UNIVERSITY OF LIVERPOOL

An Empirical Investigation of the Interplay between Typo-Morphological Transformation of Historic House Form and Sense of Place

Duygu Gokce

B.Arch. (Gazi University), MSc (University of Bath)

A Thesis Submitted in Accordance with the Requirements of the University of Liverpool for the Degree of Doctor in Philosophy (PhD)

Faculty of Humanities and Social Sciences

School of Architecture

June 2017

DECLARATION

I hereby declare that this thesis is my own work and personal effort and has not been submitted anywhere for any award. Where other sources of information have been used, they have been acknowledged, as it should be.

Signed Duygu Gokce

Date 15 June 2017

ABSTRACT

This research aims to empirically examine whether continuity during the transformation process of the physical/built environment helps to sustain people's satisfaction with life by bridging two previously independent fields of research: typo-morphology and sense of place (SoP). The former concerns the transformation process of the built environment, in paarticular continuity of urban form, represented through typological process which was theorised by the Italian Typological School. The latter is an important indicator of life satisfaction. The research proposes a mixed methodology combining typological analysis and SoP assessment, which then is applied in the Turkish context with seven selected cases of housing development in Ankara which were developed in different periods of the city's development since the late 19th century. Each period features distinctive socio-economic, political and cultural conditions that have shaped different building types or urban types. Regarding the mixed methodology, a typological frame of a set of spatial characteristics is established against which types are defined at the building, street and neighbourhood scales. Then, spatial characteristics of the building, street and neighbourhood types of the seven cases are compared in a chronological order to identify continued and partly continued (thus in typological process), or discontinued transformation. Regarding SoP assessment, firstly, a conceptual SoP model consisting of ten indicators is proposed and interview questions for the residents of the seven housing developments are developed accordingly. Then, 20 residents from each housing development are interviewed to assess their degree of satisfaction with each indicator using a 7-point Likert scale. The research did not intend to measure SoP in its absolute value but to monitor SoP in a comparative perspective. By aligning the SoP scores with the corresponding typological changes at the three scales, the research reveals that SoP is weakened during the transformation process from the traditional types to the contemporary types. It proves that changing housing typology is one of the factors affecting SoP although the degree of its impact is not entirely clear compared to that of socio-economic and demographic factors. The results demonstrate that continuity over time at the building scale helps to maintain SoP at least at the moderate level; while mutations at the street and neighbourhood scales cause dramatic decreases of the SoP scores over time. Furthermore, the degrees to which physical changes affect SoP are different at different place scales. In detail, physical changes at the street scale affect SoP the most, followed by changes at the neighbourhood scale. Changes at the building scale affect SoP the least. The study also clarifies those spatial characteristics that contribute positively to SoP and therefore should be sustained in contemporary development in the cultural context. For example, functional zoning of the houses clearly defining the individual and shared spaces, gradual transition between public streets and the private building entrances, building accesses from pedestrianised/traffic-calmed streets, having clear boundaries of housing clusters, clear separation of public and private spaces, neighbourhood design prioritising pedestrians and integrated street network centralising open spaces and encouraging social interaction. Such characteristics are mainly relevant to the design of public spaces at the street and neighbourhood scales. In sum, this thesis has established a methodological framework for SoP assessment during the process of typo-morphological transformation. The framework can be applied to other Turkish cities or is relevant to other cultural contexts. The methodology has not only shed some light on the definition of typological process, but also contributed to the lesser extended literature on measuring SoP and understanding the impact of spatial characteristics on SoP.

PUBLICATIONS AND CONFERENCES

Publications:

Gokce, D. & Chen, F., 2015. The Evolution of House Form and the Change of Culture: A Turkish Perspective. In: Oliveira, V., Pinho, P., Batista, L., Patatas, T. & Monteiro, C. eds. (2014) Our common future in Urban Morphology, FEUP, Porto, 2, pp.444-456. ISBN: 978-972-99101-6-6

Gokce, D. & Chen, F., 2016. Does typological process help to build a sense of place?, *Urban Morphology*, 20(1), pp.66-69.

Gokce, D. & Chen, F., 2017. Sense of Place in the Changing Process of House Form: Case Studies from Ankara, Turkey. *Environment and Planning B: Urban Analytics and City Science.* DOI.10.1177/0265813516686970

Conferences:

Gokce, D., 2014. The evolution of house form and the change of culture: A Turkish Perspective. *Poster Presentation*. In: Transitions to sustainable societies: Designing research and policies for changing lifestyles and communities, 23rd International Association of People Environment Studies (IAPS) Conference, 24-27 June, Timisoara, Romania.

Gokce, D., 2014. The evolution of house form and the change of culture: A Turkish Perspective. *Oral Presentation*. In: Our Common Future in Urban Morphology, 21st International Seminar on Urban Form (ISUF) Conference, 3-6 July, Porto, Portugal.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my supervisor, Dr. Fei Chen, for her guidance, stimulating suggestions and contributions throughout this study. Without her patience, motivation, enthusiasm in my research and immense knowledge, I would never have been able to finish this thesis. She is the best supervisor ever everyone wishes to have and I am already very lucky to be advised by her throughout my research and writing of this thesis.

I would also like to thank my secondary supervisor, Professor Steve Sharples, for his encouragement, friendly conversations and insightful comments in the last four years.

My sincere thanks also go to my examiners, Professor Peter Larkham and Dr. Iain Jackson, for their interest in my research and for agreeing to examine my thesis.

I should also thank the Turkish Government for their financial support and the Beypazari Municipality and Yenimahalle Municipality for their support in my research and sharing their archives.

A special thanks to my parents, Mustafa Gokce and Nurten Gokce, for not only the efforts they made during the data collection of my thesis but also their support, understanding and encouragement in all aspects of my life. My gratitude can never be enough. My brothers, the great mathematician Utku Gokce and the future architect Onur Gokce, my aunties, uncles and grandmothers also deserve my wholehearted thanks.

Last but not the least, I would like to express my deepest appreciation to my colleagues at the University of Liverpool for their continuous support, technical assistances and constructive criticisms at all times. Without all sorts of help, this thesis could not have been completed.

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDIX TABLES

ABBREVIATIONS AND ACRONYMS

ANOVA: Analysis of Variance

eta^2: Effect size

NAS: Neighbourhood Attachment Scale

PREQIs: Perceived Residential Environment Quality Indicators

p-value: Probability/Significance value

QoL: Quality of Life

R: Correlation co-efficient

SoP: Sense of Place

SPSS: Statistical Package for Social Science

CHAPTER I

"Cities are ever changing; they are 'alive', they respond to ever changing need. The most constant feature of cities is change. They represent a process of evolution by changing all the time but not always with a great evolutionary success".

(Clerici & Mironowicz, 2009, p.23)

1. INTRODUCTION

Rapid transformation of residential areas resulting in mass production and standardisation has caused extreme changes in the urban order. The creation of monotonous built forms and the extensive neglect and devastation of local, social and cultural values during the design process have resulted in a typological crisis, especially in developing countries such as Turkey. In particular, the breakdown of the established emotional and functional relations between inhabitants and their home environment has become a major problem. Given this fact, this research explores the interplay between typological transformation and the development of a sense of place (SoP) in the Turkish housing context and empirically tests the impact of the transformation on the residents' SoP satisfaction.

1.1. Background

Homes have been a material expression of lifestyles and behavioural patterns since the beginning of human civilisation and evolved simultaneously with the efforts for human survival (Ng et al., 2005; Jenkins et al., 2007). From caves and tents to the modern skyscrapers, a variety of dwelling types have been introduced to date and have become the most dominant structures in the built environment. This is mainly because of the urgent need to accommodate the increasing population, which results in higher-density residential settings. However, needs are currently not only limited to provision of shelter, because the urbanisation process is also closely associated with the living environment at personal, communal and societal levels and has an impact on the inhabitants' quality of life (QoL), sense of belonging and place attachment (Ng et al., 2005). Biddulph (2007, p.1) argues that:

> *Housing environments take up the majority of developed land, and we spend long periods of our life within them. As such the way that they are designed can simply make our lives a pleasure, or they can make it hard for us to live our lives the way that we would like. How they are designed can, in particular, open up or reduce opportunities for us.*

In this sense, residential areas and their changing physical conditions are of crucial importance in providing better life quality and satisfaction. This is also the reason why this research focuses on the residential areas.

In the pursuit of a better QoL, spaces are created to accommodate human activities, and the physical environment is constantly changing to adapt to evolving human needs. This is understandable because "*[a]s people change so do their space requirements*" (Memken et al., 1997). Rapoport (1969a) asserts that, inherently, physical form and human behaviour have always interacted with each other and that "*cities are designed to meet people's environmental preferences and notions of environmental quality*" (Rapoport, 1977, p.48). According to Relph (1976, p.31), "*[t]he changing character of places through time is of course related to modifications of buildings and landscapes as well as to changes in our attitudes, and is likely to seem quite dramatic after a prolonged absence*". For this reason, the established relationships between behavioural patterns and the physical environment are often considered to be positive since the best fit between them provides satisfaction. Therefore, as long as the fit between them is sustained and changes undergone over time are compatible, the life satisfaction can be expected to be high.

Traditionally, this has most often been done in a piecemeal manner, where both the physical forms and the lifestyles gradually adapted to one another. However, the emergence of new building types circulating the globe and universal solutions to residential architecture in the modern age has caused incompatibility of physical forms and local cultures (Birol, 2006). Therefore, "*within the modernist architectural discourse, the concept of type suffered a loss of significance*" (Guney, 2007, p.4). The contemporary built environment is thus less homogenous, and currently many cities are suffering from a typological crisis derived from the conflict between old and new; neglect of local, social and cultural values; dissatisfaction with life; and, most importantly, a loss of SoP. Furthermore, Marzot (2002) argues that the typological process is interrupted by modernity and technological advances; and, as Muratori (1949-50, cited in Marzot, 2002, p.62) indicates, this has mainly "*reduced architecture and urban design to simple technical matters*" rather than tools for social concerns. Moreover, as Krier (1979, p.15) indicates, "*in modern cities, we have lost sight of the traditional understanding of urban space*". Hillier (2007) also criticises the modern architectural practice as being ignorant of the lessons learned from previous developments. He finds that current architectural practices have moved away from the past and thinks that the lessons learnt were "*too painful to talk about*" (p.2). Oktay (2002, 2004) stresses the negative impact of newly created urban fabric on SoP and cultural identity; and finds it incapable of sustaining these social and local qualities. Bramley et al. (2009, p.2127) stress the role of urban form in achieving social sustainability and indicate that "*[u]rban forms cannot be considered sustainable if they are not acceptable to people as places in which to live, work, and interact, or if their communities are unstable and dysfunctional*" (p.2125). Clerici and Mironowicz (2009, p.23) also support that, although urban transformation is "*a modern feature of the city*", currently people find these changes extremely unusual and unexpected especially regarding their scale and depth. The changes are not small changes any more; they are clearly noticeable.

Given this, the ability of the transformed new physical environment to meet people's changing needs adequately and satisfactorily is questionable. Modernity is often considered positive to life satisfaction. However, it sometimes weakens the emotional bonds between people and their houses because it offers people fewer opportunities to appreciate the traditional values. Currently, place making is, therefore, more critical compared to that in the past, and the notion of place is psychologically more important in the contemporary built environment (Lewicka, 2011). To that end, historical understanding of the physical environment is significant. It is therefore often claimed in literature that continuous transformation of the physical environment with gradual changes would sustain the connection between the traditional forms and new developments; this will then benefit people's satisfaction with life (Rapoport, 1977; Chen & Thwaites, 2013). Stovel (1994 cited in Assi 2000, p.67) also supports that, since the gradual continuation of traditions or traditional types of functions and uses is generally seen as "*an expression of an authentic cultural and social spirit*", continuity helps to retain SoP (Oktay, 2002; Punter, 1991; Relph, 1976; Komorowski, 2007; Chen & Thwaites, 2013).

According to Chen and Thwaites (2013), gradual continuity, namely typological process, is of crucial importance because it not only sustains social and local values but also provides a grammar to design new buildings to which local people can easily adapt themselves. This also helps to overcome the current identity/typological crisis caused by buildings built with the international style circulating the globe (Chen & Thwaites, 2013). Given this, a sense of continuity is also required for a healthy living environment. Yang (2011) criticises the narrow way of looking at the tradition that ignores its strong potential to contribute to health and wellbeing in social and cultural terms. She stresses the importance of the "*historical expressiveness"* of the physical form since its loss means "*an irreparable cultural loss*". She also claims "*[a] physical environment of the fullest possible historical expressiveness (or historicity) is an important asset to healthy and expanding social life in an advanced civilisation*" (p.4). According to Relph (1976, p.31), continuity is closely associated with place identity and a useful tool by which to retain it by providing "*a sense of association and attachment*", notwithstanding our changing perceptions towards a place during its natural transformation process. This implies that the relation between people and environment is not only physical but also psychological because they interactively affect each other negatively or positively.

The physical environment transforms through the design or construction processes. The design process consists of a series of stages from defining the problem and developing the solutions to offering strategies to improve it. The problem in this context refers to the identified current incompatibility between the human needs and the physical form, and the solutions should tend to eliminate the weakness in the new design product. In this regard, the design process can help to sustain SoP through a positive response to traditional forms and types. However, how to bridge between old and new is still a heated discussion and requires a detailed analysis of the transformation process. According to Relph (1976), alternative approaches organising people-environment relations into patterns should be developed for the better understanding of the built environment. This is required initially to understand what determines the built form and to decide what should be continued or forgotten.

According to Rapoport (1969a, p.81), the built form consists of "*constant*" and "*changeable"* elements and the evolution process of the built environment shows both continuity and discontinuity. Typological process refers to progressive (continuous) changes that have occurred in the historic built forms in a given cultural context (Caniggia & Maffei, 2001). Given this, it bridges between the analysis of the old forms and the design of the new forms, and therefore it is described as something that should continue in the contemporary formations (Moudon, 1994).

Typo-morphology studies the transformation process and helps to find out how the contemporary built environment should be designed in relation to traditional cities – with either continuity or discontinuity (Kropf, 2009; Moudon, 1989; 1994). In essence, typo-morphology is a theory aiming to contribute to the understanding of the forms. The framework that typo-morphology offers was developed based on the concept of 'type', since transformation can be understood by relating a type to another in the historical evolution process (Moudon, 1989). It combines Architecture and Urban Planning disciplines (Marzot, 2002). Moreover, typo-morphology is "*a phenomenological notion that goes beyond pure geometry and intends to evoke sense of place and collective memory, which contribute to sustaining cultural identities*" (Chen & Thwaites, 2013, p.59). Given this, the contribution of typo-morphology is vital not only for the study of the physical environment by its type and shape but also for the comprehensive understanding of the formation process where the collective memory and local culture are embedded and continuously passed to the next generation.

On the other hand, typo-morphological research is also beneficial in the study of SoP and contributes to its understanding. "*In quantitative and qualitative research, differences have been found in sense of place according to cultural, social and physical components*" (Shamai et al., 2012, p.153). However, "*[a]lthough sense of place definitions nominally include the physical environment, much research has emphasised the social construction of sense of place and neglect(s)* [sic] *the potentially important contributions of the physical environment to place meanings and attachment*" (Stedman, 2003, p.671). Personal characteristics, social and cultural factors such as ethnic and religious background, and socio-economic, demographical variables such as the length of residence, level of education, income, marital status, age, gender and tenancy type (e.g. Smith, 2011; Shamai et al., 2012; Shamai & Ilatow, 2005) are the most acknowledged factors affecting SoP. However, as previous literature has suggested, people can develop strong or weak bonds with one place depending on not only their socio-cultural and economic background but also the physical characteristics of the space (Stedman, 2003). It is also supported by numerous studies that human behaviour towards a place is affected by not only cultural and social factors, but also by the physical characteristics of the place (e.g. Hay, 1998a; Hernandez et al., 2007; Lewicka, 2010). There is always a need for an environment that is "*well-organised*", "*poetic*" and "*symbolic*" and this physical setting clusters the society's aspirations and traditions to give them enhanced SoP (Lynch, 1960, p.119).

In this sense, particularly, considering the role of the built environment as a physical entity in meeting people's needs and aspirations and creating opportunities for human interaction, their satisfaction with various aspects of SoP can be discussed through spatial relations. SoP can be easily affected by changes in the physical settings. Cities are currently suffering from a typological crisis, and this unprecedented transformation and the creation of standardised and monotonous urbanisation patterns regardless of cultural, social and local values are mainly responsible for the lack of SoP. In an investigation of the impact of the physical built environment, residential areas are of crucial importance. Moreover, it becomes increasingly difficult to ignore the impact of different housing typologies on SoP in the pursuit of a better QoL. To explore the role of typological changes in enhancing people's subjective QoL, which refers to SoP in this study, an investigation of the established emotional bonds and the degree of the desired SoP offered by different types of housing developments is essential. Furthermore, "*[h]ousing lends itself especially well to typological investigation because dwelling embodies fundamental human needs that have given rise to distinct architectural types*" (Tice, 1993, p.162). Considering the growing research interest in the social impacts of the physical living environments, an investigation of the established emotional bonds and the degree of the desired SoP offered by different house typologies is essential. In this sense, the main questions that need to be asked are what makes the space both physically and socially important and what role different house typologies and their transformation processes play in attaining SoP.

1.2. Problem Statement

The newly created urban fabric is currently criticised as being incapable of sustaining local, social and cultural qualities. Therefore, it is believed that there is an urgent need to appreciate traditional urban forms where changes often occurred in a piecemeal manner to allow gradual adaptation of lifestyles. The main agreed challenge is, however, how to bridge between old and new. To address, this study suggests 'typological process' as a useful alternative tool to those previously used.

The literature claims that a continuity/typological process can help sustain better QoL and contribute to SoP. However, there is not enough research empirically proving this assertion. Cities are continuously evolving under a variety of influences, and this evolution process might be destructive as well as constructive. The empirical assessment of this phenomenon, therefore, requires the impact of continuity and discontinuity on people's emotional attachment to place to be tested.

On the other hand, although it is claimed that cities are suffering from the loss of SoP, the studies are mostly phenomenological, and most of them are not empirically grounded (Galloway, 2006; Cheung & Leung, 2008; Boyko, 2014). Furthermore, the physical dimension of SoP has been less examined and the emphasis has frequently been put merely on its psychological and social construct. Currently, what/how spatial characteristics can contribute to SoP is not clear, and this requires a closer examination. Therefore, the study of typological transformation and its impact on SoP is suggested in this study as an alternative and unique way of exploring the physical dimensions of the SoP concept.

In summary, this study attempts to address three main problems: (1) to empirically explore the impact on SoP of typo-morphological continuity and discontinuity during the transformation process of house form; (2) to clarify the benefits of spatial characteristics of past residential forms to new developments with regard to residents' SoP; and (3) to enrich the literature on the methodological aspects of SoP assessment.

1.3. Research Questions and Hypotheses

To have an in-depth understanding of why the future needs to be linked with the past and how, typological changes and SoP will be studied together, and their interplay will be revealed. This research seeks to answer the following questions:

1. How does the typological transformation of house form affect residents' SoP?
2. Does continuity during the typological transformation help to maintain/improve SoP, which in turn benefits residents' QoL?
3. Does the physical environment affect residents' SoP differently at different place scales, in particular: building, street and neighbourhood?

Accordingly, the research hypotheses can be stated as follows:

1. The evolution process of house form (negatively) affects SoP.
2. Continuity/gradual changes during the transformation of house form helps to maintain/build/rebuild SoP.
3. The perception of SoP is different at different place scales.

1.4. Aims and Objectives

The research aims are:

- To empirically explore the interplay between the typological transformation of house form and SoP.
- To ascertain whether the continuity helps to maintain/build SoP or not.

The specific objectives of the research in order to reach the above aims are as follows:

1. To examine the typo-morphological transformation of residential environments and identify continuity and discontinuity of types.
2. To develop a conceptual model for the assessment of SoP satisfaction.
3. To do a comparative assessment of the SoP satisfaction through the defined typological transformation process at the three place scales: building, street and neighbourhood.
4. To explain how typological process affects SoP at the three scales following the comparative assessment.

1.5. Scope of the Research

This research attempts to shift the attention on SoP research from a usually psychologically-based analysis to a more physical, space-oriented investigation. It tests the research hypotheses in the Turkish context with seven different house types introduced in four different morphological periods of Ankara, Turkey. The seven cases are located in two different boroughs of the city. The typo-morphological analysis focuses on three place scales, the housing layout, and street and neighbourhood levels. SoP is assessed according to the proposed multi-dimensional SoP model consisting of 10 indicators.

1.6. Research Design

The research first sets up the theoretical background through the literature reviews on typo-morphology and SoP. The key concepts of typo-morphological approach and indicators of SoP are reviewed. Accordingly, a conceptual framework is established for SoP monitoring during the typo-morphological transformation of house form. This is followed by the application of the framework (Figure 1.1).

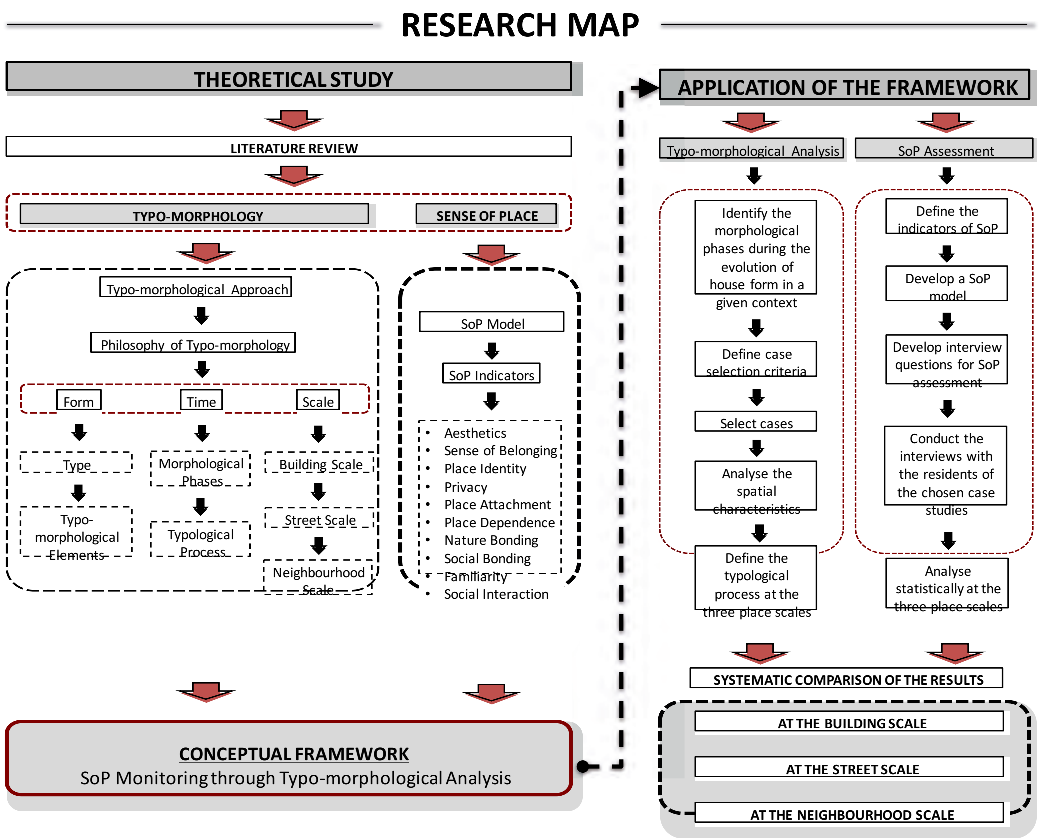


Figure 1.1 Research map

Typo-morphological analysis first requires a particular case selection. Cases are selected according to location, morphological phases/time and place scales. The evolutionary process of house form is reviewed in a given context and the morphological periods where internal and external influences have affected the formation of house form are identified. The spatial characteristics of house types are analysed, and the cases are selected in a way that their chronological changes depict a typological transformation process where both continuity and mutation can be observed. The process is described at the three main scales: building, street and neighbourhood.

Meanwhile, SoP assessment requires the establishment of a SoP model and the development of interview questions assessing the inhabitants' satisfaction with the indicators proposed in the model. The interviews are conducted for each case at the three scales, and the results are analysed statistically. The conclusion of the research is drawn from the systematic comparison of the results obtained from the typological process analysis and the SoP assessment (Figure 1.1).

1.7. Potential Contributions to Knowledge

Typo-morphology is an important design tool examining the formation of the physical environment over time from a geographical perspective, and it particularly focuses on the social dimension of the transformation. This study uses typo-morphological investigation to benefit the scarcity of literature identifying the physical dimension of SoP. On the other hand, SoP is proposed as an analytical lens to reveal the contribution of the design characteristics of the home environment, which were designed and successively modified over space and time. In this regard, this research is the first attempt to bridge the typo-morphological analysis and the empirical assessment of SoP and reveal the interplay between SoP development and typological process. In this sense, the approach adopted in this research is a methodological contribution to knowledge. Moreover, the research provides a better understanding of the relationship between people and the physical systems, and accordingly suggests that architects and planners pay attention to the problems that communities face with regard to the social, cultural and emotional meanings of their living environment in the place-making process.

1.8. Overview of Thesis Structure

This thesis comprises nine chapters. Following the 'Introduction' chapter, chapters 2, 3 and 4 provide the literature review. The literature review section is followed by the Methodology (Chapter 5), Case study (Chapter 6), Results (Chapter 7), Discussion (Chapter 8) and Conclusion (Chapter 9). The content of each chapter is discussed in more detail in the following paragraphs.

Chapter 2 reviews the approaches and methods adopted in the study of urban form, in particular, the typo-morphology discipline, adopting the principles of both typology and morphology. It emphasises the key concepts such as type, the three fundamentals of the typo-morphology, form, scale and time, and the typological process. This chapter accordingly reviews the theoretical and practical studies of typo-morphology to understand its philosophy, define its elements, and explore how it, as a design tool, can help improve QoL and SoP with a quality design practice valuing the traditional understanding of the previously built forms.

Chapter 3 introduces the concept of SoP within the framework of QoL research. Firstly, it gives a brief review of the definitions of QoL and the development of QoL research and QoL indicators, which are followed by the review of the QoL research in Architecture and Planning disciplines. Next, the attention is turned to SoP as an important determinant of subjective QoL, and the SoP literature is reviewed in detail starting with the understanding of the notion of place. In this section, the definitions and indicators of SoP and the approaches to the study of SoP are also presented, and the parameters of SoP are identified. The chapter concludes with the proposal of an SoP model consisting of a set of indicators.

Chapter 4 combines the previous two chapters and focuses on the interplay between typo-morphology and SoP. First, the main attention is paid to the gap in SoP research, in particular, the role of the physical environment in developing SoP. Second, the studies focusing on the impact of typo-morphological characteristics of the built environment on the various dimensions of SoP are reviewed, and the potential relations of spatial characteristics to the SoP indicators are discussed. Then, the feasibility of SoP monitoring through typo-morphological analysis is scrutinised. Finally, following the principles of typo-morphological analysis, a framework for SoP monitoring is introduced.

Chapter 5 establishes the methodological background for the application of the framework described at the end of the literature review chapters. The methodology chapter presents the research design and stages in two main sections: Typo-morphological analysis and SoP assessment. Firstly, the physical characteristics which are required to be analysed to define the spatial typologies are introduced at the three scales and how typological process is defined during the transformation process is explained. Secondly, the stages of SoP assessment are presented including the choice of the survey method, the interview design, the interview delivery, the data collection processes and the data analysis procedures in SPSS. Finally, the rationale for case selection following the above two methodologies is explained.

Chapter 6 explains how the established methodological framework is applied to the Turkish context. First, it provides a general introduction to the case study area and outlines the history of urban development and housing formation in Turkey. Then, the scope is narrowed down to Ankara, and the evolution of its house form is reviewed following the corresponding morphological phases. The case selection procedure is explained within the identified morphological phases, and the case studies are introduced.

Chapter 7 presents the results in two sections: Typo-morphological analysis and SoP assessment. In the first section, the chosen house types are comparatively analysed with regard to their spatial characteristics at the building, street and neighbourhood scales respectively, and the typological transformation processes between them are described. The second section presents the raw interview data including demographic characteristics as well as SoP scores, both overall and at the three scales. In addition, the impact of demographic variables on overall SoP scores is tested, and the reliability of the scores is examined.

Chapter 8 provides a systematic comparison of the results of the typo-morphological analysis and the SoP assessment. Accordingly, it discusses the implications of the results from three main respects. Firstly, the dynamic interplay between typological process and SoP at the three scales is scrutinised. Secondly, the impact of different place scales on SoP is revealed. Thirdly, the chapter discusses what contemporary housing design can learn from previous types regarding the potential contribution of their spatial qualities to SoP. The chapter concludes with the social implications of the research.

Chapter 9 summarises the key findings of the research with regard to the research questions and hypotheses. Then, the significance of the study is discussed. This is followed by an overview of the methodological considerations and the research limitations, the applicability of the research framework and design, and the future work.

CHAPTER II

2. TYPO-MORPHOLOGY AS A TOOL TO UNDERSTAND PHYSICAL FORM

The study of urban form has always been multidisciplinary, and therefore, it is contemplated from a variety of perspectives. This is mainly because a variety of forces shape cities (Jamali et al., 2011). Amongst these, the human impact is the most influential and complex one, because the built environment is where "*[t]he diversity and complexity of human settlements is reflected in* [a] *range of ways"* (Kropf, 2009, p.105). This variety should also be reflected in the ways of probing the physical environment. Therefore, comprehensive approaches are necessary to deal with the urban form as a whole and to reveal its relationship with the human being.

In this regard, this chapter firstly focuses on urban morphology as a method to understand urban form in general and then provides a brief review of the concepts of 'type' and 'typological process'. Accordingly, it continues with a review of different approaches to urban morphology, a comprehensive categorisation of which has been introduced by Kropf (2009): 'spatial analytical', 'configurational', 'process typological' and 'historico-geographical'. Amongst these approaches, this study mainly focuses on the ideas/approaches promoted by the Italian School of Typology, the British School of Morphology and the French School of Typo-morphology. The fundamental concepts this thesis pinpoints are the concept of 'typological process' introduced by the Italians; Conzen's tripartite division of the townscape (town plan, built fabric, land use and building utilisation) in the British Morphological School; and the three central dimensions adopted by the typo-morphological approach: form, scale and time. Finally, the typo-morphological studies in design practice are reviewed to identify the typo-morphological elements of the built form and the place scales.

2.1. Urban Morphology as a Method to Understand Urban Form

Urban morphology is defined as the study of urban form regarding its physical, transformational and structural relations and changing patterns over time (Carmona et al., 2010; Whitehand, 2007; Pinzon Cortes, 2009). The patterns that urban morphology identifies are shaped by the efforts made over time for human survival and simultaneously changing lifestyles (Kropf, 2005). In this sense, as Moudon (1997, p.3) states, urban morphology is "*the study of the city as a human habitat*". Table 2.1 presents a collection of the other definitions of urban morphology available in the literature. These definitions overall also show that urban morphology does not only exclusively pay attention to the physical built environment but also to the human agent shaping its structure.

