.13). Considering the impact of street quality on urban vitality data, it can be said that there is no significant relationship between them. For example, although there is no seating unit

on all streets in both zones, people who use the sidewalks as a seating area are observed in only Zone 2.

Table 5. 13. The checklist of the street quality in Zone 1 and Zone 2

Measurements / Streets	Street Trash Can	Seating	Street Trees	Score
G. Fevzi Yılmaz Street	✓	-	✓	2
İsmail Cem Street	✓	-	✓	2
Mithatpaşa Street	-	-	✓	1
Çeltek Street	✓	-	✓	2
M. Kemal Coastal Boulevard	-	-	✓	1
Zone 1				**8**
Ş. Onur Akarsu Street	✓	-	-	1
Mithatpaşa Street	-	-	✓	1
Cüneyt Street	✓	-	✓	2
M. Seyfi Eraltay Street	✓	-	✓	2
Filiz Street	✓	-	-	1
Zone 2				**7**

Consequently, the results of the urban vitality factors analyses are evaluated by scoring method to determine which factor is more effective on urban vitality in the case study (Table 5.14). The design principles to increase urban vitality specified in the literature are considered as measures for scoring (as seen in chapter 4). The factors that increase urban vitality are coded as 1 and the factors that decrease urban vitality are coded with 0. As a result of the scoring, residential density, coverage, ground floor land use, retail area distance, size of blocks, number of blocks and ground floor façade design have a significant impact on urban vitality. Moreover, residential density, coverage, size of blocks, ground floor façade design and ground floor land use are the factors related to the urban form that have the most impact on urban vitality in the case study.

Table 5. 14. The urban vitality factors of Zone 1 and Zone 2

Urban Vitality Factors		**Measures (observed in 5 streets for each Zone)**	**Coding (1: factors that increase the urban vitality 0: decrease)**	**Zone 1***					**Zone 2****				
				1	**2**	**3**	**4**	**5**	**1**	**2**	**3**	**4**	**5**
Density	Residential Density	Is the residential density greater than 125 dwelling unit per hectare?	Yes: 1 No:0	0	0	0	0	0	1	1	1	1	1
	Coverage	Is the percentage of lot coverage greater than 60?	Yes: 1 No:0	0	0	0	0	0	1	1	1	1	1
Total Score (out of 10)				**0**					**10**				
Diversity	Housing Typology	Are there different building types?	Yes: 1 No:0	0	0	0	0	1	0	0	1	1	0
	Ground Floor Land Use	Are there any mixed-use buildings?	Yes: 1 No:0	0	0	1	0	1	1	1	1	1	1
Total Score (out of 10)				**3**					**7**				
Accessibility	Public Transport	Is there any bus stop on street?	Yes: 1 No:0	0	1	0	0	1	0	0	0	0	1
	Retail area	Is it close to the retail area?	Yes: 1 No:0	0	0	0	0	1	1	1	1	1	1
	Green area	Is there a small green area of 2 ha within 400 m walking distance?	Yes: 1 No:0	1	1	1	1	1	1	1	1	1	1
	Size of Blocks	Is the street blocks length between 60 and 90 m?	Yes: 1 No:0	1	0	0	0	0	1	1	1	1	1
Total Score (out of 20)				**9**					**16**				
Quality of Built Environment	Number of Floors	Are there buildings higher than 5 or 6 floors?	Yes: 0 No:1	0	0	0	0	1	1	1	0	1	0
	Building Façade Design	Is there any vibrant or active frontage?	Yes: 1 No:0	1	0	0	0	0	1	1	1	1	1
	Street and Sidewalk Width	Is the sidewalk width greater than 1.5 meters?	Yes: 1 No:0	1	1	0	1	1	1	1	1	0	1
	Street Landscape	Are there any street trees along the street?	Yes: 1 No:0	1	1	1	1	1	0	1	1	0	1
	Street Furniture	Is there any street furniture on the street?	Yes: 1 No:0	1	0	1	1	0	1	1	1	1	0
Total Score (out of 25)				**14**					**19**				
Urban Vitality Factors (Total Score) (out of 65)				**26**					**52**				

*Zone 1: 1) İsmail Cem St., 2) M. Kemal Coastal Boulevard, 3) Çeltek St., 4) G. Fevzi Yılmaz St. 5) Mithatpaşa St.