Table 2.1 A collection of definitions of urban morphology

The Definitions of Urban Morphology	Scholars
The study of the evolution process of a particular place over time	Scheer & Scheer (2002)
The study of the physical (or built) fabric of urban form, and the people and processes shaping it	Larkham & Jones (1990)
A study identifying "the repeating patterns in the structure, formation and transformation of the built environment to help comprehend how the elements work together, notably to meet human needs and accommodate human culture"	Kropf (2014, p.41)
A "method of urban and architectural analysis used to find out basic principles of urban and architectural formations and aiming to describe the process of urban formation and change of a defined period of time within a hierarchical order"	Mihcioglu (2010, p.3)
"A method of analysis which is basic to finding out principles or rules of urban design' or 'the study of the physical and spatial characteristics of the whole urban structure"	Gebauer & Samuels (1981, cited in Oliveira 2016, p.3)
"The study of the lay-out and build of towns viewed as the expression of their origin, growth, and function"	Dickinson (1948, p.232)

The structure of urban form has multiple constituent elements. Therefore, the challenge here is in defining the term 'structure' since what generates it and how it was generated are complex questions. Kropf (2005, p.17) emphasises the ambiguity in the understanding of this structure through the words used to define the urban environment, such as "*urban fabric*" or "*urban grain*". As Kropf (2014, p.43) indicates, urban morphology looks at the urban form through its elements and their relative relationships to each other. In this sense, how the elements come together, are positioned and generate the built form defines this structure. In this respect, the structure can refer to "*spatial configuration*" since it depends on the interpretation (Kropf, 2005, p.17). Spatial configuration here refers to the structural relationship between the elements of physical form. How the structure is defined through the elements and how they come together and define the urban form both occur within a hierarchy, without doubt, even though the structure is not defined in detail (Kropf, 2014). The differences in hierarchy result in the emergence of different patterns in the built environment. These patterns help in understanding the nature of the building process at different place scales (Alexander et al., 1977). Given the fact that type is a small unit of a structure at a certain scale, the observed patterns and hierarchies in the built environment can be classified into **types** that follow a similar spatial organisation. Thus, a better understanding of the built environment and its structural patterns at different place scales primarily depends on the understanding of the concept of type at the relevant scale.

2.1.1. Type

Type initially establishes a base helping to identify specific characteristics, which construct the essence of a particular type of "*objects, events, settings and people*" (Lawrence, 1994, p.271). In other words, it is a way of thinking through classification.

The conceptualisation of type dates back to the 18th century – the Age of Enlightenment and gathered momentum with its application to a variety of human-related contexts in various disciplines (Guney, 2007). It was first introduced to modern architecture as a theory by Quatremere de Quincy (1755 – 1849) in the late 18th century (Guney, 2007; Lee, 2011). Since then, the role of type as a design tool has been immensely promoted in architectural discourses.

Architectural historian Antony Vidler (1998) asserts that there are three concepts associated with types, which emerged in different periods. The first concept considers type as a base to create a model in the rationalistic philosophy of Enlightenment. This can be mainly seen in Quatremere de Quincy's architectural interpretation of type, which associates it with three main notions – origin, transformation and invention (Guney, 2007; Caliskan, 2009). Quincy's approach emphasised type's direct association with human invention, distinguished between type and model, and adopted the idea that type cannot be imitated like a model but provides the base to create the model (Caliskan, 2009). In the Age of Enlightenment, the idea of type was also theorised by J.N.L Durand (1760-1834) and linked to style (Guney, 2007). The second typology emerged to oppose mass production in the late 19th century (Vidler, 1998). This notion of type in modernist ideology was associated with the production/form-making process and this period used the term prototype as a standardised architectural design element, which was repeated depending on the changing social structure (Vidler, 1998; Guney, 2007). The third typology radically differs from the first two typologies since there is no intention to compare man-made type with "*another 'nature' outside itself*" (Vidler, 1998, p.14). Instead, type is seen as a part of a "*chain of continuity*" and associated with the continuity of physical form from the past to the present (Vidler, 1998, p.14). This notion is represented by the neo-rationalists' interpretation of type (Vidler, 1998), introduced by Muratori after the 1960s, and developed by other scholars such as Jeremy Whitehand, Michael P. Conzen, Aldo Rossi and Carla Argan (Guney, 2007). In this understanding of typology, the elements of the built form are not imitations of the previous forms but are inseparable from the past and transferable to the new context by their re-arrangement (Vidler, 1998).

The concept of type has also been associated with space syntax theory by Bill Hillier, who borrowed the terms genotype and phenotype from the biology field to refer to the concept of type (Guney, 2007). Figure 2.1 illustrates the type-related concepts, terms and approaches used over time by various scholars and schools of thoughts.

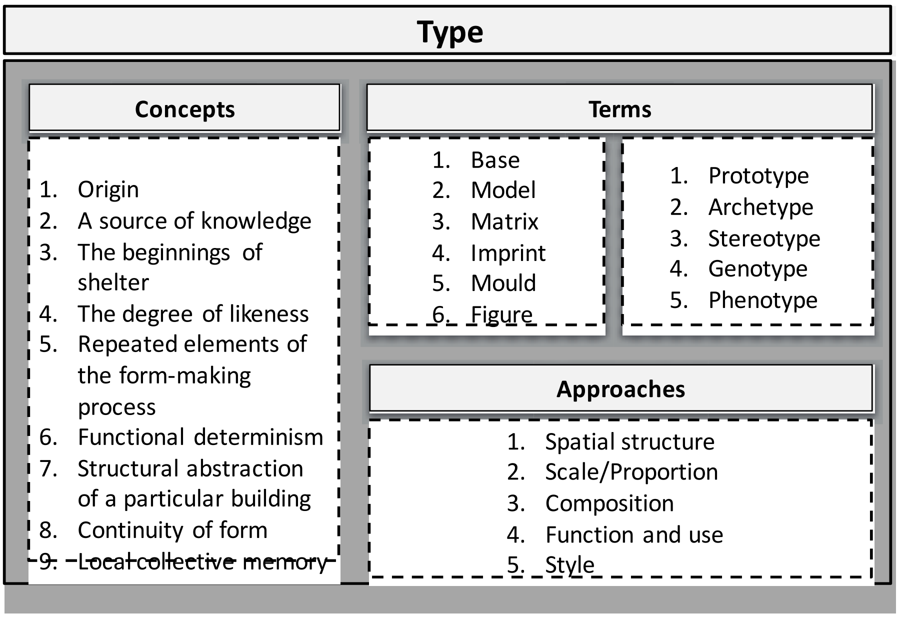


Figure 2.1 Type-related concepts, terms and approaches (adapted from Chen, 2009; Guney, 2007; Caliskan, 2009; Cataldi et al., 2002; Cataldi, 2003; Pinzon Cortes, 2009; Krier, 1998; Pevsner, 1976; Bandini, 1981; Marzot, 2002)

Following the above-mentioned neo-rationalistic approach to type, this research relates type to the history and takes it as a guidance point to trace the continuities and discontinuities undergone during the transformation process of house form. As Krier (1998, p.42) defines it, "*[a] type represents the organisational structure of a building in plan and section*" and "*evolves until it achieves its basic (i.e. its rational and logical) form*". Therefore, the role of type is regulatory in the structural formation and organisation of the built environment over time; and, until it turns into a mature type, the process of its reinvention is experiential. As Chen and Thwaites (2013, p.46) indicate, the creation of new and different building forms depends on this process, achieved through the "*experiential perception [of type] that translated into forms*". In this regard, *type* provides a vocabulary for the understanding of built forms. Schneekloth and Frank (1994) also point out the close association between type and form, since type constructs the initial idea of a building form and defines its outline. Cannigia and Maffei (1979) also advocate that the understanding of type is not only limited to being a "*base idea*" or "*origin*" but also includes the **evolutionary** nature of type, where a latter type is developed from the previous type. Given this, the role of *type* in the understanding of the formation and transformation of the built environment is prominent and two-sided. Type is thus taken as a superior point of departure for the understanding of urban form as a whole since its evolution process also gives clues regarding the formation of the built structure over time.

2.2. Different Approaches to Urban Morphology

There is no agreed, established and rigorous method to analyse urban form (Venerandi et al., 2016). However, Kropf (2009) attempted to classify the methods and aspects. He reviewed the works of some scholars such as Burgess (1925), Hoyt (1939) and Lynch (1981) regarding the aspects of urban form, and identified the approaches and methods (mainly adopted by Conzen and Caniggia) of studying urban form. He identified four approaches to urban morphology, namely, "*spatial analytical*", "*configurational*", "*process typological*" and "*historico-geographical*" by noting that these approaches together provide a comprehensive understanding of the built form structure (Figure 2.2).

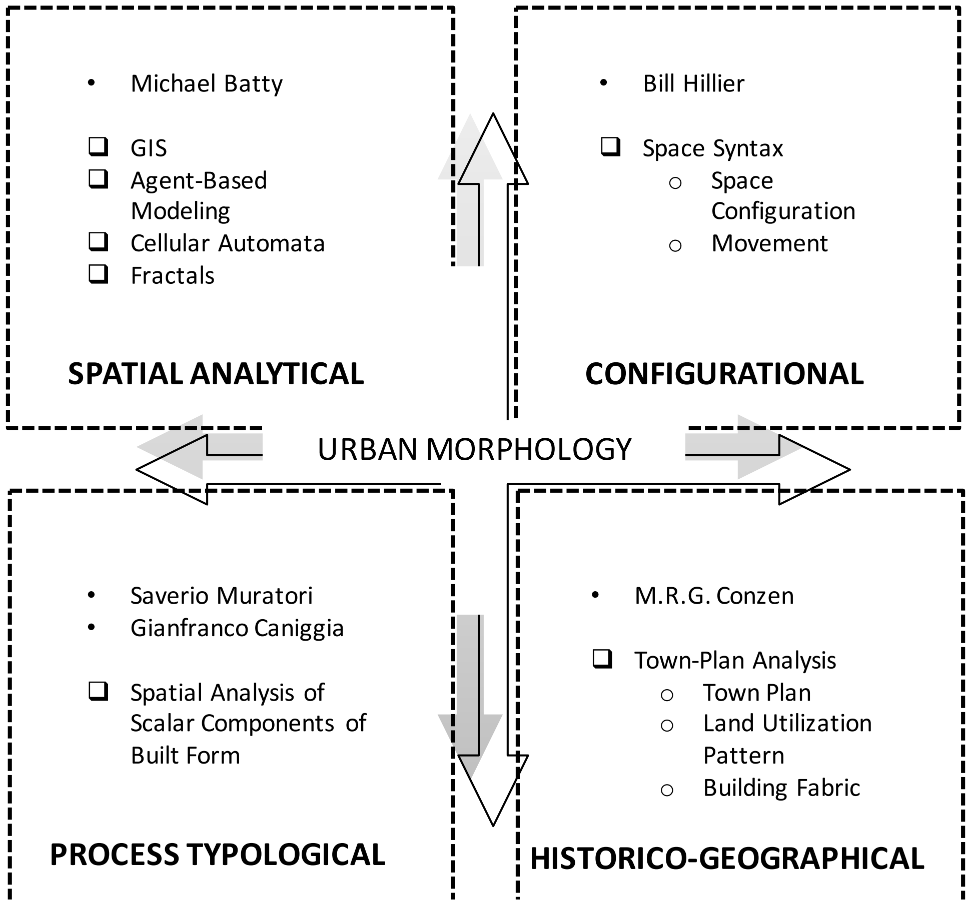


Figure 2.2 Approaches to urban morphology (adapted from Kropf, 2009)

In **the spatial analytical approach**, cities are considered as organised, but complex entities and this complexity problem can be solved with the understanding of their emergence and evolution processes through the analysis of their spatial structure and dynamics (Kropf, 2009). This approach uses a variety of methods and models such as GIS, agent-based modelling, cellular automata, fractals and so on. As seen in the work of Batty (2007), these models include data regarding city regions/areas, plots/parcels, routes and are concerned with phenomena such as changes, growth and segregation of land uses, population growth, migration and so on (Kropf, 2009).

In **the configurational approach**, space syntax is the main method used in urban morphology to analytically examine the links between form (the spatial structure/configuration of cities), function (of movement) and perception (Kropf, 2009). The basic idea adopted is that spatial configuration and movement have a determining impact on each other, and this approach can be mainly found in the works of Bill Hillier, who developed the space syntax theory emphasising the link between the human agent and spatial configuration (Hillier & Hanson, 1984). In this approach, the solid-void relations are explained through streets and spaces between and around buildings, and the entire focus is on voids (Kropf, 2009). The relationship between spaces in a structure is explained based on their position from a space chosen as a base point (Hillier & Hanson, 1984). Space syntax adopts a variety of techniques for the investigation of these relations, such as justified permeability graph (j-graph) analysis, axial and convex mapping (Hillier & Hanson, 1984; Hillier, 2007; Kropf, 2009). [This doctoral research has used the j-graphs and convex maps in the building scale analysis to identify the types at housing layout level. These will be explained in more detail in the methodology section.] Although this approach is different to the others (Larkham, 2006), Samuels (N.D) indicates that it is one of the useful approaches to urban morphology.

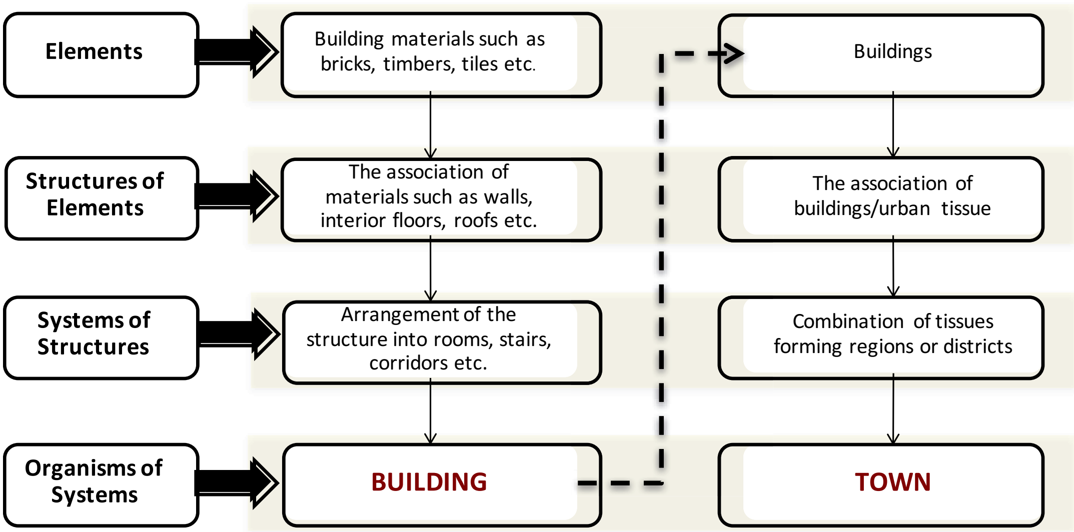


Figure 2.3 Hierarchical spatial analysis (adapted from Caniggia & Maffei, 2001, pp.73-74)

The process typological approach is mainly rooted in the works of Saverio Muratori, who was inspired by Giuseppe Pagano (Marzot, 2002). The concept was then architecturally developed by Muratori's student, Gianfranco Caniggia (Kropf, 2009; Marzot, 2002). This approach is concerned with how the built environment evolves, and what future developments can learn from the evolution of its spatial structure over time (Kropf, 2009). It mainly focuses on two dimensions: "*spatial*" and "*temporal*" (Caniggia & Maffei, 2001, p. 60). The spatial dimension refers to the analysis of the hierarchy defined between elements, structures, systems and organisms (Caniggia & Maffei, 2001) (Figure 2.3). The first stage of the analysis starts from the smallest elements such as building materials until they gradually develop and create a building as an organism.

Then, the building is taken as an element to construct a town as an organism at a bigger scale (Figure 2.3). The temporal dimension refers to the examination of the local processes of the development of this spatial structure at different levels within a defined hierarchy over time (Kropf, 2009).

The historico-geographical approach is seen in Conzen's town-plan analysis where the elements of a town and their development over time are systematically examined to define the town's geographical structure and character (Kropf, 2009). In this method, the townscape is examined based on three complexes: town plan, land utilisation pattern and building fabric (Whitehand, 2001; Kropf, 1993; 2009). The town plan is examined through its street system, plot pattern and building pattern, and the plan-units are identified according to their different combinations (Figure 2.4).

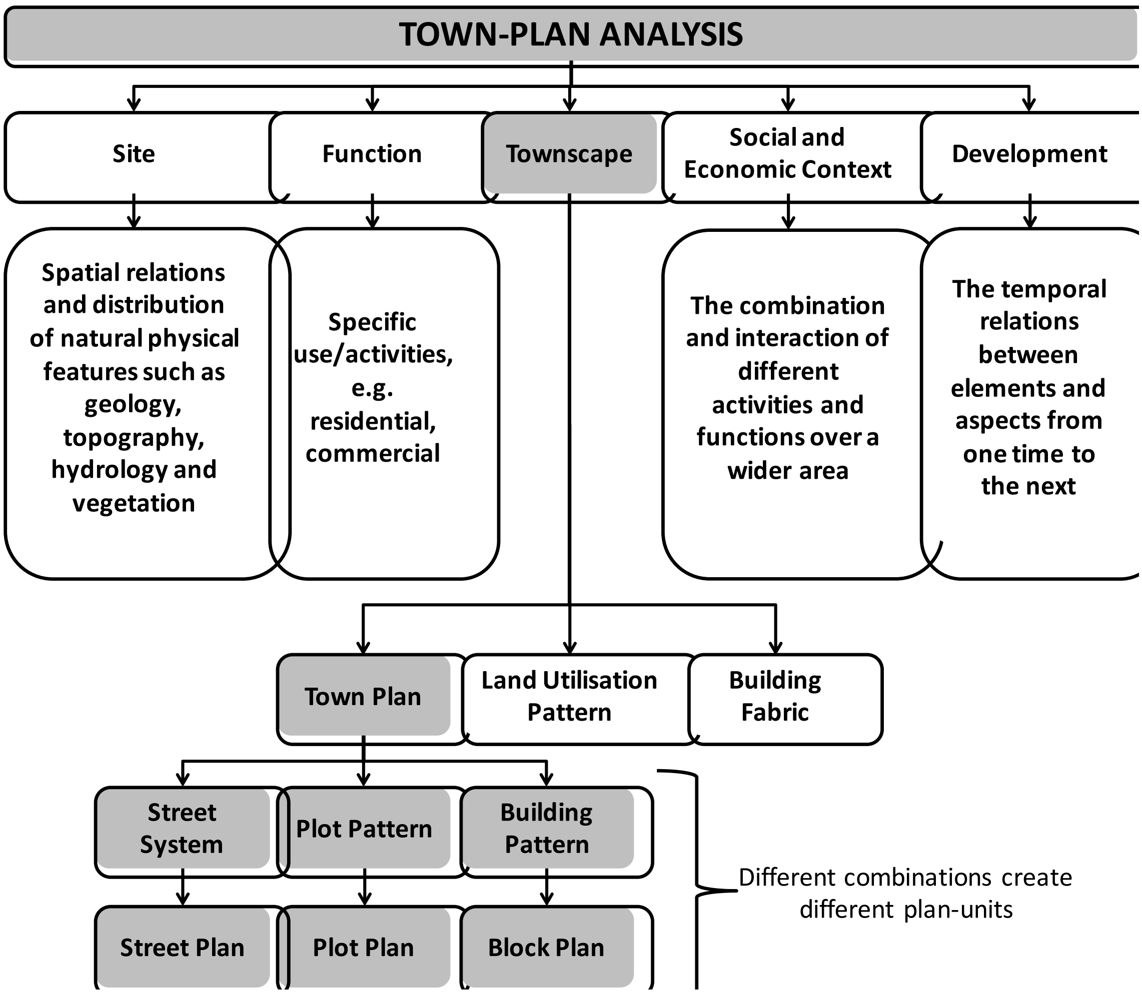


Figure 2.4 Conzen's town-plan analysis (adapted from Kropf, 1993; 2009)

The four main approaches to urban morphology, which have been briefly explained above, are mainly embedded in the works of Italian, British and French schools where the physical environment is studied together with its local processes of change and transformation under the social, spatial, political and economic influences over time. In addition, the concepts of type and typology have mainly developed under the influence of these three schools of different backgrounds (Gurer, 2012; Jamali et al., 2011). The foundation of this research is based on the two approaches called **process typological** and **historico-geographical***,* which are named based on the works of the Italian School of Typology and the British School of Morphology respectively. The following section will therefore first review the approaches proposed by the Italian and British Schools, and then turn its attention to typo-morphology, the French School of Typo-morphology and the other scholars working in this area.

2.2.1. Italian School of Typology: Process Typological Approach

In the early 20th century, Gustavo Giovanni and Giuseppe Pagano developed the typological approach, which focused on the historic city forms and different geographical traditions (Marzot, 2002). After modernisation, the concept of type was associated with tradition by the neo-rationalists, who emphasised the transformation of urban form in a continuous manner (Vidler, 1998; Guney, 2007). This approach not only opened up a new era in typological thinking but also triggered the use of morphological approaches in the architectural field (Guney, 2007).

In the mid-20th century, Saverio Muratori, one of the pioneers of the typological study of urban form in Italy (Gurer, 2012), developed the idea of type to explain the architectural organism (Cataldi, 2003). Muratori's type was grounded in the building typology, which consists of both buildings and open spaces (Gurer, 2012). His approach was based on the use of type as an analytical tool to historically examine the urban form (Gauthiez, 2004). His main concern was the discontinued inherited knowledge because of modernism (Kropf, 1993; Marzot, 2002). Muratori claimed that the essence of a city's structure could only be captured historically (Gurer, 2012) and with "*a sense of continuity in architectural practice*" (Cataldi et al., 2002, p.3). To develop preservation methods, he benefited from Architecture as a pragmatic discipline and proposed a philosophical system explaining the historical transformation process (Cataldi, 2003). He focused on the evolution of urban house forms, tracing them back to previous forms (Marzot, 2002), and his classification of analysis included the study of the built environment from an interior scale to the territorial scale (Cataldi et al., 2002). Accordingly, the typo-morphological approach has become an important tool combining Architecture and Urban Planning disciplines for the understanding of historical transformation processes of urban form (Marzot, 2002). Therefore, Muratori is also one of the pioneers of this new typo-morphological approach (Guney, 2007).

Muratori's typological approach is also named **procedural typology** since the main focus is the evolutionary process of building types (Mihcioglu, 2010; Feng, 2014). This approach was experimentally put into practice and architecturally developed by Gianfranco Caniggia (1933-1987) with special attention to building functions (Sima & Zhang, 2009; Cataldi, 2003; Kropf, 2009; Mihcioglu, 2010; Cataldi et al., 2002). Similar to the scale levels adopted in Muratori's method, Caniggia attempted to understand how the built landscape transforms by examining it under four categories: buildings, building groups, city and region (Gurer, 2012). He suggested that this categorisation can help us examine the built environment on a scale basis in more detail, and as a whole within an established hierarchy in which an object at one scale is related to another object at a different scale (Moudon, 1994; Gurer, 2012) (see Figure 2.3).

Muratori and Caniggia both tried to propose a new design theory that helped to analyse the formation process of city form (Gurer, 2012). The main aim was to acknowledge future developments via the understanding of the physical environment through its transformation over time (Kropf, 2009). With this new approach, they provided the foundation of the Italian Typological School (Gauthiez, 2004; Cataldi, 1998).

Under the influence of Muratorian and Caniggian thinking, the Italian School of Typology adopts "*a historical approach to architectural types*" (Gauthiez, 2004, p.76) and deals with the urban problems arising from architectural production (Mihcioglu, 2010). The school selects a type of object, analyses its transformation through time, and reviews the processes of the creation of new typologies through the adaptation of the chosen type (Oliveira Andrade Pereira, 2014). Its approach considers type as "*a result of a* *historical evolution, where one dominant type gives way to another by means of an accumulation of small changes carried out on the first type during a period when investment in new building is slack*" (Gauthiez, 2004, p.76). In other words, the school introduces the **typological process** as a theory of change (Scheer, 2016), which occurs between "*the base type*" and "*the mature type*" (Kropf, 1993, p.96) and reveals the importance of type as a fundamental element in tracing the changing process. In this sense, both old and new building types are parts of the *typological process* since their characteristics are adapted from one type to another (Whitehand, 2001, p.107). This intuition also leads to another notion, that the dominant type can travel to somewhere else and be used adaptively in that context (Gauthiez, 2004). [The concept of typological process will be discussed in detail in Section 2.4.3.]. This association between type and typological process has been developed by the works of important scholars, namely Aymonino, Caniggia and Maffei, who trained with Muratori. This then generated the foundation of the typo-morphological approach (see Sections 2.3 and 2.4 for more detail), the results of which are often considered to be weak and mostly not given enough attention by historians and archaeologists (Gauthiez, 2004).

2.2.2. British School of Morphology: Historico-Geographical Approach

Urban morphology was first introduced in the geography field in the late 19th century and the geographer Otto Schlüter is arguably considered as the father of this discipline (Whitehand, 2007). Schluter's works on settlement geography and ground plans of towns, which were published in 1899, have become some of the earliest examples of urban form studies (Whitehand, 2001). Subsequently, a new approach called the morphogenetic approach was introduced by his followers, such as Siedler (1914) and Hamm (1932) (Whitehand, 2007). This approach is different from morphographic approach because it aims to understand the formation of physical/built environments as an evolutionary process with special reference to their origins (Larkham & Jones 1990). This method, which mainly focuses on the visual representation of city forms, has become more dominant with Conzen's exercises mapping different building types in different historical and morphological periods in the second half of the 20th century (Whitehand, 2007). Conzen (1960) adopted a scale-based systematic approach to the study of urban form (Moudon, 1994) and divided it into three elements: town plan, building fabric, and land and building utilisation (Whitehand, 2007; Kropf, 2009; Berghauser Pont & Haupt, 2009) (Figure 2.4). Conzen's tripartite division was a major contribution to the study of urban form based on which the British Morphological School was founded (Guney, 2007; Whitehand, 2001; Feng, 2014).

Conzen further examined the *town plan* based on three planning elements: street system, plot pattern and building pattern (Kropf, 2009, p.113) (Figure 2.4). This is because, according to him, the integration of these three elements with spatial and temporal changes creates different plan units where the dynamic nature of the distinct combinations is represented (Gauthiez, 2004). Conzen's ideas have been developed by other researchers such as Barret (1996), Kropf (1993), Whitehand (1989), Whitehand and Gu (2008), Gu and Xu (2014) and today his increasing influence on urban landscape management cannot be underestimated (Whitehand, 2007).

Overall, the British approach under the influence of Conzen was different in comparison to the Italian approach and the French School's socio-cultural approach to the study of urban form (Berghauser Pont & Haupt, 2009). The British approach was from a historico-geographical perspective rather than an architectural one (Gauthiez, 2004), and the individual buildings were not important (Jamali et al., 2011). In addition, it was more conceptual rather than theoretical (Jamali et al., 2011).

2.3. Typo-Morphology

The works of Italian and British schools have established the foundation for typo-morphological studies. Initially, Muratori played an important role in developing this new approach to understanding urban form (Moudon, 1994). His philosophical and architectural interpretation of type to explain the typological process initiated the typo-morphological investigation of city forms in Italy in the late 1940s (Cataldi, 2003; Jamali et al., 2011; Kropf, 1993), and was architecturally developed and applied by Caniggia, also an Italian architect (Kropf, 1993). The British approach has contributed to the field from the geographical perspective. In this sense, as a combined product, typo-morphology has offered the study of urban form both typologically and morphologically since urban form (*Morphology*) is described based on the detailed classification of buildings and open spaces by type (*Typology*) (Moudon, 1994, p.289).

The foundation of this new approach was established through the works of Italian and British schools; however, "*typo-morphology*" was put forward as a term for the first time by the Italian architect Carlo Aymonino in the 1960s (Moudon, 1989, p.41). Aymonino et al. (1966, cited in Moudon 1989)'s aim was to demonstrate the analytical relationship between building typology and urban morphology. This new approach was developed through the works of the French School from a sociological perspective.

2.3.1. French School

The French School was established as *the school of typo-morphology* mainly under the influence of the Italians, namely Rossi, Aymonino and Muratori (Gauthiez, 2004; Darin, 1998), in the late 1960s (Feng, 2014). Its aim was to deal with the problems derived from both typological and morphological design and formation processes of the built environment (Moudon, 1994; Feng, 2014). Therefore, the French School has mainly remained between the Italian and British approaches and, as an extension, the school has focused on the typo-morphological approach (Chen & Thwaites, 2013). Its main contribution was to integrate typo-morphology with social theories such as Lefebvre's, which indeed extend the typology and morphology. Under the influence of Lefebvre, the school was opposed to the modern architectural and urban practice because of its neglect of history (Moudon, 1997; Djokic, 2009). The school mainly developed the analytical views on the relationship between built and social environments. Moreover, this school was clearly against the idea of imitating previous spatial forms without understanding of their established relationships with social values (Djokic, 2009). The emphasis was therefore put on the socio-cultural dimension of the transformation in both urban and architectural forms (Darin, 1998; Chen & Thwaites, 2013; Djokic, 2009; Nikovic et al., 2014).

The concept of type has been long discussed in France; the initiators of this were Duran and Quatremere de Quincy (Gauthiez, 2004). Therefore, the school has mainly focused on the types and aimed to identify the components of urban form through characterisation of the distinct types, forms and patterns required to guide the redevelopment projects. The typo-morphological approach adopted by the French School has focused on the analysis of the physical evolution of the living environment together with the changes that have occurred in its building types over time (Darin, 1998). The main intention of this analysis is to explain how cities transform and why some elements of the previous forms are still alive in the new formation while others have been lost (Chen & Thwaites, 2013).

2.4. Fundamentals in Typo-Morphology

Although the three schools have originated from different geographic locations and varied in their approaches, they share some fundamental concerns about urban form, which creates the basis of the integrated theory – typo-morphology. Their intellectual framework, originated from different historical contexts (mainly European), has been developed by numerous planners and architects in their design practice (Jamali et al., 2011). Although it is quite new and not fully acknowledged in literature, typo-morphology is claimed to be an effective design approach (Chen, 2009; Chen & Thwaites, 2013). It has been developed as a response to the problems derived from the limited understanding of urban forms and the loss of place identities during the transformation process (Chen, 2009). It provides a comprehensive framework based on the idea of type for urban form analysis from the perspective of its formation and transformation to inform future generations to build better-quality physical environments (Chen, 2009; Comert, 2013; Hwang, 1994; Yang, 2011; Caniggia & Maffei, 2001; Conzen, 2004; Chen & Thwaites, 2013; Moudon, 1994). As Yang (2011) and Chen and Thwaites (2013) indicate, this type of study lacks resemblance to other approaches in the history and theory of architecture; it opposes the idea of looking at only special buildings as representatives of a society's common shared value system and as "*timeless, unchangeable memories of the past*" (Yang, 2011, pp.9-10). Thus, it also values local lifestyles and examines ordinary buildings without architects as the representatives of the local culture (Samuels, N.D; Chen & Thwaites, 2013), since buildings are created and used as a result of social practice and meanings are attached to them through social relations (Markus, 1994). Hence, typo-morphology is a useful tool for the cultural understanding of the built environment.

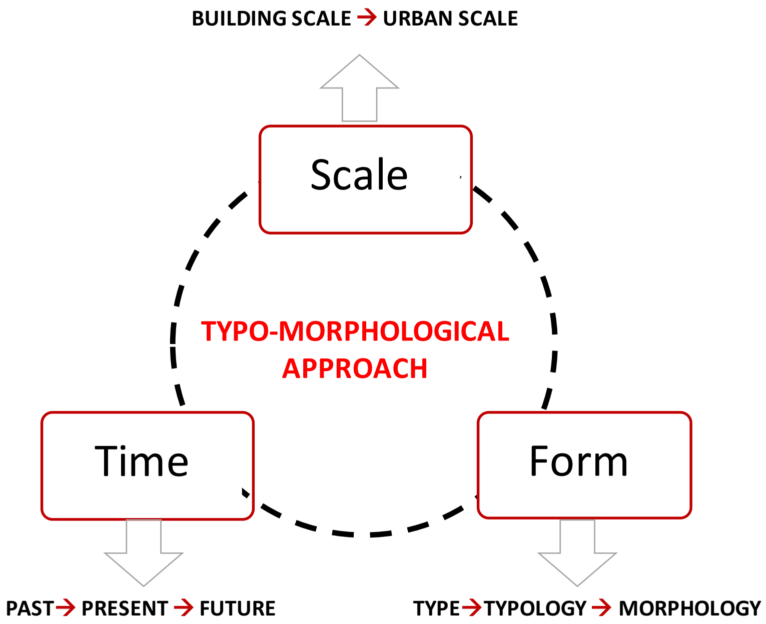


Figure 2.5 Typo-morphological approach (by the author)

From the foundation of the French School to date, this new approach has studied the link between urban form and citizens' lives, especially in social and cultural terms, to contribute to the cultural understanding of the built environment (Chen & Thwaites, 2013). Although there is no consensus – despite the variety – on what methods and approaches are used, as acknowledged in the three schools, British, Italian and French, it is generally agreed that there are three central dimensions taken into consideration in all typo-morphological studies: form, scale and time (Jamali et al., 2011; Mihcioglu, 2010; Djokic, 2009; Moudon, 1994) (Figure 2.5).

2.4.1. Form

Typo-morphology is primarily a form-based design approach that is initially associated with the physical form itself (Chen, 2009). Form is a cultural product created by a group of people in a particular location over a period of time (Kropf, 1993). Therefore, as Caniggia (1983) asserts, typo-morphology considers *"form"* as an *"environmental reaction"* against a *"human action"*, and identifies the dynamic relations between them (Moudon, 1989, p.42).

Typo-morphology studies the evolution of the built environment through the classification of the existing types of forms (Chen, 2009). As Rapoport (1969a) indicates, there is a great variety of existing building types as a result of different cultures, lifestyles, climates, materials and technology identified in different places. This variety has to be reflected in the aspects of the study of the built environment. Given this, according to Kropf (1993, p.289), the study of the built environment can be performed based on five different aspects: form, history, energy, culture and nature; amongst these, *"form"* and *"culture"* are the most closely associated aspects of built environment. Rapoport (1969a) also adds that physical form is primarily the product of socio-cultural factors since physical forces play only a modifying role in its creation/transformation process.

The discussion of **type** is of crucial importance prior to discussing the form in typo-morphological investigations. Architectural thinking about type is associated with the categorisation of places, which primarily refers to function, but also form and style (Pevsner, 1976). The notion of functional classification is built upon the use of the buildings, while classification by form is associated with culture, social history and meanings attached to physical and spatial forms (Pevsner, 1976). "*Humans use systems of thought to name and group experiences and objects into loose categories important to their cultures and times*" (Schneekloth & Frank, 1994, p.15). In other words, human nature is established by people grouping and naming their experiences through time, and the types that they define initially are the products of their perceptions and memories, and thus cultural symbols of life. Typo-morphology adopts the latter understanding of type, which is considered as a constant and recognisable cultural element of the built environment (Bandini, 1981).

In Caniggia's works, type is considered as "*a phenomenon experienced culturally*" (Gurer, 2012, p.1424). The link between **form** and **culture** is therefore better understood through the examination of the close association between **type** and **culture** since **type** is the base idea constructing **form** (Schneekloth & Frank, 1994; Rossi, 1984; Chen & Thwaites, 2013). According to Caniggia and Maffei (2001), type is an object produced unconsciously as a result of cultural experience. Therefore, similarities in type in a particular place give the place its special character and distinct identity, which then give clues regarding the societal structure. This also indicates how strongly the society engages with the shared common value (Rapoport, 1969a). Kropf (2009, p.112) states that "*types … are conceived as cultural entities rooted in, and specific to, the local process* *of cultural development”*. In other words, interpretation of types relates physical forms to human behaviour. “*Typology … is so rich in tradition and so important in intellectual history, for architectural discourse*” (Guney, 2007, p.4). Thus, socio-cultural factors, which are closely related to lifestyles, are quite important in typological variations (Chen & Thwaites, 2013). Finlay (1999) also indicates that human culture is the main determinant of city form regardless of time and scale; and adaptation of cities to new conditions is largely inherited.

Clearly, all of this proves that the physical environment is heavily shaped by culture, and that human attitude, culture and lifestyles can be read through types. According to Finlay (1999, p.30), “*‘culture’ is a contested term*”, but at the same time one that is critical for the understanding of the distinct lifestyles. Considering the difficulty in measuring socio-cultural life quality compared with the physical qualities of urban form, it is worth looking at the understanding of culture through types and this is typo-morphology’s focal aim. Hence, it is more related to the historicity and continuity of the built forms from an **unusual** perspective (Moudon, 1994). Chen (2009, p.61) also states that typo-morphology is a useful tool that can explain the interplay between “*form”* and “*convention”*, and sustain a sense of continuity by assuring its cultural representation. Hence, the conceptual framework that typo-morphology proposes aims to create socially and culturally responsive environments and establishes its basis on place identity associated with the local traditions by providing the necessary tools for architects, planners, and designers (Comert, 2013; Chen, 2009; Chen & Thwaites, 2013). It is therefore closely associated with the formation of quality physical environments by enriching the future developments in social and cultural terms.

2.4.2. Scale

Typo-morphology adopts a systematic approach to examine **form** by identifying **types** as cultural entities at differentiated **scales** (Chen, 2009; Chen, 2008; Chen & Thwaites, 2013). In typo-morphology, towns are seen as organisms, like in urban morphology (Gurer, 2012). Differently to other approaches recognised in architectural history, the environment is examined through its interrelated scales, from the interior space of a building to an entire settlement, without segregating buildings from their surroundings, plots, and open spaces (Moudon, 1989; Gurer, 2012). This is understandable and rational because the world is visualised by the shapes reflected at a variety of scales, from an entire city to "*a room within a house and the furniture in it*" (Rapoport, 1969a, p.50). Its form also evolves at various scales (Wiese et al., 2014). The evolution often starts with changes in buildings. Then, the positioning of individual buildings such as houses changes in relation to streets. The neighbourhood pattern is consequently affected. Moreover, "*[c]ultural representation and symbolism in forms does not also merely occur at the building level but also at larger scales, in public spaces, streets, urban quarters and so forth*" (Chen & Thwaites, 2013, p.59). "*Architecture and urban design 'frames' space, both literally and discursively. In the literal sense everyday life 'takes place' within the clusters of rooms, buildings, streets and cities that we inhabit"* (Dovey, 1999, p.1).

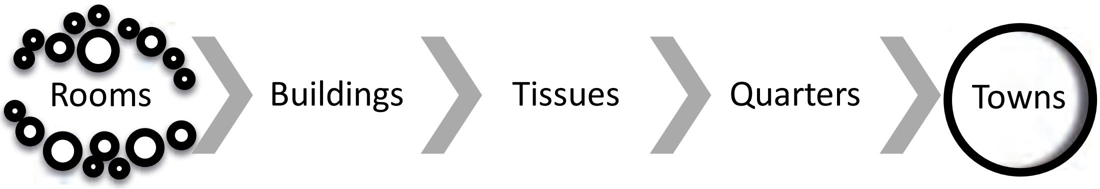


Figure 2.6 Scale of typo-morphological analysis (by the author)

Accordingly, typo-morphology analyses the built landscape, *"from the small room or garden to the large urbanised area"* (Moudon, 1994, p.289), and offers a way to bridge between building scale and urban scale (Yang, 2011; Sima & Zhang, 2009; Carmona et al., 2010; Gurer, 2012; Moudon, 1994; Chen & Gu, 2009). In this way, the built environment is dealt with as a whole (Figure 2.6). However, typological analysis is performed at a different level of detail and extent that is required for each scale (Comert, 2013). Since this holistic approach requires the detailed examination of spatial characteristics of physical forms in articulated scales, it contributes to not only the understanding of distinct characteristics of each scale but also the visualisation of the established relationships between the components of physical environment and the lifestyle patterns.

2.4.3. Time

Typo-morphology studies form through **time** and traces the transformation process of form and culture together rather than isolated, timeless and individual elements of the built environment. This is because "*[u]rban forms exist not only in space, but also in time*" (Chen, 2009, p.78). Muratori also asserts that *"building type is a priori a synthesis or a spontaneous living concept peculiar to a culture, variable in time and space"* (Cataldi, 1998, p.35). In other words, types are cultural elements (Bandini, 1981), developed, defined and changed by time (Moudon, 1994; Chen, 2009). Moudon (1994, p.308) also indicates that the built environment is under constant change and transformation; it is, therefore, impossible not to link its typological analysis to "*a measure of time*". Therefore, there is an intimated relationship between time and space (Carmona et al., 2010) and the identification of this relationship is vital in typo-morphological studies.

As Wiese et al. (2014, p.1) state, the different spatial qualities are the consequences of "*overlapping multiple processes of generation, formation, emergence, development and implementation*". In this sense, time in typo-morphology refers to the periods of formation and transformation of the built environment, namely morphological periods where cities transform at different rates under different forces, and implies the coherent interrelation between past, present and future (Hwang, 1994). Each morphological period represents the turning points where urban forms changed dramatically (Chen, 2009). Therefore, different forms created at different periods and similar types observed within the same period give that period its distinctiveness (Whitehand & Carr, 2001, cited in Yang & Jia, 2010). Historical examination of the built environment, therefore, helps to understand the spatial structure that forms over a period of time (Kropf, 1993). Thus, time is considered as an alternative dimension, namely the temporal dimension, in addition to the other urban design dimensions such as functional, perceptual, visual and social (Carmona et al., 2010, p.241). Typo-morphology examines the similarities and differences, and tries to "*recognise the temporal continuities and discontinuities in the environment*" (Moudon, 1989, pp.45-46). In other words, it looks at how types link building forms to each other as parts of a single typological process. As a result, the robustness of types and patterns is tested over time through the typological process, and, during this process, typo-morphology can examine the adaptation process of spatial forms to changing human needs (Chen & Thwaites, 2013).

a. Typological Process

The temporal robustness of a type is defined as a **typological process** according to the Italian School. The process describes the continuous transformation of physical form and refers to the process of designing the new types, characteristics of which are gradually adapted from the previous types. According to Conzen (2004), it is the gradual change of urban forms. The prominent characteristics of the typological process are "*the gradual changes and striking continuity in the formation and transformation processes of building types*" (Feng, 2014, p.115). In that sense, the typological process is a tool "*to understand how and why the built environment changes*" (Kropf, 2006, p.72).

Apparently, type is the key element for unpacking the concept of typological process. The understanding of type in the typological process is based on the scholarly discourse of the Italian School, as explained earlier. This understanding in the typological process is that the latter types develop from the former ones, and are therefore expected to be more complex (Caniggia & Maffei, 2001). Given this, typological process can be defined in a variety of ways: "*transformation process of types", "development in a continuous manner*" or "*the period of continuous change*" (Chen & Thwaites, 2013, pp.73-75). It is a cumulative process of continuous change of types in an adaptive manner to the changing needs of the local residents. Caniggia associates this process with the historical succession of building types where there is an adaptive and systematic changing relationship between the new type and the old type, and the old experiences establish a basis for the design of the new (Whitehand & Carr, 2001). According to Whitehand (2001), the typological process is a learning process where new buildings are considered to be the products and a part of a series of building types, which were adapted to each other throughout time. In Caniggia and Maffei's book 'Architectural Composition and Building Typology', typological process is defined in the 'Critical Glossary' section by Nicola Marzot (2001, p. 244) as follows: "*with reference to a sequence of significant time spans, the typological process expresses the progressive transformation of the concept of 'house' into a specific place*". Marzot's definition stresses two additional concepts in this adaptive and continuous transformation process*:* **specific location** and **time span***.* In this regard, "*[t]he concept of typological process is to trace the transformation of types in a certain location over a long period of time*" (Chen & Thwaites, 2013, p.73). The certain location is vital to the understanding of the transformation process since the concept of type is interpreted differently in different contexts and new forms are created under the societal factors that are distinct to a given location (Chen & Thwaites, 2013).

On the other hand*,* time span refers to the period covering the process of continuous change of a particular type until it mutates. Given this, in contrast to typological process or continuity, mutation may also occur during the transformation process of *types*. Chen and Thwaites (2013, p.74) also clarify that "*[o]bviously typological process cannot always be observed throughout time: when a mutation occurred to a type, the typological process stopped. It is possible that a typological process starts again and contemporary types have certain connections with previous types*". Mutation represents dramatic changes happening to types. In this context*,* Caniggia and Maffei (2001, p.55) relate the typological process to examining "*types in their progressive mutation and in their phase sequence*". Phase here refers to "*a sufficiently long time interval*" during the transformation process (Caniggia & Maffei, 2001, p.55). Given this, it can be interpreted that the length of the continuous transformation period varies, and each phase sequence depicts different types of changes at different levels. The changes might represent continuity and slight/moderate/extreme changes or mutations, which can be traced through the similarities and differences of the newly introduced house types to the previously introduced house types. However, the transformation happens in contemporary ways (Pinzon Cortes, 2006). Caniggia considers the typological process as *"a tool to record mutation of a base type of* edilizia*"* (Moudon, 1994), which refers to building types evolving according to spontaneous consciousness within the same cultural area (Caniggia & Maffei, 2001). Overall, the typological process is a theoretical model that explains the history of a city as a spatio-temporal system and helps to read its formation process (Caniggia & Maffei, 1979).

2.5. Typo-Morphological Elements of the Built Form

Considering the long development history of the typology and morphology disciplines, typo-morphology is a comparatively new theory, which still resists a generally agreed definition in literature (Chen, 2009; Chen & Thwaites, 2013; Chen & Romice, 2009). Currently, there is also no clarity regarding what elements of the built environment should be studied in what scales in a typo-morphological analysis. Thus, data selection and validity are common concerns amongst morphologists (Scheer, 2016).

According to Moudon (1989), buildings, streets, parcels and open spaces are the defining elements of the physical environment that also concern typo-morphological studies. How these elements come together and are positioned generates different built forms. Furthermore, the transformation of the elements at different levels consequently affects the formation process of the settlement. "*In general, the basis for understanding an identifiable form is understanding the interrelation* ***between parts*** *and* ***between the parts and the whole***" (Kropf, 1993, p.11) (emphasis added). Accordingly, to identify types, typo-morphology investigates the relationships between building-building, building-plot, plot-blocks, and block-street-neighbourhood, and bridges the gap between building scale and urban scale (Chen & Gu, 2009; Sima & Zhang, 2009; Carmona et al., 2010). In this way, the built form is dealt with as a whole, from a smaller scale to a larger scale through time.

According to Kropf (2009; 2005), differences observed in the characteristics of different forms at different scales probably cause the ambiguity in the study of the relations between the elements since "*[i]ndividual buildings, at one level of scale, do not have the same handling characteristics as a street, at another, or a town as a whole at yet another*" (Kropf, 2005, p.17). Therefore, there is a structured relationship between these elements defined within a hierarchy based on the relationship of part to whole without doubt; but this structure is not defined in detail (Kropf, 2014).

According to the hierarchy defined by Kropf (2014, pp.42-44), urban grain consists of three basic elements/levels: building pattern, plot pattern and street pattern, which are also the generally agreed core elements of the physical environment in urban morphology. The spaces between and around buildings are the places for the public space network (Carmona et al., 2010). Patterns of streets, therefore, vary depending on the building arrangement type. This makes the streets "*the most enduring element*" of the built environment (Carmona et al., 2010, p.77). However, a small change in any element can consequently affect the others. Very different environments are therefore the consequences of the differences in street, block and plot patterns and the different building arrangements within them (Carmona et al., 2010).

However, there is an ambiguity within the classification and the hierarchy of elements because some elements can be considered and examined within other levels and associated with each other at different degrees. Therefore, Conzen states that the defined hierarchy is one type of "*containment*": "*The building pattern is contained within the plot pattern, which is, in turn, contained within the street pattern*" (Kropf, 2014, p.44) (Figure 2.7).

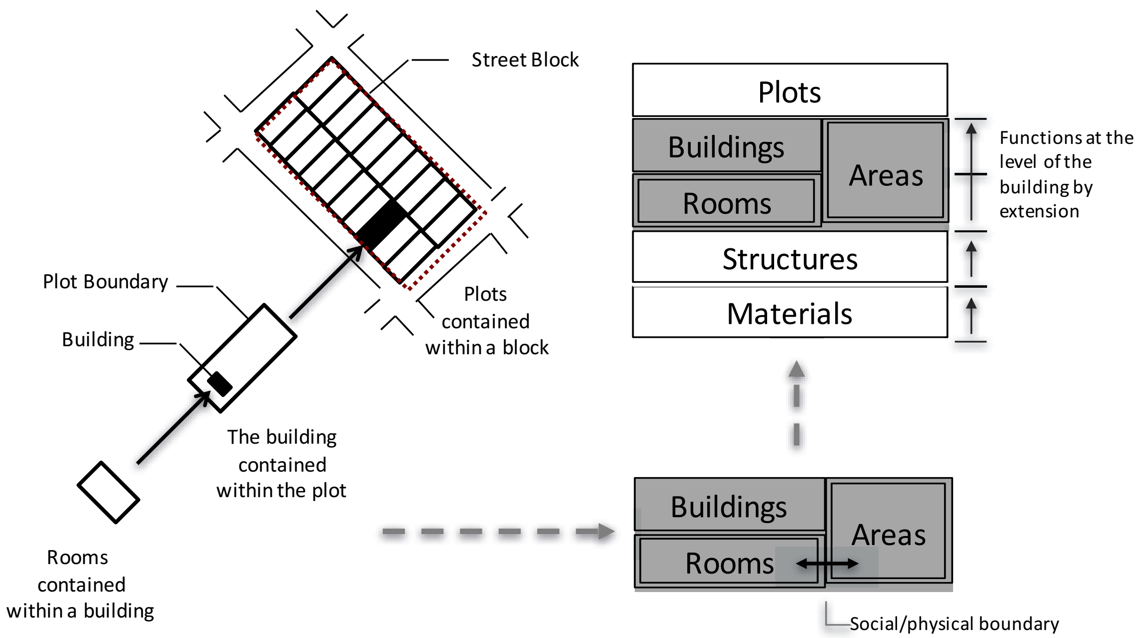


Figure 2.7 Hierarchy of elements in the built form (redrawn and adapted from Kropf, 2014, p.45)

However, the relations of all the elements within the different levels of hierarchy are not the same. While buildings can be defined within a single plot, the block where the plots are bounded might be surrounded by a series of different streets (Kropf, 2014). Therefore, according to Conzen, there is uncertainty regarding the relationships between the elements (Kropf, 2014). This uncertainty problem is overcome by Cannigia and Maffei's (1974) concept of spatial hierarchy developed following the ideas of

Muratori (Kropf, 2014). Their analysis offers the four-level compositional hierarchy already explained in Section 2.2 (see Figure 2.3).

Kropf (1993) examined the Conzenian (British) morphological approach and Caniggian (Italian) typological approach, and tried to propose a more comprehensive and detailed analysis method for the built form, taking benefit from the complementary potential of the two approaches. The combined analysis suggests a systematic investigation of the built form starting from construction of rooms to towns, which is schematically shown in Figure 2.7. This approach also extends the detail of urban morphological analysis and includes the interior building level in the spatial hierarchy. Samuels (1999) also believes that interior building plans are one of the steps that need to be analysed by morphologists as an important part of the spatial hierarchy defined between the elements of urban form. He suggests that this level of investigation should not be skipped in order not to lose the firmness of the understanding of urban form. In this sense, Kropf's (1993) analysis constructs a theoretical base to understand the hierarchical spatial system defining the built form in detail and as a whole. He suggests that this base will then benefit planning and designing practice, in particular, the development of planning legislation and frameworks. Kropf's attempt is a further development of the typo-morphological approach to architecture and urban design. The following sections will review some typo-morphological studies to give an overall idea of what elements of the built environment are studied and what place scales are included in a typo-morphological analysis.

2.5.1. Benefiting from Typo-Morphology in Design Practice

Typo-morphology has been intensively discussed theoretically (e.g. Moudon, 1989; 1994; 1997). The discussions have frequently emphasised its great potential in helping design practice (e.g. Gulgonen, 1988; Chen, 2009; Chen & Romice, 2009; Gurer, 2012; Samuels, 2008), but the approach as a design tool has only been exercised lately (Samuels, 2008). This section will review the studies adopting the typo-morphological approach to benefit design practice.

One practical exercise of typo-morphological study is Samuels' (1999) work, which examined the ways of implementing typo-morphological analysis into the different stages of the plan preparation process. His analysis showed that the planning process could take a benefit from typo-morphology in functional zoning and understanding of the potential of local types as design guidance. **Despite being mostly theoretical and conceptual, many other studies also emphasised the key role of typo-morphological analysis in helping quality design practice.** For instance, Chen and Romice (2009) and Chen (2009) attempted to reveal the role of typo-morphology in sustaining cultural identity in the Chinese context. These studies emphasised its importance in revealing the value of historical forms in generating design suggestions, which will help maintain local and cultural identity. The methodology adopted in these studies suggests that typo-morphology can be applied to the Chinese context and help sustain the cultural identities through quality urban design practice.

Tsukamoto et al. (2008) studied the typo-morphology of the residential districts of Tokyo to understand the city's current fragmented nature after the application of urban renewal projects that had caused radical changes in the cityscape. They examined both the architectural patterns and urban form and defined four types of developments, naming them "*Subdiurban*", "*Urban village*", "*Pocket blocks*" and "*Commersidence*". These terms respectively refer to the spaces, the forms of which have changed through a series of generation phases depending on subdivision of the land and car ownership, clustering of buildings around major traffic routes, the dictated historical past of the area and lot usage, and finally the mixed-use (residential and commercial) development of the land. The typo-morphology of Tokyo was studied through the changes investigated in the physical elements of built form such as building types, shapes, colours and decoration styles; the design characteristics (gates, hedges, plot walls, fences, front and back yards, parking areas, trees and plot shape) of the spaces surrounding buildings; the grid patterns, cul-de-sacs and road patterns. The study concluded that the transformation of architectural typology is the main determinant of the morphological mutations of the cities; therefore, the macro-scale changes can be better understood through the examination of the micro-scale changes. The authors also claimed that this type of investigation is initially required to provide the quality assessment of places and then it would expand the horizon to create new types and built forms. Therefore, typo-morphology is an effective design tool.

Oliveira Andrade Pereira (2014) identified the potential of morphological studies in the sustainability assessment of the urban environment to benefit urban planning. She adopted four indicators of sustainability: land use, mobility, water and biodiversity, and examined the sustainability parameters in relation to built-form characteristics such as housing and building density, building heights, intensity of subdivisions of lots, coverage of pedestrian and bicycle paths, road network, and green spaces. Her study has contributed to the understanding of the socio-cultural dimension of sustainable development through the adopted morphological approach.

Typo-morphological analysis has also been used to establish design guidelines and frameworks. For instance, McGlynn and Samuels (2000) used the typo-morphological approach to introduce design procedures for house builders to eliminate the weaknesses in planning guides that neglect the structural formation of the built form, in particular, street layout design and plot arrangement. They identified the compositional elements of built form based on the concepts developed by Conzen, Caniggia and Kropf. The relationships between the components were identified to show the relevance of street blocks to city development.

Caliskan (2009, 2013) also offered a kind of typo-morphological study. His PhD thesis focused on the planned urban areas developed within a certain time period with the limitation of the types of morphological elements that were available in that period. He analytically identified the basic features that form the patterns of the nine planned housing development areas through a typo-morphological approach in Turkey, the Netherlands and the UK. He investigated the analytical logic of typo-morphology and focused on the potential of the "*typification*" process to be used as a tool to generate design methods in Ankara. He studied three elements: street pattern, plot layout and building setting; and analysed these elements with regard to their composition, configuration and constitution. His main aim was to develop a new design framework and contribute to the development of the new patterns.

Some researchers have benefited from typo-morphological analysis to test the impact of the erection of a new development. Ariga (2005) used typo-morphological analyses in the investigation of spatial types and functional characteristics of the physical form of a district in San Francisco, USA. His approach used aspects of typo-morphology to test the physical adaptability and functional flexibility of traditional mixed-use inner urban neighbourhoods over time. He identified the formation process of the chosen neighbourhood from the early 1850s to the late 1980s at the three scales: an area-wide scale, a city block scale and a building lot scale. The morphological classification was based on the characteristics of the buildings and their associated neighbourhood spaces, such as subdivisioned parcels of individual city blocks, alley way and lot patterns, land uses, building types, building scales, setbacks and back yards, and open spaces. His results showed that formation of adaptable neighbourhoods is closely associated with the way that new small-scale building developments are integrated into the existing fabric.

Typo-morphological studies have also been conducted to read the existing form of the cities and link the changes to the social processes. For example, Mihcioglu (2010) analysed the spatial evolution of the historic core of Ankara from 1839 to the 1940s. Her morphological analysis was based on a comparison of the physical transformation process of the city fabric based on urban fabric, urban circulation network and land use pattern. She aimed to understand how external factors such as fires and planning regulations, or political changes like being a new republic and capital city, affected the formation process of a historic city centre. Shayesteh (2013) in her typo-morphological design-based research focused on the relationship between house types and built form of the urban fabric in Tehran, Iran, and tried to explain how the house types transform and adapt to changing lifestyles. The transformation here refers to when one dominant type replaces another, most probably under the influence of changing cultural factors and architectural fashion. However, she also looked at the other factors causing this replacement, such as density, the increase in land prices and car ownership, and planning policy and legislation. She examined current sizes and shapes of blocks and plots and their relation to the built form with regard to whether these changes were necessary in the first place and whether the final product could be different or not. Her focus was on the morphological analysis of the fabric. Therefore, the study limited its extent to the scales of buildings (the external envelope, not the interior spatial organisation), plots and blocks, and investigated the relations of these elements to pedestrian access, vehicular access and natural lighting. The conclusion was drawn on the comparison of the identified current patterns of distribution of different plots and possible scenarios that could change the city's expansion to other directions.

Wang (2013) examined the social and spatial characteristics of the residential form in Beijing, China, at three scales: urban, neighbourhood and household levels, to understand how the political ideology had affected the residential formation. Although this study does not literally use the term typo-morphology, it benefited from both typology and morphology. Residential land-use patterns at the urban level; the features of three gated-community developments at the neighbourhood level; and the spatial configuration and public-private area relations at house layout level represented the housing concepts of different periods at the household level. Similarly, Mezini and Pojani (2015) have not necessarily used the term typo-morphology in their study. However, they benefited from both typology and morphology to understand how the defence concern affected the formation process of residential settlements in the Ottoman city of Gjirokastra in southern Albania at house, neighbourhood and city scales. Agyefi-Mensah et al. (2015) studied the typo-morphological characteristics of public apartment buildings built in Ghana after independence to define the common design typologies. The research investigated the plan-form typologies and their evolution over time between 1970 and 2012. The authors conducted the typo-morphological analysis at the building level and categorised the 61 floor plans based on the form of access and circulation, and they argued that form is the result of the need for privacy, security and social interaction.

Another type of typo-morphological study has been conducted to test whether the typo-morphological approach, the principles of which are originated from the European context, can be applied to other cultural/geographical contexts. Yang (2011) tried to adapt Western typo-morphological theories to the Chinese context, similarly to the studies conducted by Chen and Romice (2009) and Chen (2009), which were previously mentioned above. Yang (2011) attempted to explore the link between the physical formation process and cultural and environmental adaptation. Spatial characteristics of mass housing developments in six different Chinese cities were analysed at fabric and building scales. The main attention in the comparative analysis was paid to social and local similarities and differences and their typological processes. Comert (2013) also explored whether the typo-morphological approach can be applied in different geographical locations. He reviewed the theories of Conzen and Caniggia and intended to come up with a synthesised, integrated approach and test it in the cases of Famagusta, Cyprus, and Ludlow, England. The results showed that an integrated approach could be used in different geographies and emphasised that it can ease the understanding of the built environment as a whole together with its building plans, façade formations, street and plot patterns, urban grains and cityscapes. Feng (2014) also tested the applicability of theories and methods of typo-morphology in the Chinese context by looking at the neighbourhood formation process. He introduces the idea that new approaches developed based on the understanding of the evolution processes can help historical conservation. The study adopts typo-morphological principles in the investigation; however, it mainly focuses on the morphological aspects and limits its scope to an urban tissue scale. It examines nine urban blocks depending on the street patterns, lot and building arrangements, and the typological process of the architectural fabric. The results stress that the typo-morphological approach is a useful tool for addressing the structural qualities of urban form and therefore can inform urban planning and heritage conservation.

The above text has provided a snapshot from some conceptual and practical studies adopting the principles of typo-morphological analysis. The conceptual ones generally construct their argument around the idea that typo-morphology is a useful design tool, and typology and morphology should be combined for the better understanding of the evolutionary process of the built form (e.g. Caliskan, 2009, 2013; Gulgonen, 1988). The practical cases are the ones analysing the typo-morphological elements of the physical environment. While some of them use the term typo-morphology, others just adopt principles that are similar to the approach. It is also important to state that, even though some of the studies claim that they are typo-morphological ones, their approach might be found only at the urban scale. The ambiguity regarding the principles of the typo-morphological approach is also seen in the chosen elements of the built form for the spatial analysis and place scales. However, as Scheer (2016) also states, although various elements of the urban form are studied, it is agreed in these studies that buildings, streets and plots are the commonly agreed important measurable elements of urban form. The above studies also analyse different elements at different scales. However, more or less, these studies also share the same interest in similar typological and morphological elements, and mainly consider the building, street, neighbourhood, district and city as the main place scales, and rooms, buildings, building settings, open spaces defined around/between the buildings, plots, streets and blocks as the elements of physical form.

2.6. Conclusion

This chapter has reviewed the approaches and methods for urban morphology and architectural typology introduced by Conzen, Muratori and Caniggia, and developed through the British, Italian and French schools. These approaches were originated from different backgrounds; adopted different principles; and analysed the built form at different levels of resolution. However, the main consensus among all the scholars, architects, planners and geographers was the readability and analysability of the built environment through its form (Mihcioglu, 2010).

While typology searches for a conceptual framework that is used as a useful design tool to generate form (Tice, 1993) by observing the historic forms, morphology focuses more on reading "*the city fabric to understand their formation and transformation process over time*" (Chen & Thwaites, 2013, p.57). Recently, many scholars (e.g. Kropf, 1993; 2006; 2009; Chen & Thwaites, 2013; Marzot, 2002) have agreed that the compositional structure of typology and morphology is vital for a full understanding of the evolution of the physical environment as a unified whole. Therefore, typo-morphology carrying the commonalities of both disciplines has become a widely-accepted design tool aiming to acknowledge future developments to achieve a better life quality (Kropf, 2009; Marzot, 2002). This relatively new approach looks at the physical environment differently (Gurer, 2012; Moudon 1994). It offers a new understanding of type, typology and morphology and studies the physical environment regarding its form, scale and time. Typo-morphology considers type as a design tool and the cultural product of the past, the present and the future since it provides the base, giving clues regarding its formation and transformation and therefore its link to the past and its potential to guide the future development. Typo-morphology looks at types as parts of typological processes; explains the formation process over time at interrelated place scales starting from a small room to a larger urbanised area; and offers a framework for providing a better life quality for future generations in line with traditions.