**Zone 2: 1) Ş. Onur Akarsu St., 2) M. Seyfi Eraltay Boulevard, 3) Cüneyt St., 4) Filiz St. 5) Mithatpaşa St.

5.5. Evaluation of The Case Findings

In the case of Yenikale Neighborhood, according to the results of the field study, the two selected zones differ from each other in terms of urban vitality level. Zone 2 has higher degree of urban vitality compared to Zone 1. Considering the indicators of urban vitality separately, the total observed pedestrian density in Zone 2 is almost three times of the pedestrian density of Zone 1 and vehicle density in Zone 2 is lower than Zone 1. In addition, in Zone 2, the four times the number of people of Zone 1 use the streets for different purposes, except walking. Especially, social activities are observed more in Zone 2. Considering the urban vitality level data of the zones, the urban vitality factors related to urban form are evaluated by comparing the two zones. The findings of the thesis are summarized as follows:

- **Density Related Factors That Increase Urban Vitality**

According to the findings of the thesis, it can be said that density has a significant impact on urban vitality in the case study area. Both residential density and coverage examined under the heading of density are the factors affecting the urban vitality. Zone 2 is quite denser than Zone 1. Although there are more residential units in Zone 1, it has a low residential density as it has larger residential areas. Consequently, less dense settlement areas in the neighborhood do not contribute to urban vitality.

The findings of the study support that high residential density and high lot coverage increase urban vitality. Regarding the findings from density analysis, it is recommended that the minimum sixty (60%) percent as a high lot coverage and minimum 125 dwelling units per hectare for residential density should be provided to ensure urban vitality.

- **Diversity Related Factors That Increase Urban Vitality**

Ground floor land use and type of buildings are examined under the heading of diversity factors. While ground floor land use is quite significant impact on urban vitality, housing typology is not significant factor for urban vitality in Yenikale neighborhood. Although housing typology is completely different in both zones, it does not provide

diversity within the zones itself. Therefore, the effect of building types on urban vitality is not observed. According to results of the ground floor land use analysis, Zone 2 has evenly distributed mixed uses. The majority of commercial functions in Zone 2 is for daily needs that appeal to the residents within the neighborhood. In Zone 2, beside the functions of the commercial uses on ground floors, the way of using the area is also effective. Especially, the front of the hairdressers, coffee shops, bakeries and markets are used as a sidewalk cafe as well as their own functions. People who socially interact, especially such as talking and greeting activity, are observed in front of these commercial uses in the area. Daily commercial uses are quite important to provide urban vitality. On the other hand, this diversity of land uses provides the spatial use in a wider time period. Residents are more likely to use the street and to encounter each other while meeting their daily needs at a different time of the day.

The effect of the mixed-use built environment stated in the literature on urban vitality is supported by the findings of this thesis. As a result, at least 2 or 3 separate uses must be included to ensure urban vitality in residential areas.

- **Accessibility Related Factors That Increase Urban Vitality**

In this study, the location of the case study area and the green area, retail area and public transportation distance and size of blocks are considered as urban vitality factors related to accessibility. While size of blocks and retail distance have a significant impact on urban vitality, the effect of distance to public transport and green area are not observed in two zones. The reason is that both zones are equidistant to public transportation and have a green area within 400 m walking distance. Therefore, it could not be confirmed that the distance of green area and public transportation influence the urban vitality in the selected case study area. Only the playground within the boundaries of the Zone 1 is made a difference in its diversity of activities. Nevertheless, considering the urban vitality level, Zone 1 is below the urban vitality level of Zone 2.

On the other hand, one of the remarkable findings is the block length analysis results. The block lengths of both zones are quite different from each other. While the Zone 1 has longer blocks, Zone 2 consists of shorter street blocks. This is due to the large residential areas with garden fence or walls in the Zone 1. Shorter blocks affect pedestrian mobility in a positive way and increasing the encounters. It is found out that the size of blocks has a significant impact on urban vitality. As a result, it is recommended to design

block lengths between 60 meters and 90 meters in residential areas for ideal pedestrian accessibility and urban vitality.

- **Quality of Built Environment Related Factors That Increase Urban Vitality**

Within the scope of the thesis, number of floors, ground floor façade design, street and sidewalk width, street landscape and street furniture are examined in the two zones as urban vitality factors that related to quality of built environment. Considering the results of scoring the urban vitality factors, number of floors and ground floor building design have a significant impact on urban vitality in the case study area. The higher number of floors compared to the Zone 2 reduced the relationship between the residents and the street. This situation affects pedestrian street use in a negative way. On the contrary, it is even observed that people on the balcony of the apartments interact with the people in the street in Zone 2, since the building lengths of Zone 2 are suitable for the street view distance and do not negatively affect the relationship with the street. Besides, according to the findings of the thesis, ground floor façade design is quite important for urban vitality. How the facades relate between the interior and the exterior space affects the activities of people on the street. Especially, the behavior map of the zones supports this hypothesis. All social activities take place almost in front of vibrant and active frontages. The ground floor design of Zone 2 has small units with many doors and opening and thus, it has more vibrant and active building façade in the area. Therefore, urban vitality level of Zone 2 is higher than the Zone 1.