Initially, theory-based research was conducted to understand its origin and the differences derived from locational differences. The potential benefits and principles of the typo-morphological approach have been investigated. Since the first typo-morphological studies were not available in English, it took some time for the new approach to become widespread globally. Since it has originated from the European context, its applicability in different geographical locations was also tested. The recent studies have focused more on how typo-morphology can be used as a design tool. Although it has been claimed so many times theoretically, recently practical case studies have also been conducted. These studies tried to understand how external factors such as political power, planning regulations and defence concerns affected the formation of a physical form by reading through the typo-morphological approach. Some other studies attempted to solve design problems and used typo-morphology to develop design guidance. They mainly attempted to propose combined frameworks to assess environmental problems such as sustainability, accessibility, day-lighting, density and so on, and tried to explain changing lifestyles and how these are reflected in the transformation process of the built environment.

It is noted that the understanding of the built form and the methodological bases of these studies varied. There is no clarity regarding what elements of built environment typo-morphology should be studied or how their relations to each other (part-to-part and part-to-whole) at different place scales should be defined. As seen from the various studies, the place scales generally focused on in typo-morphological studies are building, plot, block, district and city scales, and the common features taken into consideration are the spatial configuration of the rooms, building arrangements, plot patterns, street patterns, building-street, building-plot and plot-block relations. However, the extent and definition of each place scale are also different in different studies. This research is carried out at three scales: building, street and neighbourhood scales. Building scale analysis is conducted at room level, and the house layouts are analysed according to room arrangements, circulation patterns and functional zoning. Street scale analysis involves form and size of buildings and their relations to the plot and the street where they are located. The term neighbourhood refers to the house clusters rather than to large areas of land, the boundaries of which are defined by the municipalities as neighbourhoods. The analysis at this scale is conducted at the site/street block level and involves the identification of the relations of the buildings to urban structure, public-private area relations, density, land coverage, street hierarchy and plot patterns (see Chapter 5 for the details).

It is acknowledged in literature that different types of forms and spaces have different impacts on an environment and its users, and have brought about a range of social, ecological and environmental consequences (e.g. Camagni et al., 2002; Holden, 2004; Wachs, 1993). On the other hand, typo-morphology aims to link the formation processes to culture. Therefore, it is not only concerned with the physical form, but also its transformation process; the impact of this transformation on sense of continuity and place identity; and the socio-economic and political reasons behind the transformation (Chen, 2009). Therefore, it is believed that the contribution of typo-morphological studies for the better understanding of the impacts of transformation of city form on environment still needs further investigation (Fragkias & Seto, 2009, cited in Chen et al., 2011, p.41). Given this, the recent phenomenon in typo-morphology is to analyse the elements of built form in relation to social and cultural processes and lifestyles and as a design tool to guide the new formation process of the physical environment. This PhD thesis attempts to benefit from the typo-morphological research to understand the impact of the changing built environment – together with its continuities and discontinuities – over time on QoL, in particular, SoP, which is an essential indicator of life quality, especially in residential areas. Therefore, the next chapter will review the concepts of QoL and SoP.

CHAPTER III

3. SENSE OF PLACE WITHIN THE FRAMEWORK OF QUALITY OF LIFE

The previous chapter has clarified that typo-morphology has been widely advocated as a useful design tool especially in seeking for solutions to achieve a better quality of life (QoL). Differently to the previous research, this doctoral thesis aims to use this design tool to investigate the impact of continuity and discontinuity during the building transformation process on sense of place (SoP), which is also crucial – like many other dimensions contributing to QoL. Given this, this chapter has two main aims: (1) to introduce SoP as a closely associated concept with life satisfaction/QoL and explain why the scope of research was narrowed down to the study of SoP within the wider context of QoL research; (2) to review the SoP literature with regard to its association with place notion and its definitions, the study approaches and parameters in order to propose a new multi-dimensional SoP model to be used later on for the assessment of SoP for the purposes of the research. To achieve these aims, the following is organised under two main sections. The first section briefly examines QoL with attention paid to its definitions, its indicators and its understanding, which change through the development of QoL research over time and across different disciplines with different roots. QoL research in architecture and urban planning is then reviewed as the wider theoretic context of the research. Afterwards, the concept of SoP is introduced with its link to QoL. Since the research focuses primarily on SoP, the second section of this chapter reviews SoP literature in more detail. This section starts with the notion of place and continues with the review of SoP definitions, the approaches to the study of SoP and SoP indicators. Accordingly, a comprehensive framework of a set of indicators for SoP assessment is established through the literature review.

3.1. Quality of Life

3.1.1. Defining Quality of Life

In 1981, UNESCO (1981, cited in Bingol, 2006, p.32) defined QoL as "*a complex social phenomenon which may be simply referred to the individual's state of life, reflected in* *his levels of needs and satisfactions vis-à-vis his environment*" and it is "*the individual's environment's capabilities that respond to the needs and satisfactions*". Given this definition, QoL broadly refers to people's satisfaction with their surrounding conditions. Nonetheless, even the word **satisfaction** together with the other words in the term, **quality** and **life**, simply emphasises the subjectivity of the concept. In other words, the understanding and meaning of QoL can be different from one person to another. Moreover, there are not only personal factors but also cultural, social, economic, environmental, ethical, conceptual and philosophical factors determining QoL (Rapley, 2003; Andrews, 1980). As Fernández-Ballesteros (1998, p.57) indicates, "*like life itself, QoL has multiple ingredients".* What is more, QoL can be discussed at an individual scale or a group (family, community) or environmental, regional, national, city or global scale (Apparicio et al., 2008). Its multifaceted dimensions and multi-disciplinary nature complicate the possibility of having a generally accepted definition of QoL and result in its wide range of different interpretations.

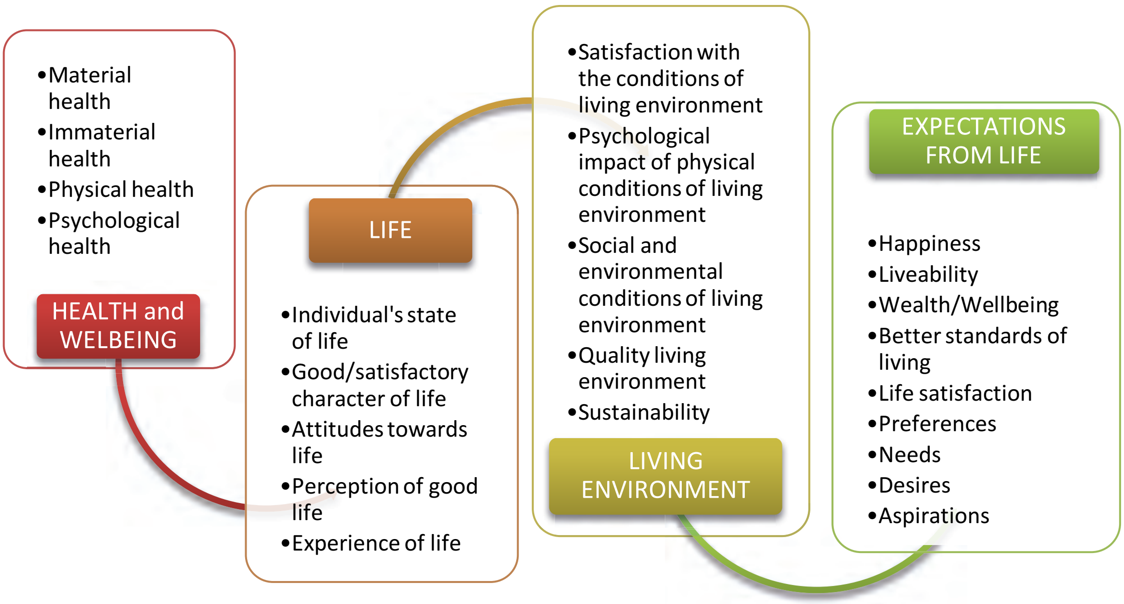


Figure 3.1 Terms and concepts used to define quality of life

The review of the QoL definitions (e.g. Andrews, 1980; Szalai, 1980; Cutter, 1985; Prohansky & Fabian, 1986; Paccione, 1986; Naess, 1999; Kamp et al., 2003; McCrea et al., 2006; Bingol, 2006; Rinner, 2007; Senlier et al., 2009; Marans & Stimson, 2011; Okulicz-Kozaryn, 2013; Rezvani et al., 2013) showed that QoL is an umbrella term, and therefore there are a variety of terms and concepts used to explain what it is, which are briefly shown in Figure 3.1. It is evident that these are overlapping concepts used in literature with no precision, and this is mainly because of the "*vague, warm and fuzzy vision of QoL*" (Phillips, 2006, p.1). However, given these definitions, it can also be concluded that QoL is either closely associated with the impact of the conditions of the living environment on people's lives or their expectations from and attitudes towards life (Paccione, 1986; Marans & Stimson, 2011; Rezvani et al., 2013). The physical conditions of the living place form the objective construct of QoL. Its subjective construct includes the consequences of the psychological impact of those physical conditions on life, and thus also partly overlaps with SoP, referring to the emotional and psychological attachment to a place or the affective bonds established between people and environment.

3.1.2. Development of Quality of Life Research and Quality of Life Indicators

Apart from the differences in QoL definitions, the understanding of QoL concept has also changed considerably from the early studies to the present. Sociologists conducted the first QoL studies and associated the concept with health in the 1930s (Bingol, 2006). In a few decades, QoL became very popular in public life and social science research (Ali et al., 2009). In the 1960s, QoL was associated with standards of living, and attention was paid to the measurement of social indicators of QoL (Bingol, 2006). In the 1970s, urban QoL studies began in the USA and England (Senlier et al., 2009). However, the main focus of the early studies was on how to define the QoL concept (Pacione, 2003). Despite this, there was no strictly accepted definition of either QoL or quality of urban life (Apparicio et al., 2008). In this period, researchers (e.g. Andrews & Withey, 1974) also made efforts to find measurement criteria for quality of urban life. In the 1980s, sociology-based surveys were developed for the QoL measurement (Sirgy et al., 2006) and comparative QoL studies were conducted between different countries at the city scale concerning satisfaction with basic needs (Bingol, 2006).

The studies, particularly after the 1980s, mainly focused on the assessment of QoL through its indicators rather than defining the concept (Senlier et al., 2009) and tried to establish a link between QoL and its parameters (e.g. Wish, 1986; Shafer et al., 2000; Kamp et al., 2003; Pacione, 2003; Southworth, 2003, Apparicio et al., 2008; Westaway, 2009). However, as with its definition, there is still no consensus on QoL constructs (Mitchell et al., 2000). Different disciplines focus on different indicators; therefore, they offer different QoL models for its assessment (Rezvani et al., 2013; Lotfi & Koohsari, 2009). This versatility also causes numerous debates on what indicators of QoL should be given more importance (Bonaiuto et al., 2003; Lotfi & Koohsari, 2009; Tesfazghi et al., 2010; Rezvani et al., 2013) and what is the relative weight of each aspect (Veenhoven, 2007). Despite the difficulty, Table 3.1 below can give a general idea regarding the measures/parameters associated with QoL in the literature.

Table 3.1 Quality of life (QoL) indicators

QoL Indicators	Literature
Economic vitality	Wish (1986), Brock (1993), Shafer et al. (2000), Bingol (2006)
Cultural vitality	Wish (1986), Mercer (2002)
Feeling of space, preferences, experiences	Wish (1986), Brock (1993), Bingol (2006), Apparicio et al. (2008)
Health (Mental/Physical)	Pacione (2003), Kamp et al. (2003)
Good quality of housing stock and living environment	Wish (1986), Shafer et al. (2000), Kamp et al. (2003), Pacione (2003), Apparicio et al. (2008)
Pollution	Apparicio et al. (2008), Kamp et al. (2003)
Easy access to services like health, sports, education, shopping, etc./ Liveability/Standards of living	Wish (1986), Shafer et al. (2000), Pacione (2003), Apparicio et al., (2008), Kamp et al. (2003)
Security and safety	Wish (1986), Kamp et al. (2003), Pacione (2003), Apparicio et al. (2008), Bingol (2006)
Personal development	Shafer et al. (2000), Kamp et al. (2003), Lever (2000)
Community development	Kamp et al. (2003)
Privacy	Wish (1986), Kamp et al. (2003), Westaway (2009)
Culture/Lifestyle/Identity	Mercer (2002), Kamp et al. (2003)
Visual perception/Scenic quality	Kamp et al. (2003)
The existence of parks/Natural connectedness	Apparicio et al. (2008)
Traffic density	Apparicio et al. (2008)
Place belonging/Sense of attachments	Ng et al. (2005)
Sustainable development (Social, environmental and economic)	Wish (1986), Shafer et al. (2000), Kamp et al. (2003)

As can be seen from the table above, QoL is easily affected by cultural, social, economic, environmental and personal factors and therefore it is a multi-conceptual subject, requiring a multidisciplinary assessment (Lotfi & Koohsari, 2009; Tesfazghi et al., 2010; Rezvani et al., 2013; Mendes & Motizuki, 2001; Rinner, 2007; Das, 2008). It is also evident that QoL consists of different indicators, some of which are objective, while some are subjective. While some scholars have not made a clear distinction between these objective and subjective dimensions, the majority mainly stress the objective measures of QoL. However, it is currently agreed that QoL refers to a person's life quality at its absolute value and therefore a multi-dimensional approach combining objective and subjective indicators is necessary for its full understanding (Hagerty et al., 2001; Diener & Suh, 1997; Kamp et al., 2003; Pacione, 2003; Cummins, 2000). Given this, Kamp et al.'s (2003) model, shown in Figure 3.2, is perhaps the most comprehensive QoL indicator-model. Given this, QoL can be defined as the perfect fit between humans and environment.

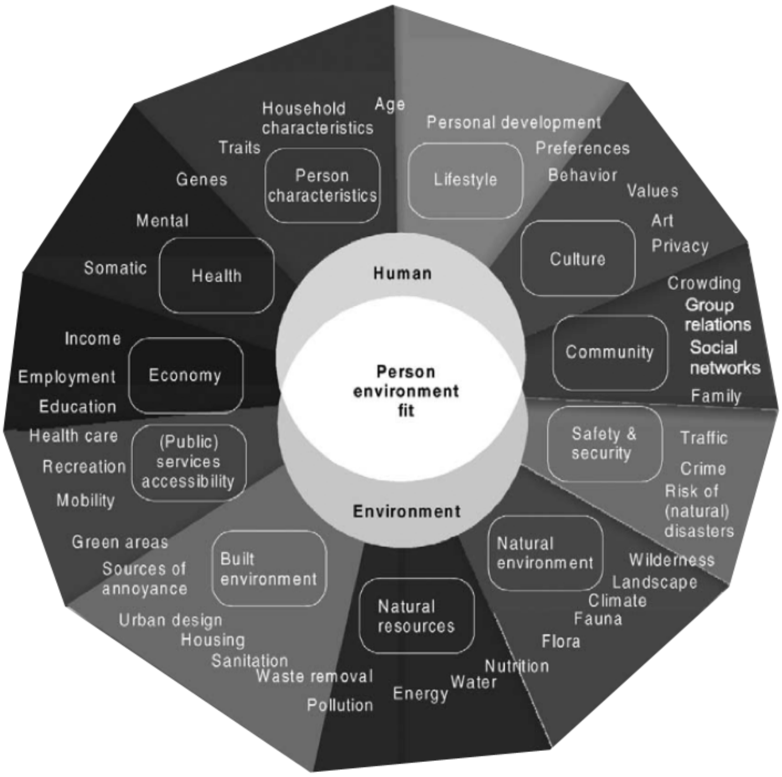


Figure 3.2 Domains of human liveability and environmental QoL (Kamp et al., 2003, p.13)

In the 1990s, the focus was turned from societal welfare to personal satisfaction, and the concept was redefined from a more multi-dimensional perspective (Bingol, 2006) and currently it is associated with sustainable development (Ali et al., 2009). With the recent concerns about sustainability, QoL studies have focused on providing a sufficient level of satisfaction with life in a sustainable way (Ali et al., 2009).

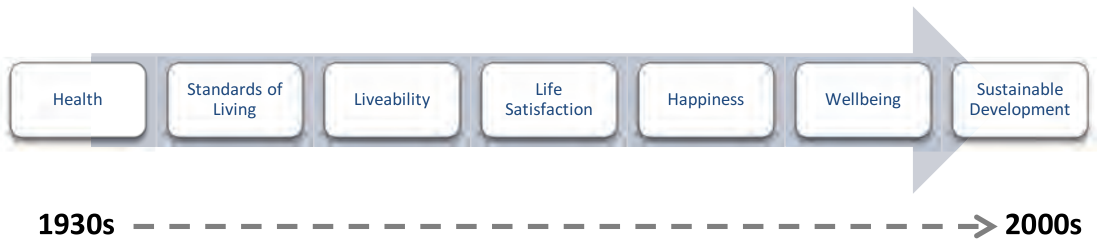


Figure 3.3 The changing concept of QoL over time (by the author)

Overall, the emphasis was on the health considerations in early QoL studies. Then, concepts like standards of living and liveability were associated with QoL. Later, attention was paid to life satisfaction, and this was followed by the study of the impact of the surrounding environment on people's life experiences, such as happiness and wellbeing. Currently, the quality of the urban environment and life satisfaction levels are of crucial importance in QoL studies and considered to be important in achieving sustainable development (Figure 3.3).

3.1.3. Quality of Life Research in Architecture and Planning

As reviewed above, QoL has been studied from different perspectives; however, it is mostly associated with health (Pukeliene & Starkauskiene, 2009), whilst studies on the quality of the physical environment have been limited (Kamp et al., 2003). What is more, QoL research in urban studies is less developed compared to that in other disciplines such as biology, medicine, psychology and sociology (see Table 3.2). However, the current concern of QoL studies is the provision of a good and satisfactory life in the contemporary built environment (Ali et al., 2009), because the urban environment is being continuously deteriorated, and this is accordingly negatively affecting the quality of urban life (Senlier et al., 2009) and causing the loss of SoP. Therefore, in the last decade, it has become one of the most important research areas (Khalil, 2012), particularly in urban planning and development (Rinner, 2007).

Table 3.2 Number of studies citing QoL in Urban, Biological, Medical, Psychological and Social Database Literature (reproduced from Fernández-Ballesteros, 1998, p.57)

	URBAN	BIOSIS	MEDLINE	PyscLIT	SOCIOFILE
1969	0	1	1	3	2
1955	112	1379	2242	187	127
1967-1974	-	20	61	62	109
1975-1979	14	160	1051	162	346
1980-1984	33	394	1695	404	507
1985-1989	200	1575	3685	877	640
1990-1995	593	5821	10641	1583	881

QoL research in architecture and planning is also more relevant to SoP because it apparently focuses more on the place dimension and importance is given to the quality of both life and the environment. Given this, there are three main aspects associated with the study of both QoL and SoP concepts: *"the person, the environment and the relationship between both"*, which propagate the people-environment studies (Kamp et al., 2003, p.14). These studies have emphasised the importance of "*the perfect fit between [people and environment] to achieve a better and desirable life quality*" over a number of years (George & Campbell, 2000, p.170). However, it is a challenging task because, as Cheung and Leung (2008) indicate, the physical conditions can be easily adaptable; however, even if these conditions are positive, they might not meet residents' genuine desires after the adaptation. In this respect, deciding what is positive or negative is subjective and having satisfaction with life quality and establishing SoP changes from one person to another. In other words, a place that is pleasing to one person might not satisfy another person's expectations, and it is difficult to interpret the affective bonds between people and a place.

Place is therefore an important determinant of life quality and the feelings and attitudes towards that place, since how well or bad its condition or design is primarily affects the users' perception of it. Rapoport (1969a, p.80) also indicates that "*the specific definition of place is variable – one man's place may be another man's non-place, and the definition of the good life, and consequently the setting for it, also vary greatly*". This emphasises that place is relevant to both material and immaterial health and contributes to the quality of both physical and social environment. Thus, not only the quality of the living environment in physical terms but also the meaning attached to the home environment in psychological terms is important.

Additionally, the studies focusing on the subjective dimension are quite limited and not empirically grounded adequately compared to those focusing on the objective or physical aspects of life (Cheung & Leung, 2008). This is mainly derived from the difficulty in studying the subjective aspect, which can be interpreted differently based on the understanding of experiential differences. Many scholars (e.g. Pacione, 2003; Diener & Suh, 1997; Kamp et al., 2003; Hagerty et al., 2001) claim that the subjective dimension of QoL should be identified. These scholars also emphasise the need for studying QoL based on the subjective qualities.

The recent research has therefore put more emphasis on the notion of SoP, which is the common outcome of environmental, social and psychological processes of place (Eyles & Williams, 2008). It is recognised that SoP is initially a human need, which needs to be satisfied (Lang, 1987; Carmona et al., 2010; Relph, 1976), and is of crucial importance in determining wellbeing choices because of its influential impact on people's feeling, thinking and understanding (Larson et al., 2013). Perhaps SoP is not directly the subjective aspect of QoL. However, it is one (or combination) of the many other aspects constructing the subjective dimension of QoL (Smith, 2011; Eyles & Williams, 2008; Larson et al., 2013; Lopez, 2010; Harris et al., 1995). However, the potential connections assumed to exist between SoP and QoL might not be straightforward and might not always be systematically approached (Smith, 2011; Eyles & Williams, 2008).

3.2. Sense of Place

Similar to QoL, SoP is also closely associated with the person-environment fit and it is often promoted as a key concept contributing to sustainable development by numerous scholars (e.g. Semken, 2012; Chapin III & Knapp, 2015; Rogers & Bragg, 2012; Stedman, 1999). This is mainly because having an SoP means having a sense of connection to a place, and this helps people develop a sense of continuous care and protection of their environment. Thus, QoL and SoP are closely associated concepts, both with each other and with the built environment. They are both concerned with people and environment. These two concepts are not therefore completely separate or independent of each other; they overlap. However, QoL is a broader concept than SoP regarding their different roots, involving many more different disciplines. Although QoL is still relevant to the quality of the physical environment, SoP is more concerned with place itself. However, it is often believed that developing an SoP contributes to having a better QoL; thus, SoP is also one of the important determinants of QoL. Given the facts above, SoP has been found to be more focused and relevant for this research content.

This section will focus on the concept of SoP. Firstly, emphasis will be given to the notion of place in SoP research. Secondly, SoP definitions will be reviewed in general terms. Then, the attention will be turned to different approaches adopted in the study of SoP. This will be followed by the parameters of SoP before establishing an SoP model.

3.2.1. The Notion of Place

There is little consistency in the understanding of the notion of place across different academic disciplines (Dovey, 2010; Relph, 1976). However, place is the product of lived experiences (Dovey, 1999; Relph, 1976; Carmona et al., 2010) and "*the psychological or perceived unit of geographical environment*" (Russell & Ward, 1982, p.454). Therefore, it is of crucial importance in QoL studies – especially in Architecture and Urban Planning.

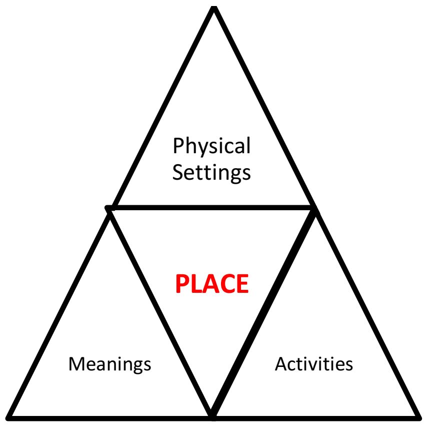


Figure 3.4 Constructs of place (Relph, 1976; Punter, 1991)

There is an interactive relation between people and environment. The main determinant of the physical environment is human behaviour. In return, place also plays a determining role in behavioural patterns and lifestyles. Place consists of three constructs: the physical setting, activities and meanings (Relph, 1976; Punter, 1991) (Figure 3.4). People develop senses, attach meanings and relate memories towards a space during their intended activities; then this makes the space a place for its users. Their satisfaction thus heavily depends on their experiences with the space. Norberg-Schulz (1979, p.5) states that "*[s]paces where life occurs are places*". Vanclay (2008, p.3) also defines place as a "*space that is special to someone*" and relates the place-making process to the process of transformation of a space to a place. What makes a space a place is our perception of it and the meaning we attach to it. Given this, place is the key source of our sense of belonging and emotional attachment (Carmona et al., 2010).

The place to which people are emotionally attached can often be called a successful place. People know what type of place makes them happy and satisfied or how a place should be so that it can meet their desires and expectations. In other words, people unconsciously look for a place where they can develop an SoP. However, according to

Montgomery (1998), although it is obvious for people to think of a successful place, anticipating that another place might also have the same success is quite challenging. Therefore, "*place and sense of place do not lend themselves to scientific analysis… they are inextricably bound up with all hopes, frustrations, and confusions of life*" (Relph, 1976, p.i). Apparently, SoP is closely associated with people's subjective QoL because place is not only a functional product but also the emotional representation of a space.

3.2.1. Defining Sense of Place

Although SoP "*resists a simple definition*" (Shamai & Ilatov, 2005, p.467), just like QoL, in general terms, it can be explained through its constructs: 'sense' and 'place'. The term 'sense' in the concept refers to the emotional interaction or perception. On the other hand, the term 'place' is the combined product of the social and physical environment where the human emotions and attitudes are attached (Shamai et al., 2012; Scannell & Gifford, 2010). As such, the term 'Sense of Place' houses both objective and subjective aspects and it is discussed through the people's perception of satisfaction with a space regarding its ability to establish a fit between the physical form and the human needs.

SoP is an umbrella term including all the other dimensions of place and can be dealt with from a variety of aspects (Shamai, 1991; Jorgensen & Steadman, 2006; Eisenhauer et al., 2000; Low & Altman, 1992; Arifwidodo & Chandrasiri, 2013; Beidler & Morrison, 2016). It has been intensively discussed in the literature both quantitatively and qualitatively by a variety of disciplines including geography, ecology, sociology, psychology, architecture and urban planning (Zia et al., 2014). The interdisciplinary nature of the concept means that its meaning can fit a variety of circumstances in different disciplines and therefore remains indefinite (Cross, 2001; Arifwidodo & Chandrasiri, 2013).

Accordingly, many people-environment related concepts have been associated with SoP (Figure 3.5). Amongst them, the most frequently used term is **place attachment** (e.g. Shamai et al., 2012; Tsaur et al., 2014; Tuan, 1974; Relph, 1976; Shamai & Ilatov, 2005; Eisenhauer et al., 2000; Williams et al., 1992; Cross, 2001). Other related concepts are **sense of belonging** (e.g. Williams, 2009; Sakhaeifar & Ghoddusifar, 2016; Low & Altman, 1992); **emotional bonding** (e.g. Perkins & Long, 2002); **place identity** (e.g. Carmona et al., 2010; Relph, 1976); and **community attachment** or **social bonding** (e.g. Hummon, 1992; Williams, 2009).

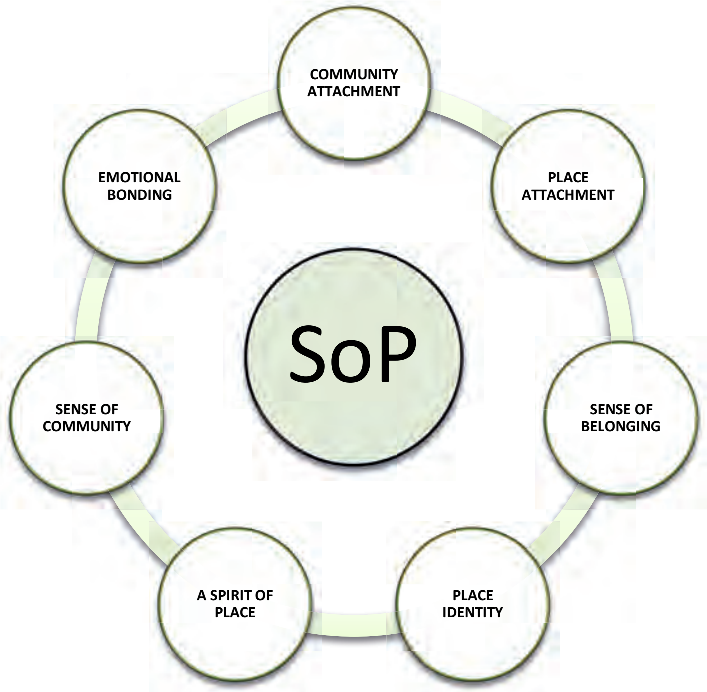


Figure 3.5 Concepts associated with Sense of Place (by the author)

SoP, just like QoL, is a multi-faceted concept consisting of the objective construct (place) and the subjective construct (feeling). In other words, similarly to QoL, the concept of SoP is also associated with both the physical space and its interpretation by its users (Jorgensen & Stedman, 2001). QoL can be good or bad. Similarly, the feelings towards a place can be positive or negative. Therefore, SoP is not necessarily meant to be always positive since it might include negative feelings as well (Arnon, 2001, cited in Shamai & Ilatov, 2005; Feldman, 1990; Vanclay, 2008; Cross, 2001). On the other hand, Kaltenborn (1998) also states that SoP varies in its intensity; thus, it can be ranked in a continuous range from weak to strong. This research recognises the negative interpretation of SoP. However, it uses SoP in a positive way, like most of the other authors in the literature, and accepts the principle that the stronger the SoP, the better the relationship between humans and the environment. In other words, the emphasis in this research context is given to the intensity of SoP.

3.2.2. Approaches to the Study of Sense of Place

The dimensionless nature of place causes the adaptation of different approaches across different disciplines to study SoP. Therefore, SoP studies are mainly phenomenological. The concept was first introduced in the geography field and has become very important through the works of Tuan (1977, 1974), Relph (1976), Norberg-Schulz (1979) and Lewis (1979). The theory of SoP has been **geographically** grounded on Tuan's (1974, p.93) ideas claiming that the physical environment is an emotion carrier, and SoP is the result of "*human beings' affective ties with material environment*". Relph (1976) focused on the issue of "*placelessness*" and associated SoP with "*the spirit of place*". SoP is then frequently discussed in relation to "*genius loci – a notion suggesting people experience something beyond the physical or sensory properties of places and feel an attachment to a spirit of place*" (Jackson, 1994b, p.157, cited in Carmona et al., 2010, p.119). Norberg-Schulz (1979) is the pioneer of this notion of SoP and he, in his book 'Genius Loci', refers to SoP as the essence of communication or the spirit of place.

Because of its intense phenomenological background, **emotional attachment to a place** has frequently been associated with the psychological interpretation of SoP (e.g. Eisenhauer et al., 2000; Mitchell et al., 1993). For instance, according to Jorgensen and Steadman (2006, p.316), SoP is a multifaceted, **psychological** concept housing "*beliefs, emotions and behavioural commitments*" developed towards a physical setting. Williams (2009) also relates SoP to emotional attachment since people develop a sense of belonging through the meanings attached to a place. Further to the phenomenological base, Steele (1981, pp.11-12) has approached SoP from an **environmental-psychological** perspective, and he claims that SoP:

> *…is the particular experience of a person in a particular setting… is the pattern of reactions that a setting stimulates for a person. These reactions are a product of both features of the setting and aspects the person brings to it… is an interactional concept: a person comes into contact with a setting, which produces reactions.*

Hummon echoes this view and explains it further from a **sociological** perspective. He (1992, p.262) states that SoP *"is inevitably dual in nature, involving both an interpretive perspective on the environment and an emotional reaction to the environment"*. In this regard, SoP develops based on the action-reaction relation between the physical setting and human perception, which satisfies the human need of being reacted to, not ignored, and feeling alive and important. Arifwidodo and Chandrasiri (2013, p.17) combine geographical, experiential and psychological interpretation of SoP and state that:

People acquire a sense of place through their experience and attachment or long-term involvement in geographically locatable places. It relates to having a sense of being in a particular environment, being fascinated by what is found there.

Overall, place can be discussed through a lengthy list of meanings and definitions, and this variety is reflected in the understanding of the notion of SoP. However, the conceptual approaches to SoP are mainly geographical. Wilkie (2003) reviewed place and SoP related concepts from the geographical perspective and provided a graphic representation of them as a starting point for researchers in the area, which is shown in Figure 3.6. The graphic clearly shows that place is multi-dimensional and its phenomenological, spiritual, social, cultural, aesthetical, geographical and historical perceptions are closely associated with the development of SoP in different disciplines and sub-fields.

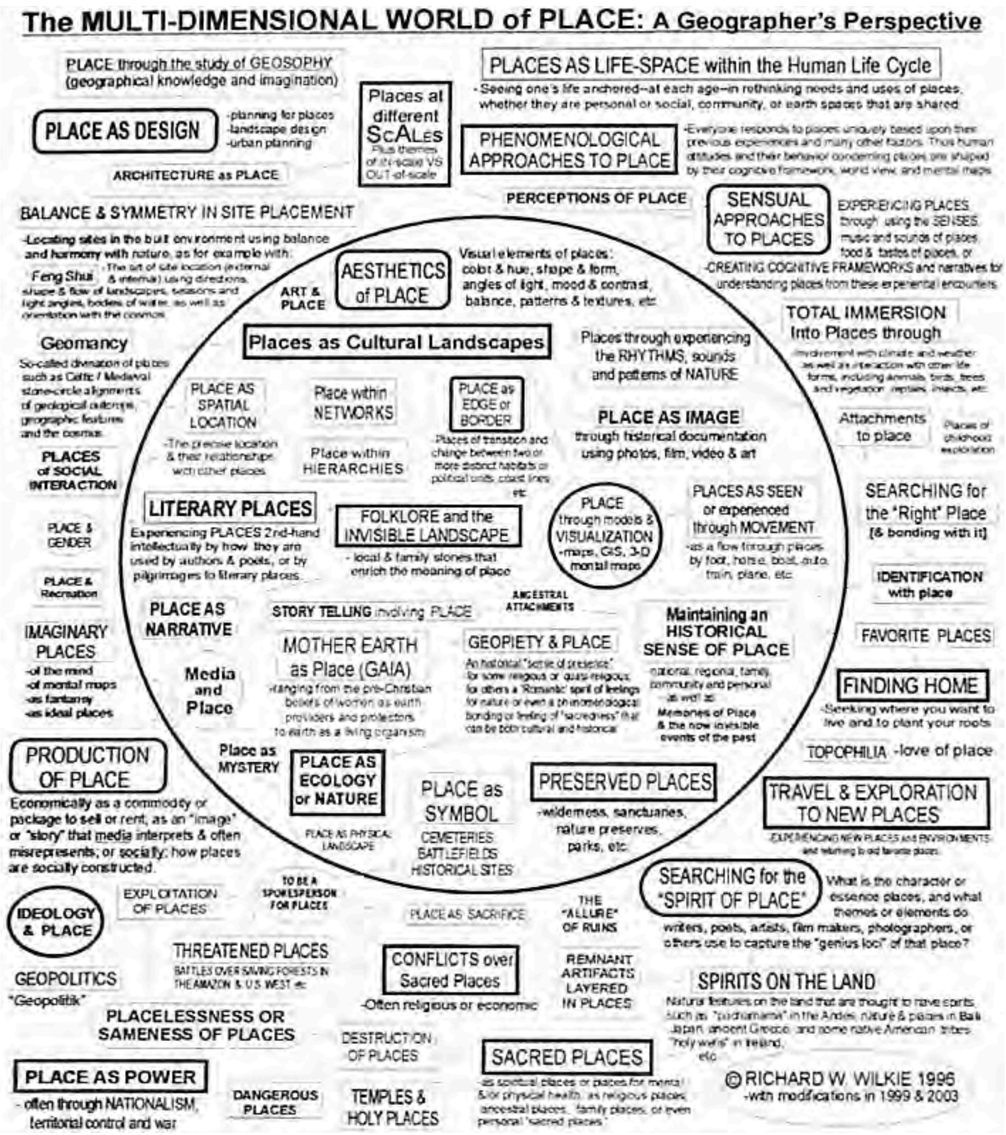


Figure 3.6 Place and sense of place from a geographical perspective (Wilkie, 2003, p.30)

The following section will review the studies of SoP in different disciplines to establish a framework of a set of indicators of SoP. In this thesis, this framework will be used to define SoP through its constructs and to empirically assess the residents' SoP later on.

3.2.3. Parameters of Sense of Place

SoP is accepted as an "*abstract*" and "*illusive*" concept (Barker, 1979, p.164) and thwarts a straightforward explanation (Shamai & Ilatov, 2005; Barker, 1979; Sigmon et al., 2002). It is also a fairly complex task to distinguish what really generates a genuine SoP despite its frequent use in the humanity disciplines (Shamai, 1991; Paradis, 2000; Kaltenborn, 1998; Barker, 1979; Shamai & Ilatov, 2005; Jorgensen & Steadman, 2006; Low & Altman, 1992). As mentioned earlier, this is mainly because of the "*dimensionless*" (May, 1970, p.211) and multifaceted nature of place and changing human perception (Jorgensen & Stedman, 2001; Dovey, 1999). However, as similarly seen in the understanding of the QoL concept, SoP can be approached through its determinants. Since different disciplines approach SoP differently, differences are also seen in proposed parameters of SoP.

It is observed that the early studies on SoP were mainly based on its theoretical and phenomenological investigation (Najafi & Shariff, 2011), as seen in the works of Tuan (1974), Relph (1976), Rapoport (1969a), May (1970), and Low and Altman (1992). It is argued in the philosophical studies (e.g. Lewis, 1979) that SoP cannot be measured since it is subjective and the empirical tools are not adequate for its measurement at its absolute value (Shamai, 1991; Sigmon et al., 2002; Relph, 1976). In addition, according to the phenomenological studies, SoP is uni-dimensional and therefore it cannot be separated into its constructs (Ardoin et al., 2012). However, studies in the 21st century, (e.g. Jorgensen & Steadman, 2006) have mainly focused on the introduction of theoretical models for the empirical measurement of SoP through its constructs (Beidler & Morrison, 2016). The following paragraphs will review the conceptual/theoretical and empirical SoP studies to identify the determinants of SoP.

Tuan (1974) referred to the term "*topophilia*" – love of place – and associated SoP with concepts such as human perception and attitude, **familiarity**, **attachment** and **aesthetic** appreciation. Many researchers have employed Tuan's theories. For instance, following his theories, Williams (2009) investigated the reasons for physical and emotional displacement experienced by refugees; in other words, the loss of SoP they experienced. He claimed that the sense of **familiarity** could help them to develop an SoP and **belonging**. He suggested that religion is an important factor that can help people to be a part of a social community and prevent alienation. Tuan's theories were also extended to other place-related concepts such as **place identity** (e.g. Proshansky, 1978; Proshansky et al., 1983); **place attachment** (e.g. Altman and Low, 1992); and **place dependence** (e.g. Stokols & Shumaker, 1981; Stedman, 2003; Deutsch et al., 2011).

Initially, this theoretical and conceptual base of place-related concepts was empirically studied with regard to their association with SoP. Although the existing literature on the empirical measurement is quite vague and loose, an early example providing both a theoretical and an empirical base was Shamai's (1991) work. Shamai (1991, p.348) examined SoP at three place scales, country, province and metropolitan area, and claimed that the "*location itself is not a sufficient condition to create a sense of place*". Therefore, he emphasised the contribution of **place attachment**, which can only be obtained through elongated contact with and participation in the place. Shamai also defined the SoP development process based on other empirical and theoretical place- and meaning-related studies. According to Shamai (1991, p.349), this process consists of three phases: **sense of belonging**, **place attachment** and commitment to a place (this is the last stage, referring to SoP itself) respectively. Accordingly, he proposed a seven-level scale referring to seven degrees of intensity of SoP, starting from "*knowledge of being located in a place*" to *"sacrifice for a place"* (p.349), and he applied the scale through questionnaires and interviews with Jewish students in four different schools in Toronto, Canada. In a later study, Shamai and Ilatov (2005) adopted a uni-dimensional approach measuring SoP by asking people regarding their level of **place attachment** at three scales: town, region, state. They claimed that this approach offered a simple tool, which makes the questions understandable for all interview participants. However, the results can be criticised for limiting the understanding of SoP merely to place attachment. This might also imply that the study used the term place attachment interchangeably with SoP, instead of as its sub-indicator.

SoP has also been empirically examined in relation to human attitude and life-related events. For instance, Deutch et al. (2011) studied SoP from a geographical perspective and focused on the spatial choice models and travel behaviour. They attempted to quantify SoP by exploring the destination choice. They used a survey method for the measurement of SoP and determined the factors related to SoP through factor analysis, namely **attachment**, satisfaction, community oriented, atmosphere, **identity**, negative aspects and self-benefit. Mansoori and Jahanbakhsh (2014) tested the potential impacts of SoP, responsive place, spatial perception and location on place identity. Their research adopted a set of measures as components of SoP such as space, culture, history, associations, activities, concentration of population, events and versatility. The results showed that **place identity** is influenced by SoP. Williams et al. (1992) related SoP to **place attachment** and identified the issue of place attachment in wilderness areas in relation to recreational activities with regard to two main subsets: **place identity** and **place dependence**. Anton and Lawrence (2014), Kyle et al. (2004), Williams and Vaske (2003), and Moore and Graefe (1994) also examined **place identity** and **place dependence** as the subsets of place attachment. Jorgensen and Steadman (2006) tried to reveal the multi-dimensionality of the concept of SoP. As a result, they proposed **place identity**, **place dependence** and **place attachment** as the determinants of SoP. Arifwidodo and Chandrasiri (2013) aimed to find the relation between housing tenancy type, SoP and environmental management. In their investigation, **place dependence** and **place identity** were taken as SoP parameters.

Place attachment is the main and "*the closest component*" of SoP (Vanclay, 2008, p.8) and the above review shows a consensus with the other two additional main determinants of SoP (namely, place identity and place dependence). However, there are other concepts, which are less explored in relation to SoP but are involved in the understanding of the emotional attachment to place. For instance, Raymond et al. (2010) criticised the two-dimensional approach looking at place identity and place dependence dimensions of SoP due to its limited scope, as it overlooked other important factors. They advocated that social context of place bonds should also be stressed for a holistic understanding of the emotional bonding to place. Therefore, they proposed a four-dimensional model including two additional parameters **social bonding** and **natural bonding** (Figure 3.7).

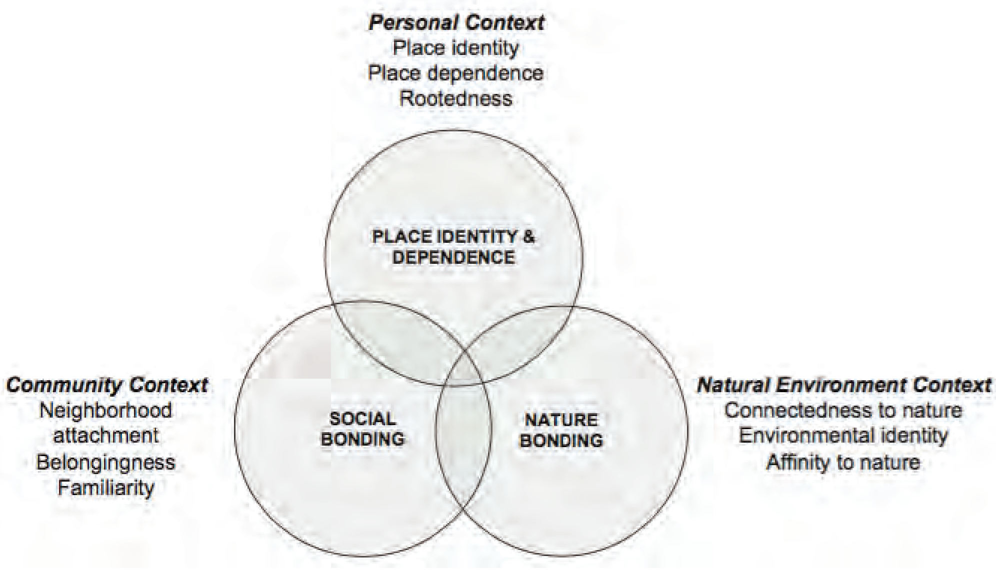


Figure 3.7 Four-dimensional model of emotional attachment to place (Raymond et al., 2010, p.425)

Similarly, Katsamagka (2013) identified place identity, place dependence, **natural bonding** and **social bonding** as the four measures of place attachment and investigated their relationships with outdoor education. Zhang et al. (2015) investigated the impact of the availability of green space and **natural connectedness** on health and wellbeing, and the emotional attachment was examined according to four dimensions: place dependence, place identity, affective attachment and **social bonding**. Gosling and Williams (2010) studied the link between pro-environmental behaviour and emotional association to place. In their study, the emotional association consists of two forms: **place attachment** and connectedness to nature or **nature bonding**. In addition, **nature bonding** is considered as the representation of the past and locality helping to create liveable environments; therefore, it contributes to familiarity, continuity of cultural ties and SoP (Uslu & Gokce, 2010; Wen Li et al., 2010)**.**

Tsaur et al. (2014) and Kyle et al. (2005) proposed **social bonding** as the third construct of SoP in addition to **place identity** and **place dependence**. Ramkissoon et al. (2012) studied the relationship between pro-environmental behaviour and place attachment by dividing the concept into four dimensions: **place identity**, **place dependence**, **place affect** and **social bonding**. Perkins and Long (2002) associated place attachment with emotional bonding and SoP, and accepted **social bonding/sense of community** as an important dimension of social capital contributing life satisfaction and place attachment. Eisenhauer et al. (2000) also provided empirical support emphasising the importance of **social bonding** as an important determinant of SoP. They looked for the reasons why people have an emotional attachment to certain places and develop meaningful relations with them. They found two dominant reasons for people having a strong SoP: their interaction with their family and friends, which makes the place meaningful for them, and the characteristics of place.

Many other studies have also emphasised the role of social bonding in having a stronger SoP (e.g. Low & Altman, 1992; Kyle et al., 2005, 2004; Hay, 1998a, 1998b). Hay (1998a) investigated the socio-cultural context of SoP and turned his attention to rootedness. He values the significance of social association and considers **social bonds** as a requirement to build SoP. Cross (2001) also tried to find out why a person can develop very strong bonds to one place and very weak ones to another by *stressing* two different but associated aspects of SoP: *"relationship to place" and "community attachment".* According to Cross (2001), "*relationship to place"* refers to the bonds people develop with places in a variety of ways. It might be considered as a type of **place dependence** that makes people make the best use of the place for their purposes. On the other hand, 'community attachment' refers to **social bonding**. This attachment can be explained parallel to the different place scales, starting from the smallest housing layout to the neighbourhood scale. People's relations with their other family members, guests, relatives and friends within the same house, with their friends and neighbours in the same street and neighbourhood, play an important role in establishing strong bonds with the place where they interact with each other. This reflects the degree of their place attachment.

In addition to nature and social bonding, it is also conceptually claimed that privacy is also closely associated with SoP (e.g. Andrews & Withey, 1974; Low & Altman, 1992; Relph, 1976). However, the literature revealing their association is quite limited (Elprama et al., 2011). Sigmon et al. (2002, p.33) associated SoP with "*psychological home*", which refers to "*a **sense of belonging** in which self-identity is tied to a particular place*". In addition, they emphasised the close relationship between **privacy** and SoP. Clemons et al. (2004) applied the psychological home concept to halls of residence context and investigated the link between SoP and "*sense of self*" in halls of residence. They put the stress on the importance of having control over space, namely **privacy**, to build a SoP. In another student housing study, Elprama et al. (2011) found that **privacy** helps to develop the emotional attachment to place. Harris et al. (1995) also made a cross-cultural assessment between American and Asian student residents (mainly married and with children) to test the impact of privacy regulations in apartments and courts. The study revealed that **privacy** is influential in establishing place attachment and contributing to psychological wellbeing.

As "*the transactional component of privacy*" (Altman, 1975, cited in Newel, 1995, p.95), **social interaction** promoted by the physical setting is also an important indicator of SoP. Urban form is the physical environment formed by lived experiences, individual and collective memories, and spatial activities (Ozaloglu, 2006; Relph, 1976; Carmona et al., 2010; Lotfi & Koohsari, 2009), and the interaction between space and human activity makes space both physically and socially important. Therefore, Ferriss (2006, p.117) states that **social interaction** is one of the important determinants of SoP by leading to "*satisfactions, subjective wellbeing and the quality of life*". Eisenhauer et al. (2000) also stressed the importance of social interaction in considering that a place is special to its users. They explored the types of activities in four communities and found that **social interaction** is the main source of the SoP development.

The studies on the relationship between **aesthetic** appreciation of the physical environment and SoP are mainly theoretical. According to Tuan (1974, p.140), "[*o*]*f human senses **sight** is the most discerning spatially: the habitual use of the eyes leads us to appreciate the world as a spatial entity of well-defined lines, surfaces and solids. The other senses teach us to perceive the world as a rich unfocused ambiance".* Gordon Cullen (1961, cited in Gehl, 2011, p.181) also indicates that places can encourage people to be a part of place through its visual characteristics; and can contribute to SoP. "*Cuthbert* (2006, p.174) *suggests that an aesthetically pleasing experience is one that provides pleasurable sensory experiences, a pleasing perceptual structure and pleasurable symbolic associations"* (Gjerde, 2013). Gjerde and Vale (2015, p.82) have also empirically revealed the potential contribution of an aesthetically pleasing environment to SoP and contributed to the existing literature by validating their claim that "*people attach meanings to buildings and other parts of the built and natural environment when forming an **aesthetic** response*". Florida et al. (2011, p.33) also support that "*perceived beauty or aesthetic character of a location has a positive and significant effect on perceived community satisfaction*". Aesthetic appreciation shows that the urban environment is cared about by its users and therefore it contributes to a sense of community and an improved QoL by means of increased SoP (Carmona et al., 2010).

Tuan (1974) relates the concept of **familiarity** to the attachment to the past because what makes people deeply tied to their material life is the affection bred by the sense of familiarity. Following this, sense of **familiarity** and **sense of belonging** can also develop based on the visual understanding of place **(aesthetic appreciation of place)** since people judge the place to which they will move based on the criteria they have established based on the visual qualities of their previous living spaces (see Tuan (1974) for a review). Lopez (2010, p.48) also supports that "*[v]isual quality can affect a person's experience greatly because people respond to what appears before them, visual cues in the area, and what they recall of places*". In this sense, feeling **familiarity** with the visual qualities of the physical environment would contribute to SoP negatively or positively based on the people's previous satisfactions or dissatisfactions. Inalhan and Finch (2004) also state that psychological association between people and environment is established based on three main processes: attachment, **familiarity** and identity.

Sense of belonging, as previously mentioned by some of the scholars (Williams et al., 1992; Shamai, 1991; Sigmon et al., 2002; Tuan, 1974; Low & Altman, 1992), is another important determinant of the emotional attachment to a place. Although these two concepts are closely associated, the hierarchy between them is unclear. According to Sakhaeifar and Ghoddusifar (2016), SoP needs to be achieved to establish a **sense of belonging**. That is, sense of belonging is a type of feeling that is higher than SoP. Semenza and March (2009) studied how community involvement enhances social wellbeing, and their results showed that the increased social interactions and **sense of belonging** in urban design interventions brought about the enhancement of SoP.

Overall, as explained above, the literature suggests that various terms and concepts have been associated with SoP. Despite a certain amount of consensus on some of the indicators, there is still ambiguity in the literature regarding SoP, the other place-related determinants and the hierarchical relationship between them. It is therefore a challenging task to assimilate SoP with its precise meaning, dimensions and measurement methods with a consensus. SoP should be approached in a more comprehensive way including all the above-mentioned dimensions. The following section will propose a new multi-dimensional model of SoP.

3.2.4. Sense of Place Model

As reviewed in the above SoP literature, **place attachment** is the most frequently closely associated concept with SoP (e.g. Tuan, 1974; Low & Altman, 1992; Shamai, 1991; Shamai & Ilatov, 2005; Deutsch et al., 2011; Jorgensen & Steadman, 2006; Perkins & Long, 2002; Cross, 2001; Mazloomi et al., 2014). Some authors have even either used the term place attachment to refer to SoP itself or took place attachment as a single dimension to explain SoP and grounded the measurement of SoP on it (e.g. Shamai & Ilatov, 2005; Cross, 2001; Eisenhauer et al., 2000). **Place identity** and **place dependence** have frequently been adopted as the two most common main subsets of SoP and/or place attachment by numerous researchers (e.g. Williams et al., 1992; Jorgensen & Steadman, 2006; Deutsch et al., 2011; Mansoori & Jahanbakhsh, 2014; Arifwidodo & Chandrasiri, 2013; Raymond et al., 2010; Tsaur et al., 2014; Eisenhauer et al., 2000; Moore & Graefe, 1994; Kyle et al., 2005; Bricker & Kerstetter, 2000). However, some researchers (e.g. Raymond et al., 2010; Jorgensen & Stedman, 2001) criticised this approach for being rudimentary and suggested including other dimensions such as **nature bonding** (e.g. Raymond et al., 2010; Katsamagka, 2013) and **social bonding** (e.g. Raymond et al., 2010; Tsaur et al., 2014; Perkins & Long, 2002). As reviewed in the literature, other indicators associated with emotional attachment to place are **sense of belonging** (e.g. Williams et al., 1992; Shamai, 1991; Sigmon et al., 2002; Tuan, 1974; Low & Altman, 1992); **aesthetic quality** (e.g. Tuan, 1974; Cuthbert, 2006; Tuan, 1974; Gjerde, 2013; Gjerde & Vale, 2015; Lopez, 2010; Gordon Cullen, 1961); **privacy** (e.g. Sigmon et al., 2002; Low & Altman, 1992; Dovey, 1999; Andrews & Withey, 1974); **familiarity** (e.g. Tuan, 1974; Williams, 2009; Inalhan & Finch, 2004); and **social interaction** (e.g. Eisenhauer et al., 2000; Cross, 2001; Ferriss, 2006).

Table 3.3 Terms and concepts frequently discussed in relation to sense of place

SoP associated concepts frequently discussed in the literature		
1	**Aesthetic**	Tuan (1974), Gordon Cullen (1961), Cuthbert (2006), Tuan (1974), Gjerde (2013), Gjerde & Vale (2015), Lopez (2010), Lewis (1979)
2	**Sense of Belonging**	Tuan (1974), Shamai (1991), Sigmon et al. (2002), Hay (1998a, 1998b)
3	**Privacy**	Sigmon et al. (2002), Clemons et al. (2004), Andrews & Withey (1974), Low & Altman (1992), Dovey (1999), Elprama et al. (2011); Harris et al., (1995), Harris et al., (1995), Sigmon et al. (2002)
4	**Place Attachment**	Tuan (1974), Low & Altman (1992), Shamai (1991), Shamai & Ilatov (2005), Deutsch et al., (2011), Jorgensen & Steadman (2006), Perkins & Long (2002), Cross (2001), Mazloomi et al. (2014), Jorgensen & Stedman (2001)
5	**Place Identity**	Proshansky (1978), Deutsch et al. (2011), Mansoori & Jahanbakhsh (2014), Williams et al., (1992), Jorgensen & Steadman (2006), Arifwidodo & Chandrasiri (2013), Raymond et al. (2010), Tsaur et al. (2014), Eisenhauer et al. (2000), Mazloomi et al.(2014), Beidler & Morrison (2016), Kyle et al., (2004)
6	**Place Dependence**	Stokols & Shumaker (1981), Williams et al., (1992), Jorgensen & Steadman (2006), Arifwidodo & Chandrasiri (2013), Raymond et al. (2010), Tsaur et al. (2014), Cross (2001), Mazloomi et al. (2014), Beidler & Morrison (2016), Kyle et al. (2004)
7	**Nature Bonding**	Uslu & Gokce (2010), Raymond et al. (2010)
8	**Social Bonding**	Uslu & Gokce (2010), Raymond et al. (2010), Tsaur et al. (2014), Perkins & Long (2002), Eisenhauer et al. (2000), Hay (1998a), Cross (2001), Kyle et al. (2005), Hay (1998b), Kim (2000)
9	**Familiarity**	Tuan (1974), Williams (2009), Kyle et al. (2005), Hay (1998a, 1998b)
10	**Social Interaction**	Eisenhauer et al. (2000), Cross (2001), Ferriss (2006), Kim (2000)

Overall, it was observed that uni-dimensional, bi-dimensional, or four-dimensional approaches, which have involved different combinations of above mentioned 10 variables, have been proposed to explain the links between various place- and emotion-related terms and SoP (Table 3.3). Although their contribution to SoP individually is not totally clear, all these parameters directly or indirectly contribute to SoP where the physical environment can play a critical role for the users of a place. This research, has therefore adopted all these indicators as the determinants of SoP.

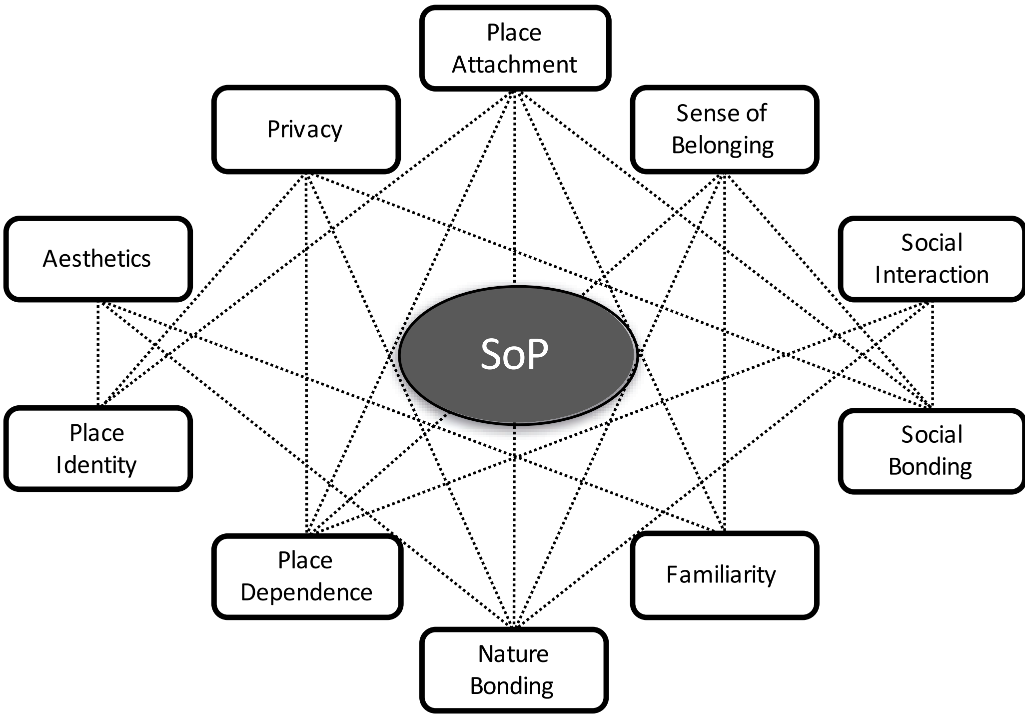


Figure 3.8 Multi-dimensional model of SoP (by the author)

Although this research accepts that all these 10 indicators are associated with SoP, their association with each other and contribution to each other's understanding cannot be ignored. However, the literature is vague regarding the association or the hierarchical relationships between these concepts [the possible relations of each subset to other subsets are shown in Figure 3.8]. Since there is no consensus, this research prefers to remove the hierarchical relationship between the indicators and adopt the multi-dimensional SoP model consisting of 10 distinct but interrelated dimensions shown in Figure 3.8. This is a new analytical and methodological approach for the comprehensive assessment of SoP.

3.3. Conclusion

This chapter has started reviewing QoL literature and narrowed it down to SoP. The review showed that QoL and SoP are closely associated concepts and both are relevant to the relationship between people and environment. However, QoL is a broader, more multi-disciplinary and more holistic concept concerning human life qualities (particularly health). QoL and SoP partly overlap and are not completely independent of each other. QoL is relevant to both objective and subjective conditions affected by the physical conditions of the living space and the psychological consequences of the impact of those physical conditions on life, respectively. In contrast, SoP is more specific to the emotional and psychological relationship and affective bonds established between people and place. However, since the notion of place and place making is crucially important in this research context and SoP is the common outcome of social, psychological and environmental processes of place, SoP has been found more relevant within the scope of this research. The chapter clarified that SoP a multi-faceted concept that can be approached from geograpghical, psychological, environmental-psychological and sociological perspectives and like QoL, there is no concensus on its definitions and indicators for a robust measurement of the satisfaction. As a result of the review of the existing SoP models and indicators, this chapter has proposed ten SoP indicators in relation to the place dimension: aesthetic quality, privacy, place attachment, sense of belonging, place identity, place dependence, nature bonding, social bonding, familiarity and social interaction. This is a new and the most comprehensive SoP model introduced to assess SoP.

Recalling the main intention of this research to bridge between typo-morpghological analysis and SoP assessment, the previous chapter (Chapter II) has already introduced the typo-morphology as a useful design tool to achieve better life quality and better understanding of the concept of typological process. Accordingly, this chapter has introduced the concept of SoP within the framework of QoL research and proposed a SoP model for the assessment of SoP. Now, the next chapter will discuss the reciprocity between typo-morphology and SoP through the research gaps identified in both fields.

CHAPTER IV

"Places are identified with what does not change; their 'sense of place', 'character' or 'identity' is seen as relatively stable."

(Dovey, 2010, p.3)

4. BRIDGING THE GAP BETWEEN TYPO-MORPHOLOGY AND SENSE OF PLACE

This chapter primarily aims to explain the reciprocity between typo-morphology and sense of place (SoP), which were independently reviewed in Chapter II and Chapter III respectively; then to establish a new analytical framework for the SoP monitoring during the transformation of the historic house form. The following starts with the identification of the gap in SoP research with an attention paid to the place dimension and continues with the review of SoP literature studying specifically the physical environment/place. This is followed by the discussion on the role of the spatial characteristics of the built environment in enhancing SoP. Then, the potential links between typo-morphology and SoP and the feasibility of studying these two together are scrutinised. At last, a conceptual framework is proposed.