On the other hand, street and sidewalk width, street furniture and street landscape have not significant impact on urban vitality in the case study area. According the findings of the analysis of street quality, streets and sidewalks are the same width in both zones. In addition, although Zone 2 has more damaged and discontinuous sidewalks, this situation does not affect urban vitality level. On the other hand, although Zone 1 has more score in terms of street furniture and street landscape, these factors could not make a positive difference in terms of urban vitality level in the zones. Street furniture and street landscape are not found to have a positive effect on urban vitality in the case study area. Nevertheless, these are the factors that their impacts in terms of walkability and urban vitality should not be ignored for other urban areas.

Zone 1 should have more active and vibrant facades instead of blind facades formed by closed residential areas that are not connected to the street to achieve urban

vitality. In addition, although the street quality in Zone 2 is not good in terms of walkability, the high density of pedestrians indicates that the demand is high. For this reason, a safer pedestrian flow can be achieved with sidewalk and street improvements.

CHAPTER 6

CONCLUSION

This study examines the impacts of urban form on urban vitality in different urban blocks in residential areas. Firstly, a literature review is conducted including the definitions of concept of vitality, the researches on urban vitality at various scales and urban vitality factors related to urban form. Following the literature review, as the case study of the thesis two zones with different morphological features in Yenikale Neighborhood in Narlıdere District in İzmir are examined. While, Zone 1 involves residential use with high-rise apartment blocks, Zone 2 covers mixed-use with mid-rise apartment blocks. It is aimed to determine and evaluate the effects of urban form on urban vitality by comparing the differences related to urban form between the two zones. Within the scope of the field study, 5 streets that represent characteristics of the area in both zones were selected and urban vitality indicators are measured in these streets. According to the results of the measurements, urban vitality level is determined by scoring method for each street of the two zones. Moreover, morphological analyses are carried out to reveal the characteristics of urban form that affect urban vitality in the two zones. According to the measurements of the urban vitality factors, the results of urban form data are evaluated by scoring method. By doing so, it is aimed to determine which factors have an impact on urban vitality in the selected zones.

To create livable and sustainable cities, the streets must be places where people are present, meet, interaction and social activities occur. One of the most basic way to create this environment is to provide urban vitality. Urban vitality encourages street use, people to communicate with each other on the street, and the creation of safe and walkable environments. Generally, the researches on urban vitality that have been conducted so far have chosen the street in a historic city center or the area in a central business district as a case study area. Whereas urban vitality is not a phenomenon that is need to be considered only for the areas with the high potential to use in urban centers. In this direction, this study is one of the first studies on urban vitality at urban block scale in residential areas located in Izmir.

In the case of Yenikale Neighborhood, according to the results of the field study, the two selected zones differ from each other in terms of urban vitality level. Zone 2 has higher degree of urban vitality compared to Zone 1. Considering the indicators of urban vitality separately, the total observed pedestrian density in Zone 2 is almost three times of the pedestrian density of Zone 1 and vehicle density in Zone 2 is lower than Zone 1. In addition, in Zone 2, the four times the number of people of Zone 1 use the streets for different purposes, except walking. Especially, social activities are observed more in Zone 2. Considering the urban vitality level data of the zones, the urban vitality factors related to urban form are evaluated by comparing the two zones.

In conclusion, it is found out that residential density, coverage, ground floor façade design, ground floor land uses, and size of blocks are the most effective factors related to urban form on urban vitality. Besides, distance to retail site and number of floors have a reasonable impact on urban vitality. On the other hand, street landscape and street furniture have the least impact on urban vitality in the case study area. According to the findings of the thesis, in order to increase urban vitality, urban blocks in residential areas should have the qualifications listed below:

- High density design
- Equally distributed mixed-use buildings
- The commercial functions consisting of small businesses where people can supply their daily needs
- The residential area designed with shorter block length (between 60 m and 90m)
- Up to 5 or 6-storey buildings
- Permeable building facades
- Private residential areas surrounded by vegetation instead of walls
- Streets with street furniture for people needs
- Streets with continuous and wider sidewalks
- Improved street and sidewalk material
- Streets with street trees along the street

Consequently, the findings of the thesis indicates that seven factors related to urban form are associated to increase urban vitality in Yenikale neighborhood. These are residential density, coverage, ground floor land use, retail area distance, size of blocks, number of floors and ground floor façade design. Thus, the results of the thesis verify the

literature examined. This study may help to create a basis for decision makers and urban designers with the results obtained. Accordingly, studies should be conducted on streets which has low degree of urban vitality and urban design decisions should be made to promote urban vitality based on the vitality factors related to urban form. Additionally, for future researches, the relationship between more variables of urban vitality can be examined in larger urban areas by using advanced research tools such as GPS tracking devices. The findings of the study contribute to develop policies to achieve and maintain urban vitality at a meso scale. However, while these findings are evaluated in future studies, it should not be ignored that each community has its own characteristics and conditions.

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