4.1. The Gap in the Sense of Place Research: Studying Its Physical Construction

SoP has been studied as an interdisciplinary subject from a variety of perspectives in literature. The studies mainly focused on the philosophical, phenomenological and psychological understanding of the concept and tried to conceptually identify its affective, spiritual and cognitive dimensions (Deutsch et al., 2011; Kaltenborn, 1998). In particular, phenomenological studies of SoP were not empirical and tended to approach SoP holistically rather than multi-dimensionally (Smith, 2011). Apart from these theoretical and non-positivistic approaches clarifying the extent of the emotional connections to place, in contrast recent studies have intended to quantitatively measure the connotations of SoP (Deutsch et al., 2011). Their positivistic views have stressed the requirement of defining the concept more accurately and conducting an empirical study of SoP (Shamai 1991). These studies therefore either empirically identified the determinants of SoP and then proposed methodological tools for the SoP measurement or assessed SoP comparatively. The studies offering a comparative understanding of SoP concept have been conducted in a variety of contexts. Some have compared SoP between groups of people who belong to a different nationality and race, and who are from different geographic locations and socio-economic and cultural backgrounds (e.g. Anton & Lawrence, 2014). Their common aim was to find the factors affecting SoP, such as ethnic background, age, gender education, the length of residence and so on. On the other hand, few studies have compared SoP through differences observed in the physical environment. (Figure 4.1 shows the categorisation of SoP research).

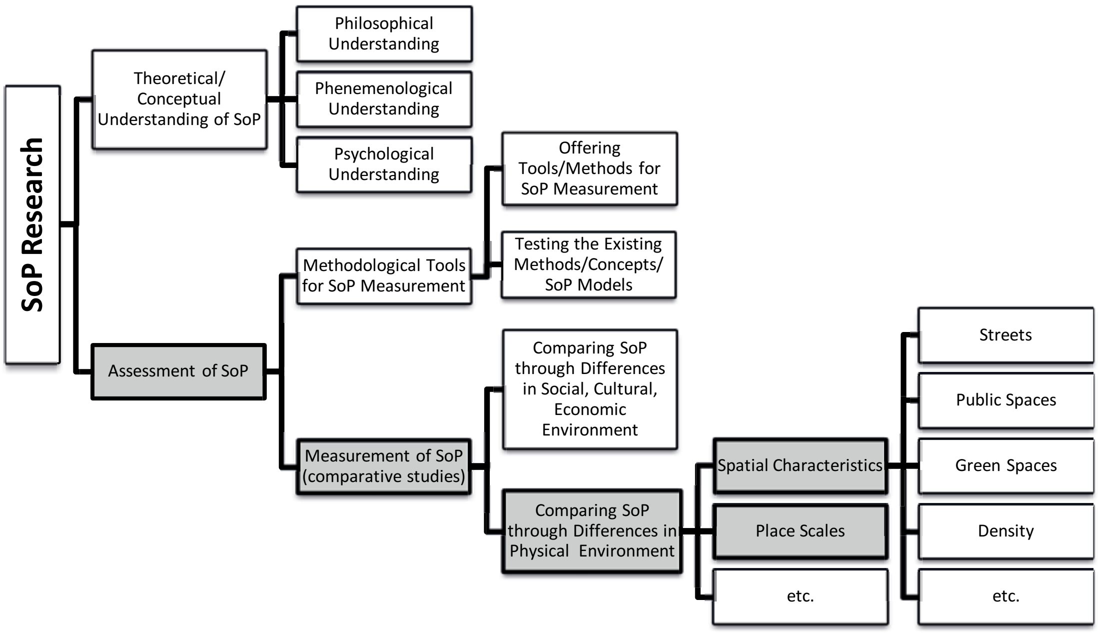


Figure 4.1 Categorisation of SoP research to date (by the author)
*Grey shading indicates the focus of this thesis

The literature has proved both quantitatively and qualitatively that SoP shows differences depending on both socio-cultural and physical factors (Hay, 1998a; Hernandez et al., 2007; Lewicka, 2010; Shamai et al., 2012; Stedman, 2003; Smith, 2011). Regarding its social construct, the literature has extensively discussed personal characteristics, ethnic, religious and socio-economic background, and other demographical variables such as the length of residence, level of education and income, marital status, class, age, gender, tenancy type, public participation and place of residence (e.g. Shamai et al., 2012; Shamai & Ilatov, 2005; Mazloomi et al., 2014; Anton & Lawrence, 2014; Smith, 2011) with regard to their potential impact on SoP (See Table 4.1 for the full list of such factors with the relevant literature). However, previous literature (e.g. Hay, 1998a; Hernandez et al., 2007; Lewicka, 2010; Lynch, 1960) has also suggested that people can develop strong or weak bonds with one place depending on not only their socio-cultural and economic background but also the place's physical characteristics (Stedman, 2003). In other words, changing physical characteristics of the built environment also affects people's SoP (Vanclay, 2008). Nevertheless, the social construction has always been given a great deal of emphasis and the contribution of a high-quality physical environment to the fulfilment of place meaning and establishment of place attachment has often been neglected, even though the definitions of SoP unexceptionally used the term the "*physical environment*" (Stedman, 2003, p.671; Hidalgo & Hernandez, 2001).

Table 4.1 Socio-economic and demographic factors affecting sense of place

Socio-economic demographic factors affecting SoP	Literature
Class	Rose (1995), Shamai & Ilatov (2005)
Gender	Rose (1995), Shamai & Ilatov (2005), Hidalgo & Hernandez (2001), Anton & Lawrence (2014), Brown & Werner (1985), Smith (2011)
Race	Rose (1995), Shamai & Ilatov (2005)
Religion	Shamai & Ilatov (2005), Williams (2009)
Age	Shamai & Ilatov (2005), Hidalgo & Hernandez (2001), Anton & Lawrence (2014), Mazloomi et al. (2014), Farshchi et al. (2014), Brown & Werner (1985), Nanzer (2004), Lewicka (2010), Zhang et al. (2015)
Culture/Ethnicity	Brown & Werner (1985), Ujang & Zakariya (2015)
Income	Williams et al. (1992), Nanzer (2004)
The Length of Residence/Experience	Shamai & Ilatov (2005), Brown et al. (2003), Arifwidodo & Chandrasiri (2013), Hay (1998a), Anton & Lawrence (2014), Mazloomi et al. (2014), Farshchi et al. (2014)
Tenancy/Ownership Status	Arifwidodo & Chandrasiri (2013), Anton & Lawrence (2014), Brown et al. (2003), Hay, (1998a), Lewicka (2010)
Rootedness	Hay (1998a)
Birthplace	Hay (1998a)
Personality	Diener et al. (2013)
Education	Farshchi et al. (2014), Williams et al. (1992)

Human-environment interaction is a two-way process; therefore, neither the human agency nor the physical setting can be excluded from this process (Carmona et al., 2010, p.111). Relph (1976) also criticises the studies looking at this process due to their oversimplified ways of understanding the environmental disorders and their mechanical and dubious solutions ignoring human behaviour and daily life. Relph (1976) also claims that a better understanding of this process will benefit the design of the new physical environment, which could be able to emotionally feed its users satisfactorily.

Currently, there is a growing research interest in the social impacts of the physical environment (Chen & Thwaites, 2013), particularly the loss of SoP. The impacts of a high-quality physical environment on people's wellbeing have frequently been discussed in literature (e.g. Southworth (2003); Pacione (2003); Westaway (2009); Shafer et al. (2000); Apparicio et al. (2008); Kamp et al. (2003); Senlier et al. (2009); Farshchi et al. (2014); Billig (2005). Although the historic examples of successful places are still available to take some lessons from, a considerable number of new developments are currently built with a lack of SoP (Montgomery, 1998). Lynch (1960, p.119) indicates that there is always a need for an environment that is "*well-organised"*, "*poetic*" and "*symbolic*"; and this physical setting is embedded within the society's aspirations and traditions to give residents enhanced 'SoP'. Moreover, as Montgomery (1998, p.94) indicates, SoP has to be sustained in contemporary settings where QoL "*is not a luxury but an essential*". There is, therefore, an urgent need to verify the impact of physical environment on SoP through empirical research combining both qualitative and quantitative research methods.

The following section will review how the physical dimension of place have been studied in SoP literature.

4.2. Physical Environment in the Sense of Place Research

One of the primary objectives in design is to make places, and SoP is of crucial importance in creating successful places because it helps to maintain the quality of the physical environment (Najafi & Shariff, 2011). This quality is then expected to contribute to SoP in return. Montgomery (1998, pp.95-96) indicates that urban quality is the product of the proper combination of physical elements (e.g. architectural form, scale, vistas, open spaces, green areas, etc.) with each other and with the psychology of place; however, the socio-cultural and psychological dimension of space is more significant in achieving this quality. On the other hand, Beidler and Morrison (2016) state that, although the social experience of place is influential, the primary source affecting SoP is the physical setting. This potential of the physical setting in SoP measurement has been identified in various studies. However, there is no clarity or agreement on the place dimension or perspective that is associated with the notion of SoP.

Some studies have looked at the place dimension as only a geographical location rather than an architectural product, and identified the link between place and SoP regardless of its architectural design features. For instance, Anton and Lawrence (2014) examined the impact of place of residence (urban and rural) on some indicators of SoP such as place attachment, place identity and place dependence. They looked at the differences in socio-economic demographic variables such as ownerships status, the length of residence, gender and age. However, their primary conclusion was drawn on the strong relationship between place of residence and place attachment, and they found that people living in rural areas were more emotionally linked to their living environment than those living in urban areas. They also claimed that the larger the community size, the less the attachment to the place.

Shamai et al. (2012) focused on the territorial dimension of place and examined the impacts of different place scales on SoP: home, settlement and region. The study did not find any differences depending on the variety in demographic variables such as age, gender or length of residence, but did find differences between the previous living place and the new place. Although the concept of place in this research was not also defined in architectural terms, similar to Anton and Lawrence's (2014) research, the study emphasises the significant impact of the geographical and physical dimension of place on SoP, while Anton and Lawrence's (2014) attempt reveals the potential impact of place density on SoP.

Another study focusing on the place dimension regardless of its spatial-physical characteristics was conducted as a literature review by Graham et al. (2009). They identified the potential relationship between the historic environment, SoP and social capital. The generally adopted notion in the study is that the link between historic environment and SoP can be explained in relation to three dimensions of SoP: "*place distinctiveness*", "*place continuity*" and "*place dependency*". This study also did not consider the architectural value of a heritage environment but looked at heritage activities that encourage people to communicate and become involved in place making.

However, the study has brought to the discussion the notion of whether it is people's relationships in a place or the built environment creating SoP.

In architectural terms, religious architecture has always been popular in SoP research due to religious buildings' spiritual power on people's perceptions. Mazloomi et al.'s (2014) study can be given as an example looking at the relationship between SoP and architectural physical design in a religious context. They looked at three perceptual predictors (place identity, place dependence and place attachment) of SoP in contemporary mosques in Malaysia and examined the potential influences of architectural design features, the spiritual atmosphere and the social environment of the mosques. The primary aim of the research was to examine the impact of socio-demographic variables on SoP rather than the impact of the place itself. However, the study also emphasised the influence of architectural design features (Islamic architecture) such as texture, colour, shape, geometric orientation and spatial sequences to SoP – albeit not as much as the social and spiritual environment. Another important result of the research is that it did not observe any differences depending on socio-economic demographic data, such as length of experience and age, although the other literature claims the opposite.

SoP has also been associated with the particular characteristics of the physical environment. To explain: Beidler's (2007) research examined the influence of the physical form of a neo-traditional neighbourhood in Blacksburg, Virginia, USA, on its residents' SoP. Density, proximity of houses, public-private area relations and the relationship of the housing to the un-built environment were taken as physical form characteristics that affect residential experiences. The results partially supported the idea that physical setting can help enhance SoP, since the scope was limited to the attached housing with limited social interaction in the outdoor public area. However, according to the research, the concept of SoP is heavily dependent on social interaction and therefore the design features contributing to social interaction – such as the use of semi-public spaces, quality outdoor environment design and small, intimate, semi-public spaces connected to the housing units – are relatively important in achieving SoP. The research also emphasised that the public spaces are not only the design elements contributing to social interaction; the quality of design is also significantly important, in particular, regarding building residential SoP.

Another stream of the study of the physical dimension of SoP is the investigation of the impact of new development in existing settlements on the place character and SoP. For example, Lopez (2009) focused on the impact of new development on the character of downtown Cayucos, California, USA, and proposed a design approach allowing for changes and responding to enhancement needs such as accessibility, parking, amenities, and management but at the same time keeping the town character and the local SoP. She looked for the ways to maintain people's SoP while allowing the development needs. In her further argument, Lopez (2010, p.46) suggested that three concepts, namely "*sense of place*", "*experience of place*" and "*design*", should be studied together to identify successful places and decide what place elements should be maintained to help retain and enhance SoP.

Billig (2005) aimed to understand how SoP is affected where urban revitalisation projects are implemented. She examined the impact of both physical and sociological factors on SoP, and carried out interviews with only women in six different housing developments built in and adjacent to old neighbourhoods, where the deteriorated urban texture is replaced by the more prestigious and modern housing developments. She identified the contrast between new and old buildings regarding their height, shape, design, colour and landscape design features. She also compared a number of housing units, building arrangements (e.g. along a street, in a star shape, in a square shape, or in a semi-closed horseshoe shape) and type of separation – walls and fences. She concluded that SoP is affected by both socio-economic differences observed between the old and new residents and the differences in physical appearance and the design of the new and the old housing developments. The study also suggested that SoP should be taken into consideration when the erection of new buildings in the existing environment is necessary, and planning and design should aim to maintain and enhance the existing SoP.

Farshchi et al. (2014) studied the impact of deteriorated urban texture on SoP in Sarshoor, a market place in Mashad, Iran. Three types of blocks were defined according to the level of deterioration following criteria looking at the land coverage of worn-out, instable buildings and passages and the presence of historic buildings and monuments. Farchchi et al. (2014) also identified differences in the degree of SoP depending on age, education, being immigrants to or local people from the chosen area, being a resident or a passenger, and the length of residence. The research, as a result, developed scenarios and offered some suggestions like wider passageways, building new homes in harmony with the existing fabric, not constructing modern buildings in the deteriorated neighbourhood and creating mixed-usages of the area.

Overall, the physical dimension of SoP has been identified by numerous scholars and in a variety of contexts. Even though their main focus is on the physical dimension, the general tendency in these studies is to look at the socio-economic demographic variables together with the **physical place** factor. This is mainly because the literature is commonly agreed on the impact of demographic variables on SoP and the benefit of studying its physical and social dimensions together. However, not all studies have observed significant differences in SoP because of social, economic, cultural and demographic differences. Furthermore, the meaning of place also differs from one study to another. Thus, not all the studies have defined place architecturally and with regard to its form-based spatial characteristics. Therefore, the way that the physical setting is related to SoP varies across the studies. It can be a geographical, territorial, spiritual, conceptual, aesthetical or architectural relation. Moreover, as seen in the above studies, the physical characteristics of place discussed in relation to SoP are different as well. The most common spatial characteristics associated with SoP are density, public-private area relations, building heights, access network, building types, landscape design, the contrast between old and new buildings, site arrangements, public space design, borders, etc. The scholars have, either superficially or in depth, looked at these spatial characteristics individually or as a combination of a few. However, the selection of the physical elements in these studies was fairly random. They lacked consistency and a solid scientific approach. In this regard, employing typo-morphology in this research context is also to improve the data quality of physical elements studied in relation to SoP. Additionally, although SoP has also been studied in relation to the impact of the physical changes after transformation, the scope was limited to the regeneration developments and the adaptation of the new buildings to the existing context, and no study has been found looking at the impact of different physical spaces and their transformations on SoP.

4.3. Spatial Characteristics of Physical Form and Sense of Place

Although SoP is subjective, people experience a place through its physical elements and its spatial boundaries. In other words, the primary visible source of SoP is still the physical forms evoking the personal feelings towards them. Rapoport (1977, p.2) explains this with the concept of "*environmental determinism*", which in geography refers to the potential of the physical environment to regulate human behaviour. He (1977, p.2) further indicates that this is also a traditionally accepted notion in planning and design and implies that "*changes in the form of cities and buildings can lead to major change in behaviour, increased happiness, increased social interaction and so on*". Fishman (1982) also indicates that Howard, Le Corbusier and Wright believed that social reform could be achieved through a change in the physical environment. Currently, it is generally agreed that the spatial design characteristics significantly affect how people perceive and experience space (Clifton et al., 2008; George & Campbell, 2000). These characteristics have been discussed in a wide range of contexts such as social interaction, privacy, place identity, social bonding, place dependence, aesthetics and familiarity, which are also the main determinants of SoP. The recent research, however, proved that the spatial characteristics are not adequately examined regarding their direct relation to SoP, and the physical dimension of SoP has remained comparatively less investigated compared to its social dimension. The following will identify what spatial characteristics of physical form need to be taken into consideration in SoP monitoring through typo-morphological analysis.

Apparently, interaction is the key word in the investigation of the spatial relations and their potential contributions to SoP, since SoP can only be developed through a human's interaction with a space. In this sense, many space-related characteristics can contribute to social interaction at different intensities and different place scales. Wiese et al. (2014, p.1) indicate that "*[h]uman interaction is restrained and enabled by many different spatial features such as distance, connectivity, accessibility or functionality*". Similarly, Biddulph (2007, p.48) relates the SoP achievement to "*the patterns of access, character of the layout and the relationships between different types of urban space (from public to private)".* In addition, building arrangement and layout planning and design of public open spaces also enhance a healthy living environment and provide the continuity needed for a good life (Falkirk Council, 2007). George and Campbell (2000) also indicate that spatial configuration plays an important role in determining wellbeing choices. Different spatial configurations lead to changes in people's attitude towards a place and affect their perception and the ability to establish the desired fit between the space and their needs. Saraf and Ahlen (2010) stress the importance of building and site arrangement in establishing SoP, particularly in housing developments. They (2010) also indicate that characteristics such as open space configuration can define the characteristics of a certain housing typology. In this regard, it is predicted that housing typology itself should also contribute to SoP.

Privacy is another concept associated with interaction. Rapoport (1977, p.201) defines privacy as "*the ability to control interaction*", in particular, unwanted interaction. People feel belongingness, attachment or dependence to a place as long as they can control the intended activity. In that sense, privacy is an important human need that is affected by the way in which the physical setting is designed. Zimring 1982, cited in George & Campbell, 2000) indicates that, in addition to social interaction, spatial configuration can also be associated with other important needs such as privacy and wayfinding. Density is another physical aspect controlling human interaction and limiting intended activities. According to Rapoport (1977), density can (positively and negatively) affect privacy depending on what it is limiting: wanted or unwanted interaction. When it is an unwanted interaction, he refers to "*crowding*" (p.201) concerning privacy. Therefore, according to him, how the density is perceived affects our perception regarding the quality of the environment and therefore SoP. Bramley et al. (2009) also stress how density can be influential in people's relations at the societal level and claim that social segregation can be eliminated through the design of high-density, mixed-use compact cities. They argue that lower densities help to achieve positive social outcomes and enhance place attachment, safety and, in particular, home satisfaction.

Lopez (2010, p.49) indicates that "*[b]uilding density, scale, and type are key factors to* *the design of a space because people are able to create a relationship between their evaluative responses and the building's visual attributes*". According to Bramley et al. (2009), in addition to social interaction, density also affects place attachment since density might make people find their neighbourhood aesthetically pleasing because of its appearance and then they will feel proud of it. Therefore, built form can also contribute to people's aesthetic satisfaction. According to Gjerde (2013), the other built form characteristics affecting the aesthetic perception are complexity, order, compositional scale and human scale. Regarding the aesthetic evaluation of urban streetscapes, building heights and façade composition are amongst the design elements influencing people's perception (Gjerde & Vale, 2015). Considering that different typologies can be identified in differences in such characteristics, typology also contributes to aesthetic quality. "*Alan Colquhoun (1981) argued that typology as a design method could fill the vacuum between technical determinism and aesthetic values*" (Chen & Thwaites, 2013, p.48).

Familiarity can also be emphasised by the built form characteristics, in particular, with typology. Durand believed that what creates familiarity is forms and proportions, which are the result of different compositions of architectural elements creating a certain type (Chen, 2009). Schneekloth and Frank (1994, p.15) also indicate that "*[t]ype and acts of typing allow us to make distinctions between things and to divide them; they allow us to recognise similarities between things and to collect them*". Given this, the pattern that we become used to seeing also gives a sense of familiarity and facilitates the adaptation to the new development and therefore contributes to SoP.

Social bonding and community attachment are other social aspects that can be regulated through the physical arrangement. Brown and Werner (1985) found that the design features of streets could affect social bonding, and people feel more attachment to their neighbourhoods in cul-de-sacs compared to those in through streets. This satisfaction can also be linked to satisfaction with privacy since the cul-de-sacs can increase their users' control over their surrounding environment.

Overall, the built form is the product of complex relations of individual physical elements. Although many others can be added to the list above, Figure 4.2 summarises the spatial characteristics that are mainly discussed in relation to their influential effect on human perception and satisfaction with the place and life. These elements are also important elements of typo-morphology that need to be studied systematically to understand the changes and transformation undergone by the physical environment over time.

Scale	Spatial configuration	Typology
Form	Public to private area relations	Appearance
Proportion	Layout planning and design of public places	Complexity
Connectivity	Building and site arrangement	Order
Distance	Open space configuration	Facade composition
Accessibility	Density	Streetscapes
Functionality	Land coverage	Building heights

Figure 4.2 Spatial characteristics of physical form (by the author)

Amongst these elements, this study firstly takes the typology and scale dimensions of place in relation to typo-morphological analysis and adopts the relevant spatial elements in relation to the chosen place scales such as spatial configuration, public-private area relations, density, land coverage, connectivity, accessibility and building heights which will be identified later in the methodology chapter in detail.

4.4. The Reciprocity of Typo-Morphology and Sense of Place

Typo-morphology and SoP are two independently developed research areas and have made important contributions to the people-environment studies. While typo-morphology has primarily dealt with **form**, SoP research has mainly been associated with **human perception**. Indeed, both physical form and human behaviour have always been found dependent on each other, and their relations have been discussed both qualitatively and quantitatively (e.g. Rapoport, 1969a, 1977; Relph, 1976; Stedman, 2003; Tuan, 1977, 1974; Gehl, 2010, 2011). Typo-morphology has never had proof for its claim that continuity in the transformation of the physical environment helps maintain better and more high-quality living in social and cultural terms. On the other hand, as identified earlier, physical form is underexplored in SoP research. Therefore, it is believed that the potential reciprocity between typo-morphology and SoP concepts might fill these identified gaps.

Typo-morphology and SoP can be brought together in a single study following the criteria that apply to both: form, time and scale. **Form** is a determinant of human behaviour and therefore, as a physical entity, it is the primary source of SoP. People primarily perceive their environment through its physical features such as lines, surfaces, solids and voids (Tuan, 1974). However, their judgement of a place depends on the criteria, defined according to their social and cultural values, which have developed over time. On the other hand, in urban morphology, form is the product of this evaluation process and therefore it is a cultural product created by a group of people in a particular location over a period of time (Kropf, 1993). This emphasises the two-way process between human interaction and physical form claimed by many scholars (e.g. Carmona et al., 2010; Rapoport, 1969a). Therefore, both typo-morphology and SoP are vigorously and transactionally linked to **form**.

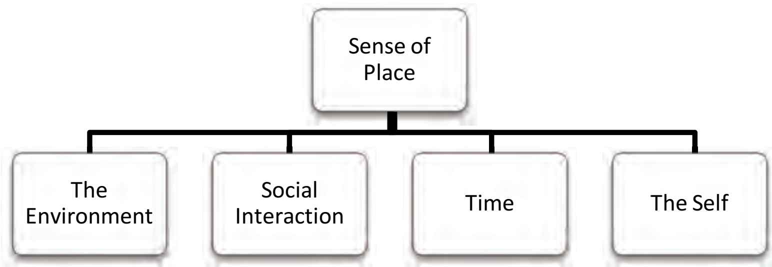


Figure 4.3 The four dimensions of sense of place (adapted from Beidler & Morrison, 2016)

Time refers to the process of experience in the SoP research. The positive or negative sense towards a place develops over **time**. In essence, the nature of SoP is experiential; it exists and evolves over time (Canter, 1983, cited in Deutsch et al., 2011). According to Beidler and Morrison (2016, p.206), SoP is the result of overlapping processes of "*the physical environment, the psychology of the self and the sociocultural circumstances, all of which vary over the course of time*" (Figure 4.3). Places are also in a state of continuous change and formed or transformed based on experiences. Wagner (1972, p.49, cited in Relph, 1976, p.44) states that *"[p]lace, person, time and act form an indivisible unity"*. In this unity, place and people develop interactive relations through time and activities (Figure 4.4). *"As places change over time, there is a 'continuing* *narrative' involving past, present and future SoP"* (Carmona et al., 2010, p.119). Therefore, SoP is embodied in places and sustained over time through the changes in physical settings. In this sense, both typo-morphology and SoP can be evaluated as the products of long-term experiences and both are dependent on the time factor.

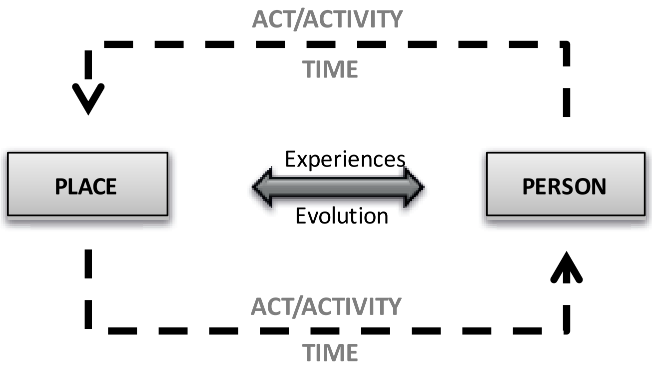


Figure 4.4 Place-person relations through time and activity (by the author)

Scale is an important dimension of place and determines the activity types and the degree of interaction with physical form and SoP. Wiese et al. (2014, p.1) also support the view that space is experienced through "*physical and non-physical activities and their relations **across scales** and over time*" [emphasis added]. Therefore, the development process of SoP shows differences depending on the place scale since the expectations and needs from different place scales are different. What is more, although SoP is mainly the concern of architects, it has lately become popular amongst urban planners and interior designers (Jackson, 1994, cited in Jiven & Larkham, 2003). This also implies that SoP is relevant to places as small as a room and as large as an urban area. In the SoP literature, it has been observed that SoP has been studied in relation to **homes** (Anton & Lawrence, 2014; Jorgensen & Steadman, 2006; Jorgensen & Stedman, 2001; Lewicka, 2008), **recreational areas** (Tsaur et al., 2014), **apartments** (Lewicka, 2010; Lewicka, 2008), **neighbourhoods** (Brown & Werner, 2009; Lewicka, 2010; Lewicka, 2008), **natural areas** (Davenport & Anderson, 2005; Ramkissoon et al., 2012; Gosling & Williams, 2010), **landscapes/gardens** (Baker 2014), **cities** (Lewicka, 2010; Lewicka, 2008), **regions** (Lewicka, 2010; Lewicka, 2008), **districts** (Lewicka, 2008) and **historical places** (Lewicka, 2008). Except for a few empirical studies (Lewicka, 2010; Shamai et al., 2012; Cuba & Hummon, 1993; Lewicka, 2008), the relation between place scales and SoP is underexplored (Jorgensen & Steadman, 2011). However, these studies suggest that differences in place scales do matter in SoP research and have different psychological implications (Montello, 1993; Hidalgo & Hernandez, 2001; Lewicka, 2010; Shamai & Ilatov, 2005; Jorgensen & Steadman, 2011; Vanclay, 2008; Sakhaeifar & Ghoddusifar, 2016). Shamai (1991) also states that even the definition of SoP differs depending not only on human factor but also on the **scale** factor. Brown and Werner (1985) also state that places are at different levels of scales, and therefore people's feelings of attachment also differ and occur at different levels. Deutch et al. (2011) and Hidalgo and Hernandez (2001) also suggest that the **scale** factor should be taken into consideration in examining SoP. They also emphasise the importance of studying SoP not only at the home level, but also at the neighbourhood and city levels. In addition, the scale factor also needs special attention in SoP research not only because SoP and its implications might vary through different place scales, but also to provide better understanding of the SoP concept as a whole. Carmona et al. (2010, p.123) clarify this point by stating that "*[t]he SoP does not exist in any particular part but in the combination of those parts into a greater whole. A building, for example, is part – but only one part – of the place experience*". On the other hand, as mentioned in Section 2.4.2, typo-morphology studies the transformation of physical form at differentiated scales (Chen & Thwaites, 2013) and offers a systematic investigation by bridging between building scale and urban scale (Yang, 2011; Sima & Zhang, 2009; Carmona et al., 2010, p.77; Moudon, 1994). Given this, **scale** is both an experiential and a physical dimension of place, and it is systematically linked to both SoP and typo-morphology.

4.5. The Conceptual Framework

The above review has shown that the study of SoP and the typo-morphological investigation are compatible through the concepts of form, time and scale, and they can be studied from each other's perspectives. Following these three concepts, this thesis offers a conceptual framework combining the typo-morphological analysis and the SoP assessment for SoP monitoring during the typo-morphological transformation of house form. Through this approach, it is aimed to identify the physical dimension of the SoP concept and empirically prove whether continuity during the transformation process of house forms helps to build/maintain SoP or not.

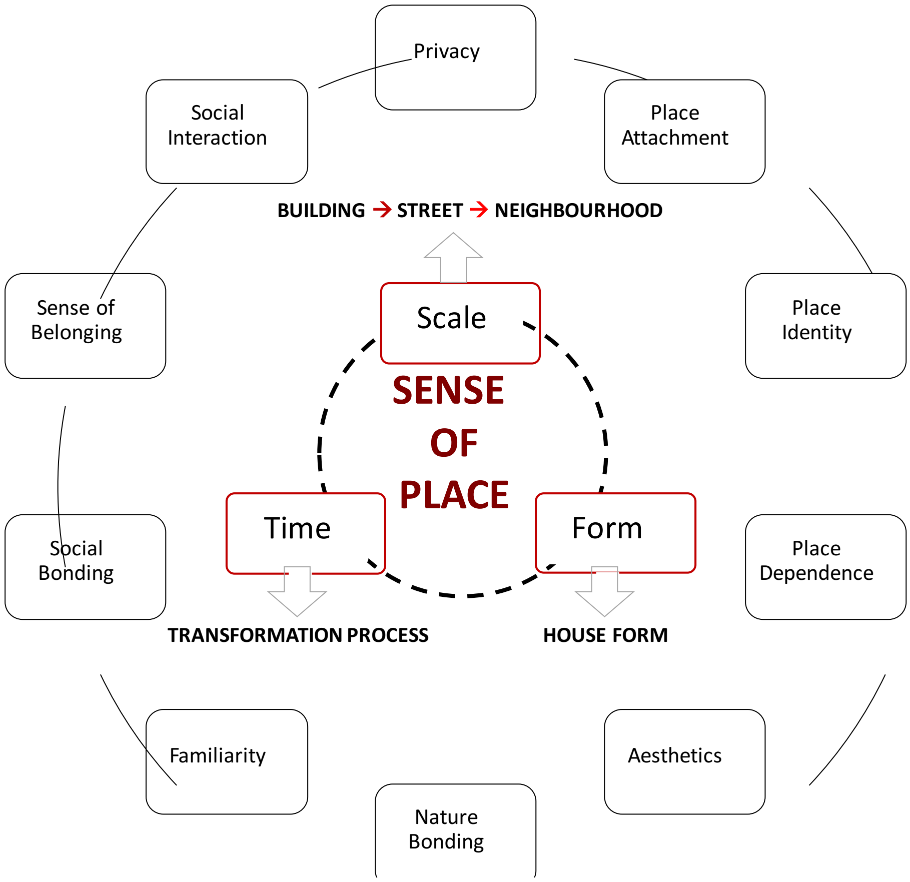


Figure 4.5 SoP monitoring through typo-morphological analysis (by the author)

This new conceptual framework, proposed to embrace the SoP assessment and the typo-morphological analysis, has first offered a SoP model (Section 3.2.4) to overcome the obstacle of the lack of a widely agreed definition and a set of measuring indicators for SoP. The adopted 10-dimensional SoP model is unique to this study since its indicators are specifically linked to the in-depth study of physical forms. Also, the model frames the definition of SoP adopted in this research. The study has also identified the appropriate place scales and the physical elements for both SoP monitoring and typo-morphological analysis. Three main place scales are adopted in the study: building, street and neighbourhood scales, and are applied to both the SoP assessment and the typo-morphological analysis (Figure 4.5). It is aimed to test the impact of continuity or mutations that occur during the transformation of house form through the selection of particular house typologies, some of which form a typological process, while others do not. The final stage in the framework is the systematic comparison of both results at the three place scales (Figure 4.6).

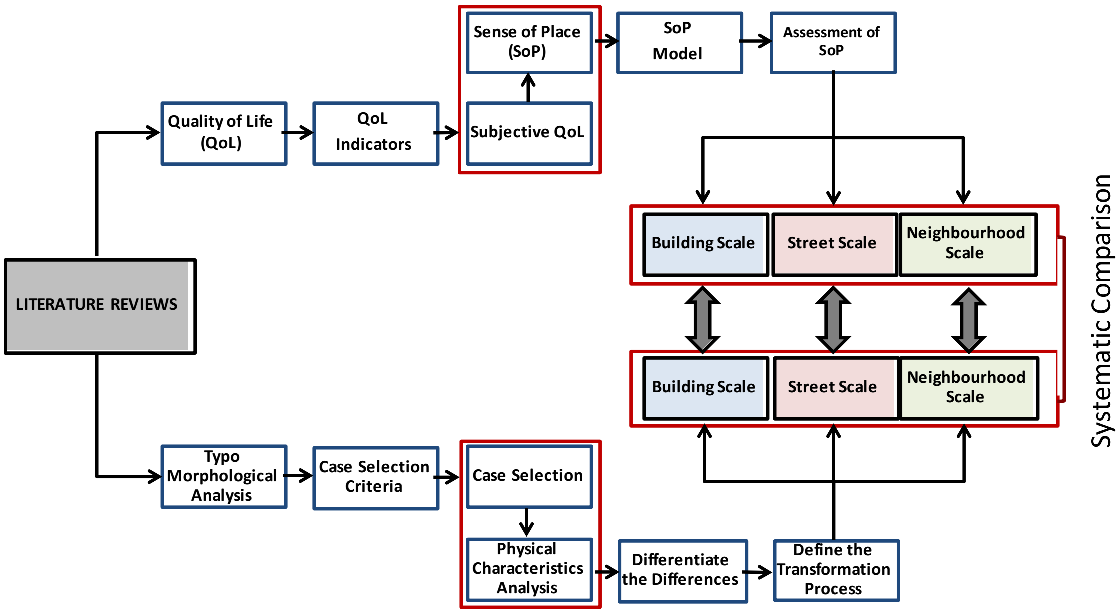


Figure 4.6 Research map (by the author)

In brief, the adopted framework offers an alternative methodological approach to the SoP assessment integrated with the typo-morphological analysis. It aims to uncover the physical dimension of SoP by examining the housing transformation, while it contributes to the social dimension of typo-morphology. The framework is set on the three elements of typo-morphology: form, time, and scale, and the assessment of the 10 likely indicators of SoP. As the framework identifies the methodological stages of the intended research, its extent will be explained in detail in the next (methodology) chapter.

4.6. Conclusion

Provision of QoL is primarily important for sustainable development. In humanities and social science research, QoL has been mainly associated with living standards and liveability conditions. Although economic welfare might be an important factor regarding life satisfaction, it does not always necessarily bring about that satisfaction. The social environment is also significantly important, and the psychological implications of the physical and spatial characteristics of the built environment on how people perceive and experience space and establish SoP cannot be ignored.

SoP is an important human need that should be met in design achievement, because of its positive contribution to the social construction of the built environment. On the other hand, typo-morphology is a useful analytical tool identifying the social dimension of the transformation process of physical form. It can test the robustness of the built environment to meet the changing human needs over time and seek solutions. It aims to contribute to the sustainability and improve the life quality of future generations in line with traditions.

Because of the scarcity of research quantifying SoP and the well-established understanding of its social dimension, it is suggested that new research should stress the physical dimension of the SoP concept. It is also believed that this will enable a better understanding of the psychological impacts of the physical environment. A typo-morphological approach to SoP can therefore be considered as an effective way to quantify it, with a special focus on its **place** dimension. On the other hand, the measurement of SoP will help to reveal the social impact of the typological transformation of the built environment by providing a better understanding of the social/psychological significance of living space. Therefore, there is a need to clarify the uncertainties of both disciplines through the combined approach.

It is believed that the potential contribution of this analytical combination of typo-morphology and SoP research will help us formulise the interactive relations between form and perception, define this relation as a part of a process, and help the construction of the fit between people and environment for better life quality in social and cultural terms.

CHAPTER V

5. METHODOLOGY

Following the proposed framework described in the literature review chapters above, this study aims to find out whether the typological process/continuity helps to maintain SoP or not. Since the nature of this study combines both physical analysis of the living environment and its subjective evaluation by its inhabitants, the study adopts a mixed methodology and combines qualitative and quantitative methods, the typo-morphological analysis and the SoP assessment, respectively. The following information is thus organised in two main sections. The first section focuses on the typo-morphological analysis of the spatial characteristics of the house form, while the second section explains the research design and stages of the SoP assessment through the interview method. Both require primary and secondary data collection. These are followed by the third section explaining the case selection rationale.

5.1. Typo-Morphological Analysis

As reviewed in Chapter 2, considering Conzenian and Caniggian approaches to the study of urban form, the typo-morphological approach requires a systematic analysis of three main elements: hierarchy of scales, a series of types and periods of their development (Chen & Thwaites, 2013, p.70) (Figure 5.1). This analysis is "*the most multi-layered and most complex form of investigation*" defining "*physical and spatial structure of the city*" (Djokic, 2009, pp.109-22). It offers a comprehensive and systematic way of analysing **form** in terms of **time** continuity in articulated **scales**.

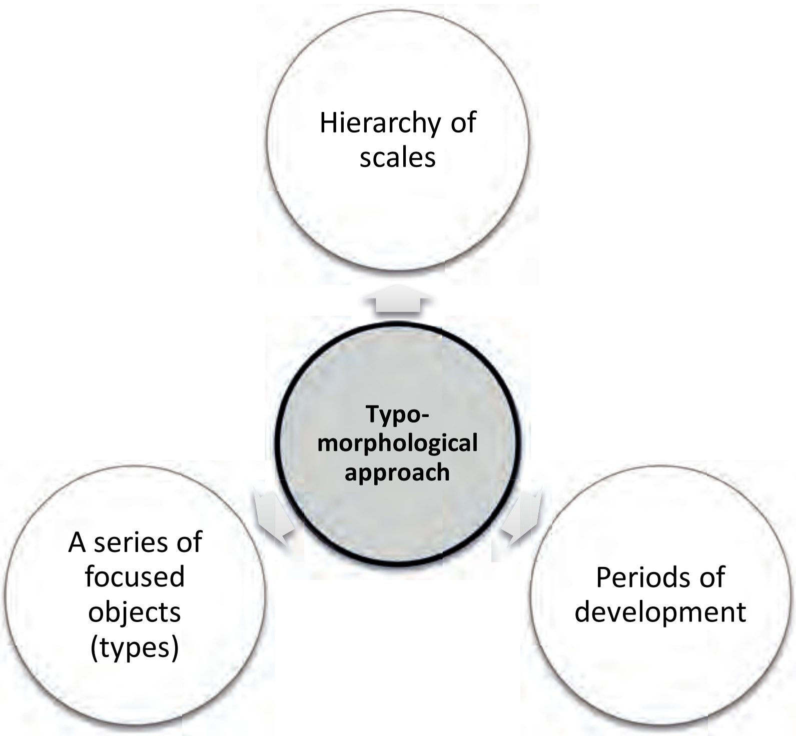


Figure 5.1 Three essentials of the typo-morphological approach (adapted from Chen & Thwaites, 2013)

In this study, form is discussed in relation to the house environment at three different levels of resolution, and the dimension of time, which is *"needed to recognise [the] mutations"* (Marzot, 2001, p.244) undergone by the house form, is analysed through the identification of the morphological periods of changes. Morphological periods are where the physical environment transformed at different rates under different forces. Each morphological phase refers to "*some turning points when dramatic changes taking place*" (Chen, 2009, p.78). Given this, the morphological periods are identified through the changes in social, cultural, political, environmental or economic factors affecting the housing transformation in a certain location over a period of time. Then, the changing housing design concepts in the consecutive periods are historically examined. The spatial types are defined according to particular spatial features at relevant place scales. According to the observed similarities and differences in their spatial characteristics, the typological transformation process is defined. Given this, the following will first explain the spatial characteristics by which the spatial typologies are defined at the building, street and neighbourhood scales in this research. This will be followed by the procedure for defining the typological process by identifying the continuities and discontinuities during the transformation process of the house form.

5.1.1. Defining Types

"*The history of architectural and urban culture is seen as the history of types: Types of settlements, types of spaces (public and private), types of buildings, types of construction*" (Krier, 1978, p.41). In other words, the built environment is understood as a result of a typification/typological classification process of its mutual spatial characteristics. Simply put, the typological classification is about transforming the experience into "*some sort of code*" that is written within types that will guide the formation of the future spatial elements of the city (Djokic, 2009, p.109; Tice, 1993, p.162). Types, therefore, are defined as the possession of a certain set of features observed in architectural and urban elements of space at a particular scale. The typological investigation is not only limited to an individual type but also the interaction between types, since the spatial formation of the built environment can be explained based on the relations among them (Djokic, 2009; Krier, 1978). Given this, **type in this study refers to a set of certain features observed in architectural and urban elements at a particular scale, and the origin that can be transformed over time to create new forms under different factors at a given location.** "*Any classification [however] should not be taken too rigidly, but should rather be observed as a process which continually develops and changes*" (Djokic, 2009, p.126). This will then help to construct the base to define the typological process in the given context.

In typo-morphological studies, the concept of typological zoning is the starting point of the typological classification (Kropf, 1998) because space configurations represent the structured relations between the elements of physical form into which the life experiences are translated. Therefore, typological studies are mainly concerned with the layouts as the primary determinants of form (Tice, 1993) and the built environment is analysed as a spatial unity through its spatial configuration and the mutual relationships between its typological and morphological elements (Djokic, 2009; Kropf, 2014). Peponis (1997, p.34.1) also indicates that spatial configuration is the "*underlying structure of potential movements*" and it is explained through the "*built shape*". The way that the elements of built shape come together creates different patterns in their spatial configurations. In addition, urban tissue, which is fundamental in typo-morphological studies (Kropf, 1998), is analysed at different degrees of resolution (streets, blocks, plots, buildings, rooms, structures and materials), according to Conzenian and Caniggian's approaches (see Chapter 2). Given this, configurational analysis is a type of analysis where the relation of each elementary spatial unit is characterised (Ozbil, 2013) and the functional relations are often descriptively (rather than analytically) explained both part-to-part and part-to-whole (Weisman, 1981, cited in Kim, 2001).

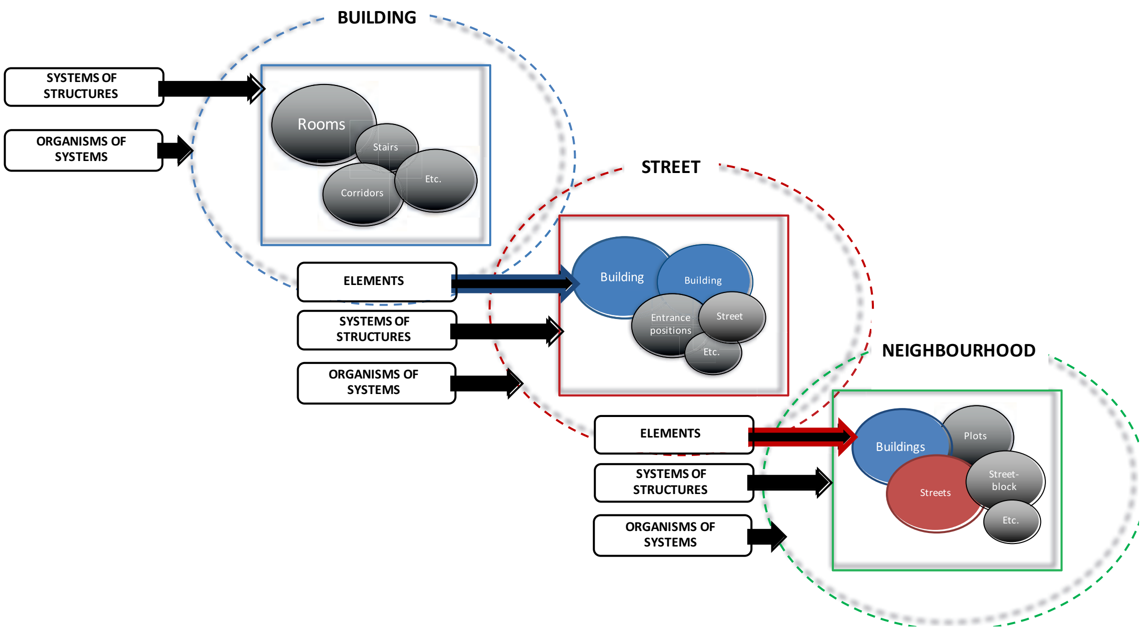


Figure 5.2 Hierarchy of spatial elements and the study scales used in this study (by the author)

In this study, following the Caniggian approach shown earlier in Figure 2.3, the analysis starts from the level defined in his hierarchy of spatial elements as "Systems of Structures", referring to the arrangements of rooms, stairs, corridors, etc., in the building organism. Then, it moves onto the next level, "Organisms of Systems", and focuses on the buildings. In the next level, the study takes the buildings as "Elements" of street form and then explains their association through building-building and building-street relations. At last, their combination forming small neighbourhoods is analysed as the "Systems of Structures". Overall, this study looks at the physical form at the three articulated scales (building, street and neighbourhood), and defines types according to their systematic spatial configurational analysis (Figure 5.2). The following section will explain the spatial characteristics used in the configurational analysis at the three scales, respectively.

a. Building Scale

Typo-morphological analysis at the building scale involves the analysis of the house plans, in particular, with regard to their spatial configurations that are also critical to the residents' overall satisfaction and experiences out of the living space (Memken et al., 1997). The configurational analysis of house layouts can be performed in a number of ways. For instance, according to Wedin (1979), the spatial configuration is analysed in relation to zoning (public, work, private zones), circulation and organisation of space (Memken et al., 1997, p.72). Dovey (1999, p.141), for example, stresses the four primary clusters of domestic space syntax according to their ability to "*mediate relations between inhabitants and visitors, and between different generations and genders within the house*": a formal living zone, an informal living zone, a master suite, and minor bedroom zone (Figure 5.3). To give another example, the general floor plan of a building can also be described according to massing, entrance, spatial hierarchy, site relationship, core location, interior circulation, public/private zoning or solidity/transparency (Frederick, 2007, p.16, cited in Caliskan, 2009). The important factor here is that the selected criteria/units used to analyse the spatial configuration should apply to all cases.

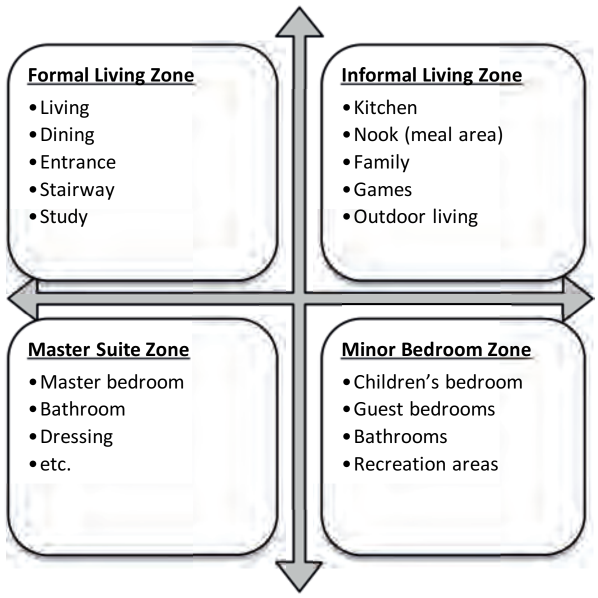


Figure 5.3 An example of functional clustering (adapted from Dovey, 1999, p.141)

This study examines the house layouts based on the arrangement of rooms. The degree of connectivity between rooms and how they are coordinated around different functional zones of the house are identified. Special attention is mainly paid to the collective places such as entrance halls, living room/space and circulation areas such as corridors and staircases. In this study, the major functional spaces of the house layouts are investigated in **four categories**: the entrance hall (E), the living area (L), circulation (C) such as corridors and staircases, and the intimacy areas (I) such as bedrooms and bathrooms. This functional zoning is then discussed according to public-private area relations and the patterns of day-night usage of the layouts.

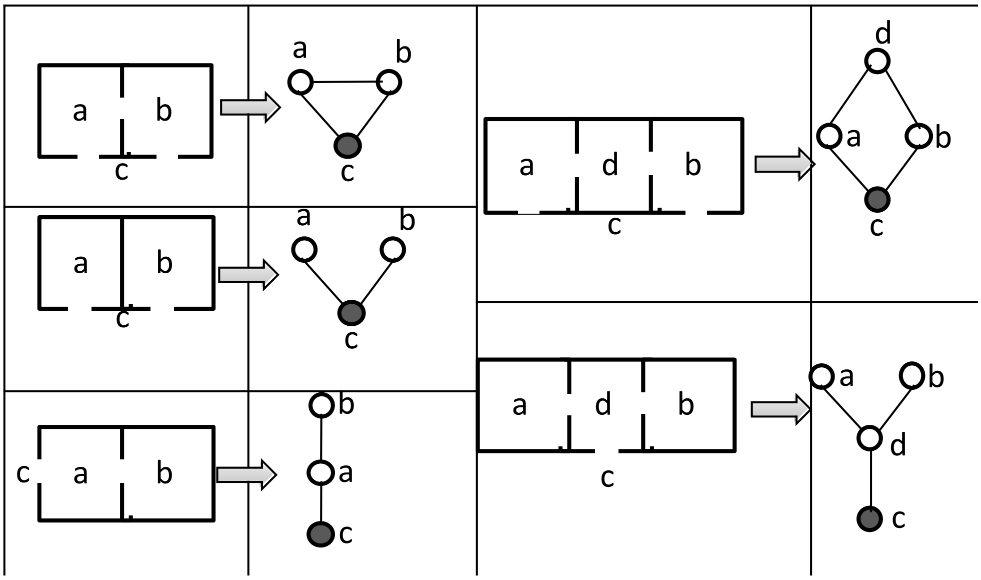
Typo-morphological analysis of the house plans also employs a limited number of concepts from space syntax theory, which will be explained in detail below. All the characteristics of building plans that are examined in this study through space syntax are actually incorporated into typo-morphology. However, the presentations in space syntax are clearer.

Space syntax is a well-acknowledged configurational approach to urban morphology that experimentally reveals the social and cultural meaning of an architectural space by the analytical representation of the geometry of that space (Kropf, 2009; Peponis, 1997; Hillier et al., 1987; Jiang et al., 2000; Ferdous, 2012), which is also the concern of typo-morphology. Space syntax is a popular spatial analysis method that has become increasingly well integrated with other approaches (Hillier, 2007), and recently it has become a useful analysis tool in typo-morphological studies (e.g. Serra et al., 2013; Nophaket & Fuiji, 2004; Berhauser Pont & Haupt, 2005). It looks at the physical space similarly to the ways that typo-morphological studies do. It also similarly investigates the link between human behaviour and physical space on a configurational basis and focuses on the social aspect of its formation process (Bafna, 2003). Moreover, space syntax theory can be applied from the smallest spatial structural space within a building to the urban space (Marshall, 2005). However, space syntax expands its analysis in space rather than in time and explains how the individual elements of the built environment are aggregated together to create neighbourhoods and cities, while urban morphology looks at the development processes of these individual elements over time, (Berghauser Pont & Marcus, 2015). Additionally, the theoretical basis of the space syntax is established depending on how space facilitates the movement (Kropf, 2009). Moreover, the logic behind the space syntax is the topological relations between the spaces within the same system of setting. It is claimed that the theory looks at the topological relations to eliminate the geometrical differences, which are "*sociologically irrelevant*" (Bafna, 2003, p.19). However, the geometrical differences are often important in typo-morphology, which are essential to make the cases comparable through their spatial characteristics. As Bafna (2003, p.19) states, space syntax approach provides "*a broader typological category*" which enable the categorisation of distinct places. For the above reasons, space syntax can be useful in assisting typo-morphological analysis but cannot replace it.

The reason for using space syntax at the building scale is therefore for the visual representation of the plan configurations of the functional layouts. The visual representation involves the **justified permeability graphs (j-graphs)** showing topological relationships between different functional areas and **VGA (Visibility Graph Analysis)** showing the integration and connectivity within the layout. In addition, **convex maps** are created in Depthmap software to compute **mean depth**, **integration** and **connectivity** values of each case. The following will explain these space syntax-related concepts.

- **Justified Permeability Graphs (j-graphs)**

Justified permeability graph analysis is "*the primary form of space syntax analysis*" providing a structural diagram that maps the interior layout from the external entry point (Dovey, 1999, p.21). The produced diagram only represents the configurational relations between spaces, not the actual layout, and shows the number of steps through which the whole layout is accessible and the depth of each room from the location chosen as a carrier point. Figure 5.4 shows how the space configurations are translated into j-graphs. The representation reveals some topological characteristics (e.g. depth and linearity) of space, which are examined through the appearance of the graphs, such as linear structure, connected structure, fan structure and so on (Dovey, 1999).



* (c) is the entry point/the selected carrier point

Figure 5.4 The translation of the space organisation to permeability graphs (redrawn and adapted from Hillier & Hanson, 1984, pp.48-49)

This mapping technique helps us to identify the differences, between the areas even though they have the same number of spaces in the same order and organisation but differently connected and integrated. Moreover, the hierarchy between the public and private areas can be defined according to these maps. Through this method, the study of the structure of spatial types is approached from an etic and professional perspective, and the identified distinct spatial relations give clues regarding the social life (Robinson, 1994).

- **Visibility Graph Analysis (VGA)**

VGA analysis provides a way of describing the spatial configuration with regard to visual and spatial accessibility by performing eye- and knee-level analyses respectively (Turner et al., 2001). The visibility graphs of the house layouts are created through the Depthmap software, and the graphs indicate the locations in the house layouts directly and mutually visible from a chosen location within the system. In this research, the most connected and integrated area of the layout – which is mainly either an entrance hall or a living room – is chosen and the visibility of the layouts is investigated in order to understand the impact of different space configurations and accessibility patterns on the social function of the living space, in particular, privacy and social interaction. The analysis also shows how the public and private areas of the layouts are clustered and what locations offer multidirectional fields of view.

- **Convex Mapping**

It is a mapping method mainly used to map the spatial configuration of the building layouts (Bafna, 2003). The spatial configuration is represented as a partitioned space into "*the fattest possible convex spaces*" (Hillier & Hanson, 1984, p.97). The mapping process starts with the identification of the convex spaces in the house layout and continues until the entire layout is subdivided (Figure 5.5). This map is produced through Depthmap software to calculate certain spatial connection properties of the cases: depth, integration and connectivity. These terms and how they are calculated will be explained below briefly.

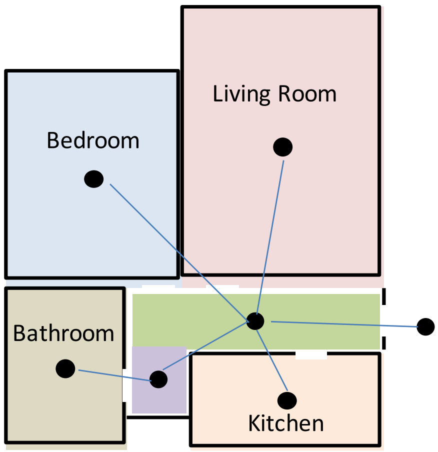


Figure 5.5 Convex mapping process (schematic representation)

- **Depth**

Depth or shallowness of a space is calculated through the number of steps from an external entry point (Jiang et al., 2000; Dovey, 1999). It can be simply measured by "*counting the intervening number of spaces between two spaces*" (Bafna, 2003, p.21). It is an independent variable, but it is important for the calculation of the integration value (Jiang et al., 2000). Depth is calculated by the following formulas:

$$\text{Total Depth of node } i = \sum_{j-1}^{n} d_{ij}$$

$$\text{Mean Depth of node } i = MDi = \frac{\sum_{j-1}^{n} d_{ij}}{n-1}$$

where MD_i is the Mean Depth, n is the number of nodes in whole system, and d_{ij} is the shortest topological distance between i and j points in the system (Jiang et al., 2000, p.164).

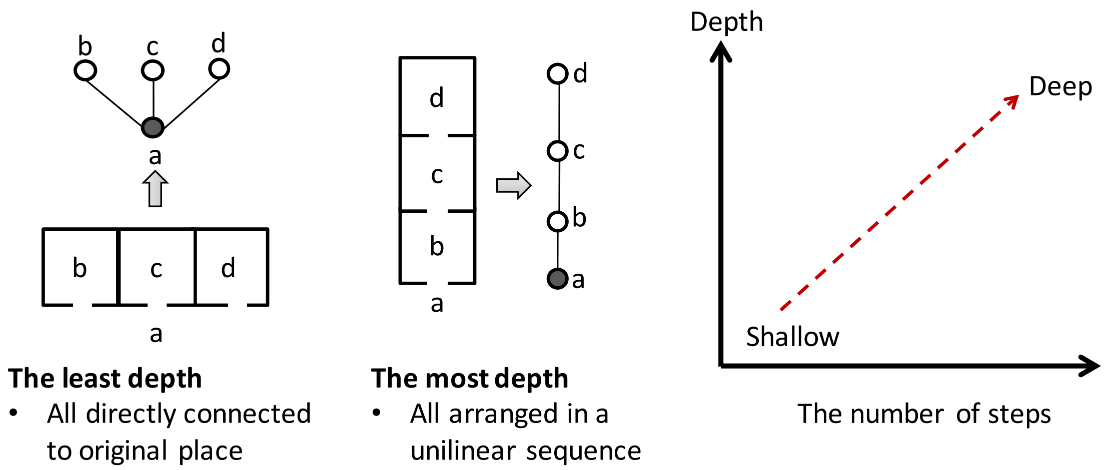


Figure 5.6 Depth and integration/relative asymmetry (adapted from Hillier & Hanson, 1984, pp.108-9)

Depending on the type of the spatial configuration, a house layout can have a fan shape, linear shape or ring shape j-graph. The linear structure is always the deepest compared to the fan or the ring, since one needs to cross all the spaces from one to another in order to start from the entry point to get to the deepest point of the system (Dovey, 1999, p.22) (Figure 5.6).

- **Integration (I)**

Integration is a measure of topological accessibility and is mainly associated with the notion of asymmetry, which is decided in relation to the depth (Figure 5.7). The measure of relative asymmetry (RA) compares how deep or shallow the system is, and it is calculated by the following formula (Hillier & Hanson, 1984):

$$RA = \frac{2(MD-1)}{k-2}$$

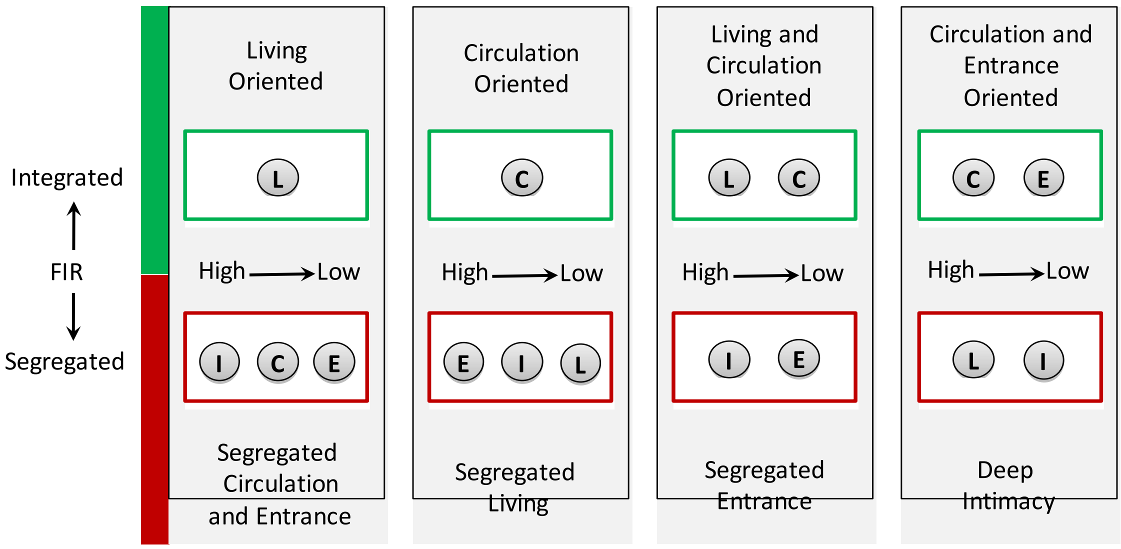
The formula gives an RA value between 0 and 1, where the low values indicate shallowness/high integration and high values indicate deepness/segregation (Hillier & Hanson, 1984, p.109). RA is "*also called relative mean depth*" since the mean depth is expressed "*as a fraction of the maximum possible range of depth values for any node in a graph with the same number of nodes as the system*" (Bafna, 2003, p.25). To allow comparison amongst systems with different numbers of nodes, RA values needs to be transformed to Real Relative Asymmetry value (RRA), which can be calculated by the following formula (Hillier & Hanson, 1984, pp.109-10):

$$RRA = \frac{RA}{D_k}$$

where D_k is the d-value of a system with k number of spaces. The d-value that provides "*the standardised values for the integration parameter*" is calculated by the following formula (Jiang et al., 2000, p.164):

$$D_k = 2\left\{k\left(lg_2^{((k+2)/3)-1}\right) + 1\right\} / \left[(k-1)(k-2)\right]$$

The values of RRA below 1 (between 0.4 and 0.6) mean that the system is strongly integrated, while segregation will be observed in the spaces where the RRA values are tending to 1 and above (Hillier & Hanson, 1984, p.113).



(L): Living room, **(I):** Intimacy areas such as bedrooms, bathrooms, toilets,
(E): Entrance, **(C):** Circulation areas such as entrance hall, corridors, staircases

Figure 5.7 Different house layout configurations according to the integration values (concept inspired by Tatsuya & Mayuko, 2014)

Following the procedure explained above, RRA values of all the function areas for all cases were calculated. The selected layouts were examined with respect to the functional integration (FIR) values of the different functional zones (FIR) (i.e. living room (L), intimacy areas (I), entrance (E) and circulation areas (C)). The concept is explained briefly in Figure 5.7.

- **Connectivity (C)**

The number of spaces that are accessible from a space gives the connectivity value of the original space. If a space is linked to many other spaces, it shows large connectivity. However, if the space has small connectivity, it means it is independent (Tatsuya & Mayuko, 2014). In this study, the measure of connectivity is recorded for each function area in the layout. The whole system connectivity is also calculated through the mean connectivity of the individual functional areas in the layout.

Overall, the building scale analysis is carried out mainly through space syntax-related concepts and values. However, the above-mentioned values are relevant to the intended typo-morphological analysis at the building scale. Initially, justified permeability graphs provide the basis for the configurational classifications of the chosen house layouts. VGA analysis gives clues regarding visual control over the layout. Convex mapping is just a procedure for the calculation of the values of depth, integration and connectivity. The comparisons of these values through the cases indicate the trends regarding how the most connected, integrated, deep, and controlled areas of the house layouts have changed over time.

b. Street Scale

The street, as a public space, is an important component of urban form and helps to establish a community's SoP. Barrie et al. (2010, p.3) also emphasise the importance of streets by defining them as "***places*** *before movement*". The way that a street's spatial components (such as its buildings, walkways, scale, shape and proportions, access points and patterns, and the hierarchy between public and private spaces) are designed can significantly affect how people experience the environment when walking down the street. It is therefore often believed that, where liveable street principles are applied and good street design is valued, the streets can contribute to its inhabitants having better QoL and help them achieve better SoP (Biddulph, 2012; Barrie et al., 2010). Given this, in this study, the street scale analysis does not intend to define the street type itself, since "*the street does not exist without the buildings that define it*" (Panerei et al., 2004, p.158). It rather looks at how spatial characteristics of house form along a residential street are coordinated. In that sense, the analysis defines the hierarchical relations between the above-mentioned street components. This study categorises such spatial features at the street scale analysis into three groups in relation to building arrangement, street properties and accessibility (Figure 5.8).

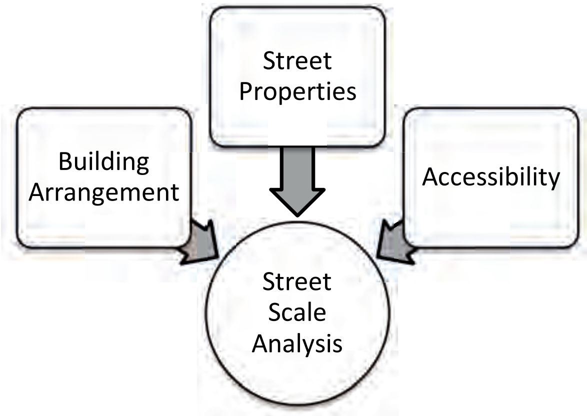


Figure 5.8 The extent of street scale analysis of this thesis (by the author)

In terms of the **building arrangement**, the street form can be examined with regard to how the buildings are positioned and relate to each other along a route, for instance, how buildings are arranged along a street, at regular or irregular intervals; whether building frontages are continuous along with the street or not; how the buildings define the street shape, whether buildings are slightly set back or not or a buffer zone created between the buildings and the street; and whether building types are similar or different in their shape, scale, size and proportion (Figure 5.9). The examination shows the relation between the street formation and the building arrangement, and it reveals whether the street formation is the result of the building arrangement or it is independently created for movement needs only.

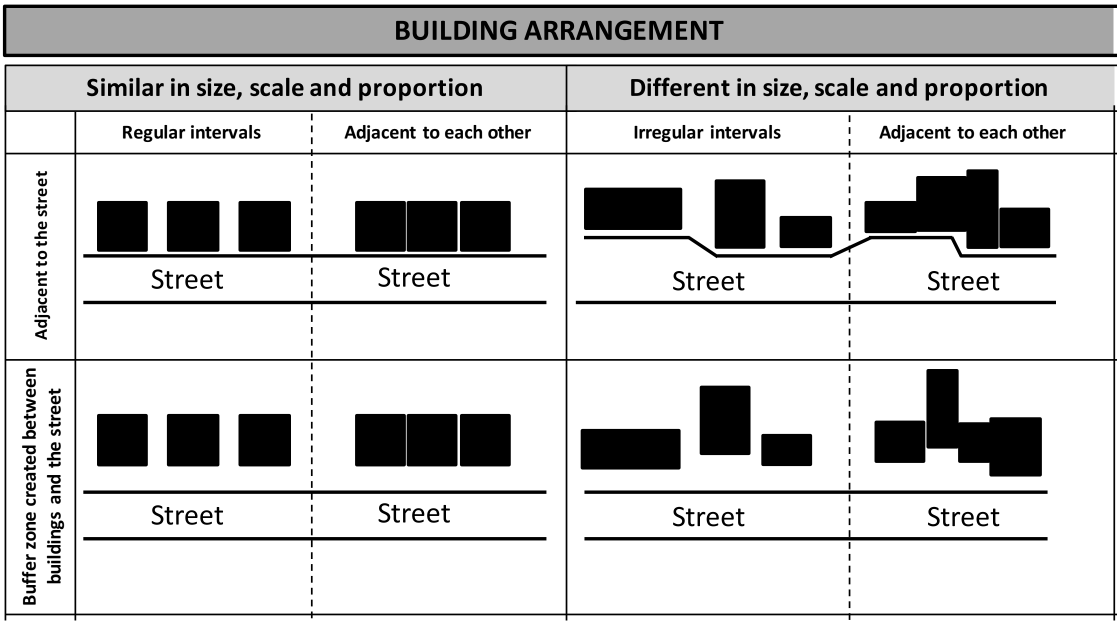


Figure 5.9 Building arrangement and street formation relations (indicative, not exhaustive)

With regard to the **street properties**, a residential street can be analysed in relation to its shape, width and length and its proportion to the height of the buildings arranged along it, for instance, whether the street width is continuously regular or bending, narrowing and varying; whether it is traffic-calmed/pedestrianised or not; whether any place is provided between streets and buildings for social interaction such as seating, play or standing by; building height to street width ratio and active front coverage (%) (Figure 5.10).

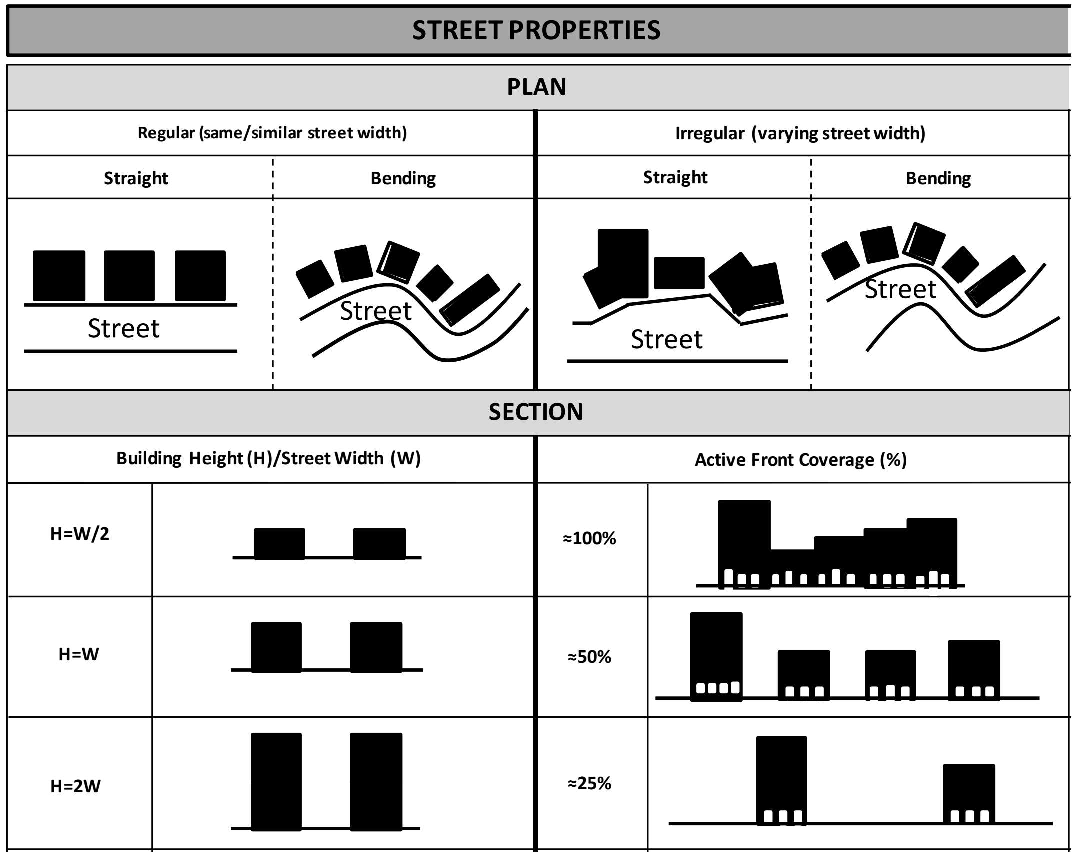


Figure 5.10 Street shape, width, building height and active front coverage relations (indicative, not exhaustive)

Accessibility can be analysed both spatially and visually. Spatial access is associated with movement and physical accessibility (Figure 5.11). For instance, depending on the form of the residential setting, street access can be limited to only the residents of a particular housing development and their guests. The physical access can also be controlled by the building entrance design in relation to the street. For instance, the access pattern is different in a side or back entrance than in an entrance facing the street. This concept is also closely related to how the access pattern is arranged from the public street to private building entrance. Public to private area access hierarchy controls the pedestrian permeability. Another concept that needs to be introduced here is that the direction changes. The directional distance is measured by the minimum number of turns from an assigned point (the closest public street) to another point (the building entrance) in the street network system (Peponis et al., 2008). Although this measurement is not based on the metric measurement, it is an important parameter by which to evaluate the street connectivity (Ozbil et al., 2011).

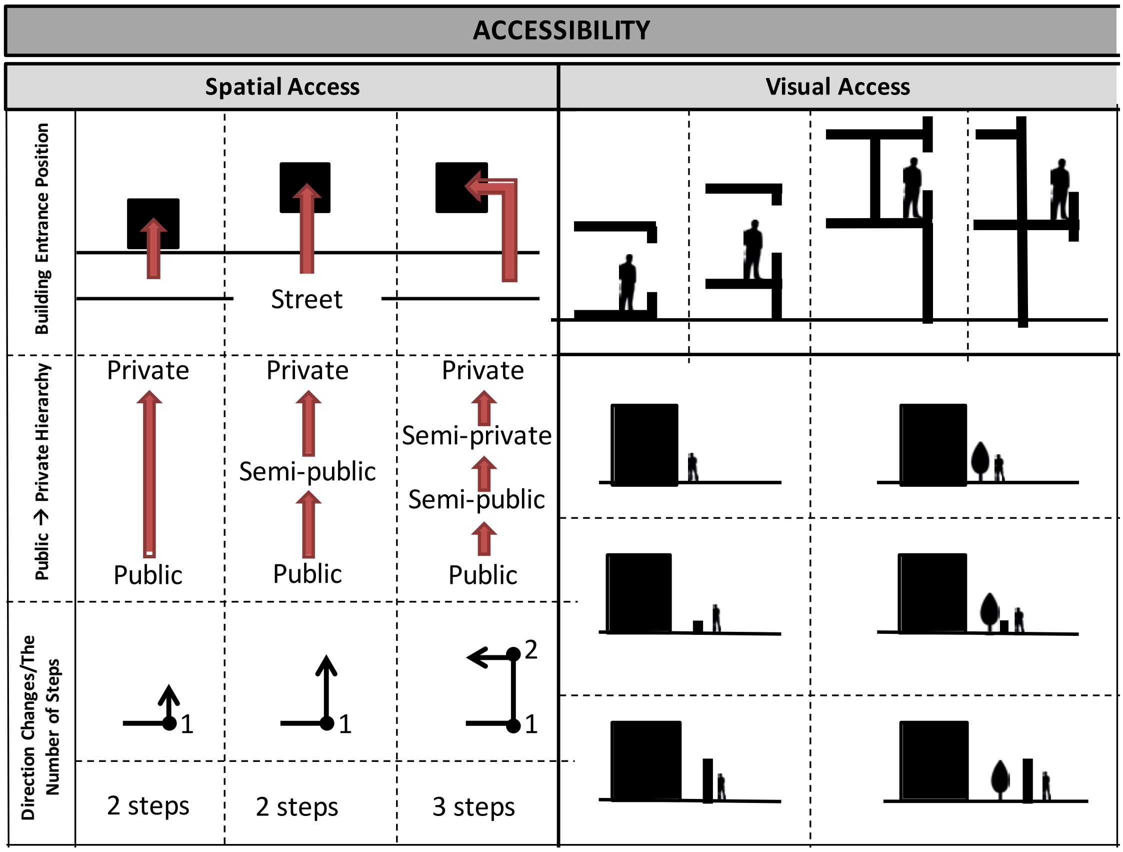


Figure 5.11 Accessibility features (indicative, not exhaustive)

On the other hand, visual access is concerned with the street controllability and the level of intimacy in both houses and the private open spaces. Some examples of the features affecting the level of control and interrupting or allowing visual access are balconies/windows overlooking streets, recessed buildings entrances, homes facing the street, the presence or absence of a buffer zone between the buildings and the street, low/high fences/hedges, greenery/tree intervals.

c. Neighbourhood Scale

The study of neighbourhoods, particularly residential neighbourhoods, varies to a great extent, for instance, in terms of its boundaries, size and scale. Thus, defining the boundaries of a neighbourhood has been long discussed and often considered as a practical obstacle (Coulton, 2012). Although a neighbourhood is simply defined as a basic building block of urban form, the ambiguity regarding what elements it consists of still remains (Song & Knaap, 2004). One methodological challenge this study needs to overcome is, therefore, to define the concept of neighbourhood.

Neighbourhood is both a social and territorial concept (Coulton et al., 2013). It can be defined socially by its users based on their perception or geographically according to the legal responsibilities of the relevant governmental departments. Having a sense of living in a neighbourhood depends on feeling a part of the community living in that neighbourhood. Therefore, even if the residents live in the same geographical neighbourhood, their perception of the neighbourhood might be different (Coulton et al., 2001). In that sense, neighbourhoods are not the areas that are fixed and constant in their boundaries. They involve not only physical but also social and psychological processes. This study focuses on the social definition, namely perceived neighbourhood, rather than the physical areas, the boundaries of which are designated at the governmental level. The scale of a neighbourhood is limited to the dwellings' immediate surroundings, where the localised social interaction is structured amongst the residents of a group of houses or a housing development.

Conzen's (1960) plan unit analysis involves the study of three elements: streets and their arrangement in a street system; plots and their aggregation in street blocks; and buildings and their block plans. The areas named as neighbourhoods in this study are urban blocks or plots, which are defined within Conzen's (1960, p.5) town-plan analysis as the areas partly or wholly surrounded but not occupied by street lines. Depending on the chosen housing typology, they are either neighbourhoods consisting of a series of plots contiguously placed along a same street line or single land parcels where a group of buildings are arranged with unclear plot boundaries. In this extent, the largest-scale spatial analysis in this study is at the Conzen's street-block/plot scale. The analysis of the street block or the plot patterns independently from the town-plan analysis, which also involves places at larger scales, refers to plot-pattern analysis or block-plan analysis of the buildings in the neighbourhoods (Conzen, 1960). The latter is loosely referred to as building in town-plan analysis; however, the block plan of a building is defined by the building's footprint on the ground (Conzen, 1960). In a general sense, the neighbourhood in this study is an urban tissue defined through the arrangements of streets and plot series and the building arrangements within the chosen street blocks, and its different types are identified according to their position, outline and arrangement (see Kropf 1998) (Figure 5.12).

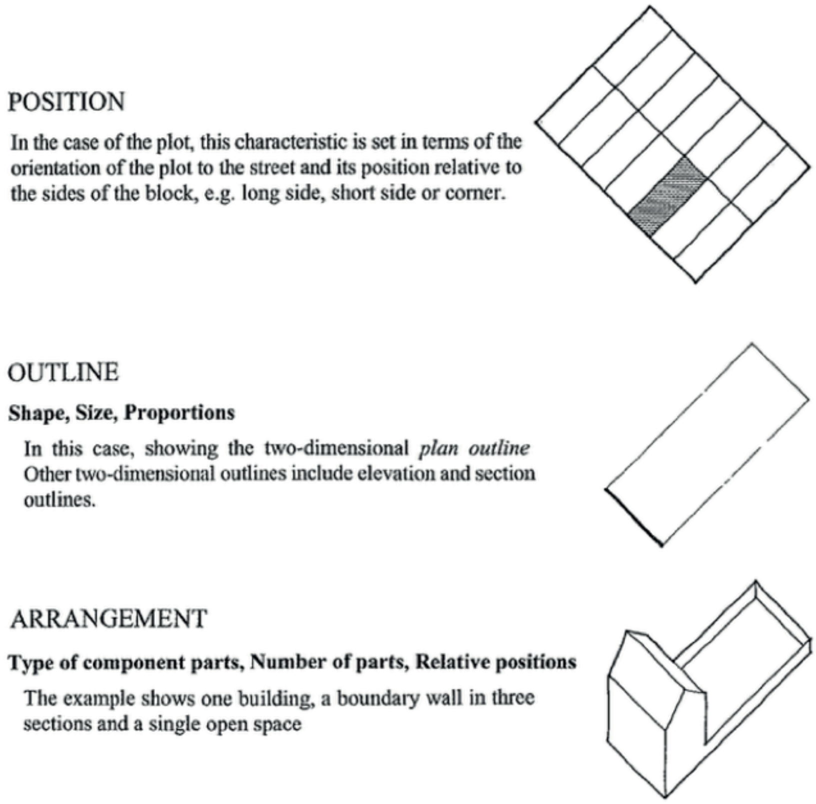


Figure 5.12 Characteristics used in identifying types (Kropf, 1998, p.132)

Figure-ground mapping is the most common method of configuration analysis that helps to identify the neighbourhood patterns (Biddulph, 2007). It provides a fuller picture of neighbourhood type in relation to density, land coverage, street network and street connectivity. In this regard, density measures (land coverage, building height and spacing) and street network pattern (street hierarchy, street connectivity and public-private area relations) are the two main measures adopted in the study of spatial configuration at the neighbourhood scale because of their great potential to influence social relations. The following explains these measures in detail.

- **The Measures of Density**

There is a lack of clarity regarding the measurement of density since it can be interpreted from a variety of perspectives and quantified in various ways across different countries (Alexender et al., 1988; Churchman, 1999; Raman, 2010; Forsyth, 2003; Cheng, 2010; Richardson et al., 1998; Berghauser Pont & Haupt, 2009). However, it is a deeply rooted concept in urban planning and is frequently used to quantify entities such as buildings, people, houses, services or floor space in a given area (Berghauser Pont & Haupt, 2009; Raman, 2010). Density in this study refers to "*building density*" that "*has an intricate* *relationship with urban morphology*" (Cheng, 2010, p.9). Density is an important measure guiding the formation of the built environment with regard to different combinations of plot ratio and land coverage that create different urban forms (Cheng, 2010; Bergdoll & Williams, 1990). For instance, differences in land coverage and building arrangement can result in very different urban forms with the same density, which affects the inhabitants' perception differently (Rapoport, 1969b; Rapoport, 1969c; Cheng, 2010) (Figure 5.13).

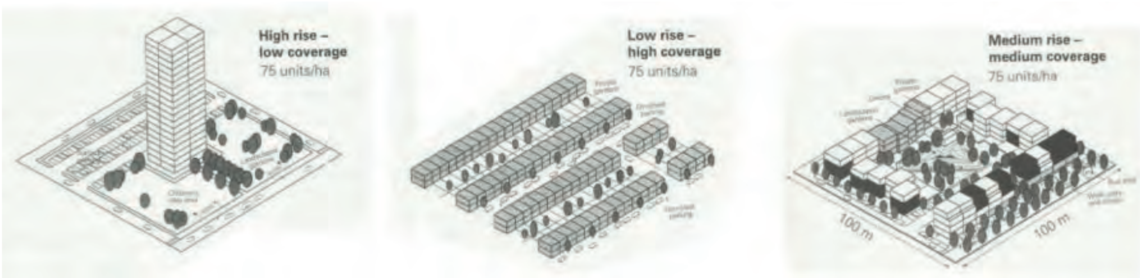


Figure 5.13 Housing developments with the same density but with different land coverage (Moughtin & Mertes, 2003, p.196)

According to Rapoport (1975, p.136), density is primarily associated with "*crowdedness*" in an area; however, it is also related to the "*perceived experience*" of the population living in that area. Therefore, it can be discussed both spatially and socially. Similarly, Cheng (2010, p.3) also argues that density is not a simple concept; it involves two main concepts: "*physical density*" and "*perceived density*". The spatial dimension of density can be discussed in relation to "*height, spacing between buildings, juxtaposition and the degree of enclosure*" (Rapoport, 1975, p.136). On the other hand, the social dimension or perceived density is associated with "*how spacing, physical elements, territorial boundaries, hierarchies, the size and nature of group, its homogeneity, rules for behaviour control the degree of social interaction*" (Rapoport, 1975, p.136). This second part is also directly related to the scope of this research because of its significant impact on SoP. Table 5.1 below presents some of the spatial characteristics of urban form that are claimed in the literature to affect the perceived density.

Table 5.1 Factors affecting perceived density at the neighbourhood scale (adapted from the review of Rapoport, 1975; Cheng, 2010; Zacharias & Stamps, 2004; Bonnes et al., 1991; Bergdoll & Williams, 1990; Cooper-Marcus & Sarkissian, 1988; Flachsbart, 1979; Robinson et al., 1975; Forsyth, 2003)

SPATIAL CHARACTERISTICS OF BUILT FORM AFFECTING PERCEIVED DENSITY	
Building height	Balance between built-up and vacant spaces
Building height to space ratio	Block length
Spacing between buildings	The number of street intersections
Space complexity	The number of buildings
Size of the buildings	The extent of building coverage
Variety in building façade	Building type/typology
Visual access to open and green space	Visual complexity
Street width	Building articulation

Although there is an ambiguity regarding the measurement of density across the studies, land coverage, building height and spaciousness are amongst the most common measures defining the density of urban form (Berghauser Pont & Haupt, 2009). Land coverage expresses the relationship between built and un-built areas and it is generally visually represented by figure-ground maps (Berghauser Pont & Haupt, 2009). The land coverage in a housing development is measured by the following formula:

$$Land\ Coverage = \frac{Building/s\ Footprint\ Area}{Site\ Area}$$

where *site area* refers to the total lot area of the housing development (Forsyth, 2003; Cheng, 2010). The inverse measure of the site coverage represents the open space ratio (Cheng, 2010, p.6), which allows the housing site to be evaluated in terms of "*the amount of open space left on the [housing] site*" (Forsyth, 2003, p.6). 'Site' in this research – depending on the differences in housing typology and their different formation at the neighbourhood level – might refer to a parcel/plot or a block. The calculation therefore can be performed according to either the area of one single dwelling located in a plot, the boundaries of which are known, or the total area of a group of housing buildings located in a block where the parcel boundaries of each building are not clear.

Land coverage alone, however, is not adequate to read the neighbourhood form since the amount of open space left over might vary depending on the heights of the buildings (Berghauser Pont & Haupt, 2009). For instance, low-, medium- and high-rise housing developments can be designed with the same population density, but different land coverage and open space design. Building height is an important factor affecting the perceived density (Rapoport, 1975; Cheng, 2010; Zacharias & Stamps, 2004; Bonnes et al., 1991; Bergdoll & Williams, 1990). However, it is alone not enough to explain the urban density since it is also necessary to differentiate between different urban forms depending on the how the spacing between them is distributed (evenly distributed over the area or buildings surrounding large open areas) (Berghauser Pont & Haupt, 2009) (Figure 5.14). The spacing between buildings is therefore another important measure that is relevant to both perceived density and urban morphology. Spacing also involves measures such as side-to-side distance and back-to-back distances between buildings depending on the housing typology.

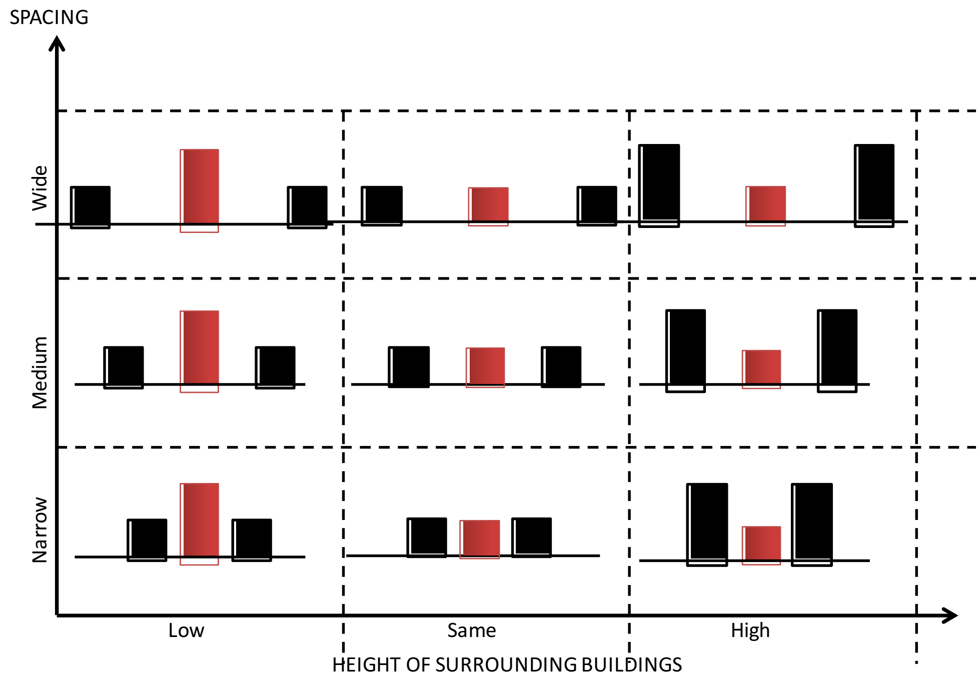


Figure 5.14 Spaciousness' relation with the height of the surrounding buildings (indicative, not exhaustive)

- **Street Network/Pattern/Hierarchy**

Streets are the important design elements of urban form that help us to understand the movement patterns. Their different configurations, hierarchies and connectedness create distinct neighbourhoods. Although there are many terms used interchangeably, such as street, route, path, highway (Moughtin & Mertes, 2003, p.129), in this research, streets are only residential and can be the areas facilitating people's movement both as pedestrians and in vehicles. Therefore, streets can refer to either streets with/without pedestrian sidewalks or a path/a route utilised only for pedestrian access.

Composition and configuration are the two key concepts enabling a simplified understanding of the street layouts (Marshall, 2005). While the composition is the geometric layout of the street network with "*its absolute position, lengths, areas and orientation*", the configuration is an abstract schema showing the connections, relative positions and adjacency (Marshall, 2005) (Figure 5.15). The configuration mapping is more useful in this research content since it will help in the translation of the traditional street layout, which is mainly manifested by broken and curvilinear streets, to straight lines so that its configuration can be compared to the modern street patterns.

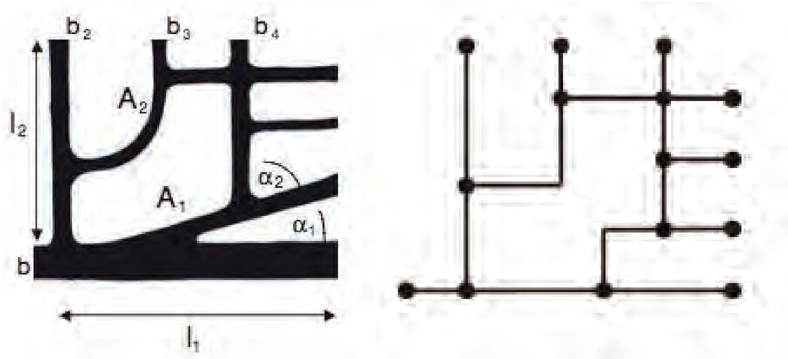


Figure 5.15 Composition (left) and configuration (right) (Marshall, 2005, p.86)

Street configuration could be explained further with the hierarchy defined between the public and private areas. There are four different degrees of public-private spaces, the different configurations of which create different living environments: "*public, semi-public, semi-private and private spaces"* (Biddulph, 2007, p.44). Street layout is created between these areas of different privacy levels. Access patterns from a public zone to a private housing unit can follow different street hierarchies, which will present different social values. The spatial sequence from public to private areas and the way that the streets were brought together and connected to each other affect how people experience their living environment. Ferwati (2010) also argues that changes in street connectivity and design cause simultaneous social changes.

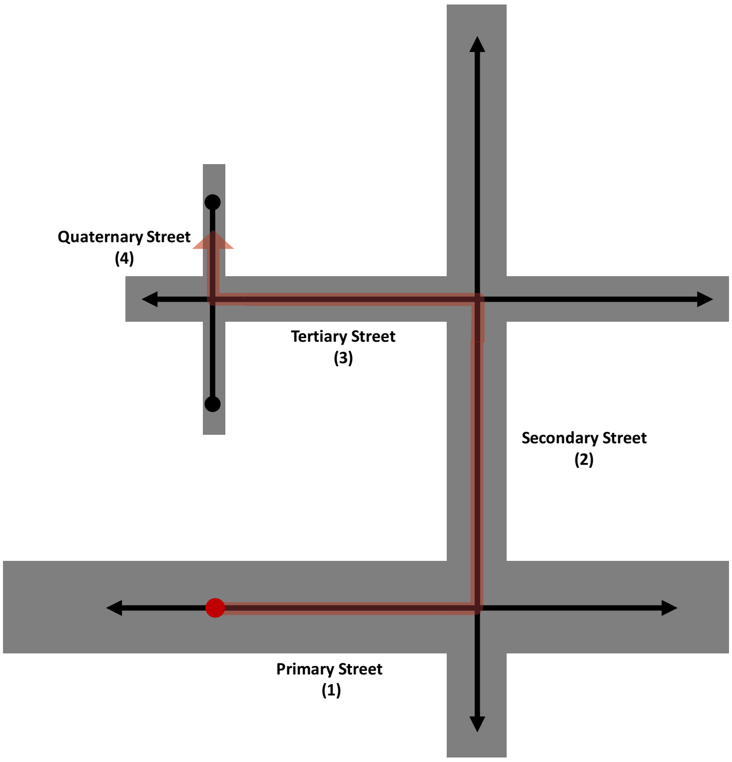


Figure 5.16 Street hierarchy

Figure 5.16 shows the street hierarchy starting from the main public street (primary) and leading to the streets becoming more and more local and private, namely secondary, tertiary and quaternary streets. The type of streets providing accesses to the housing sites affects privacy and social interaction both inside and outside the houses. Memken (1997, p.76) also states that "*[h]ow one enters and exits the home will have a direct impact on how the spaces are arranged in the housing unit. Entryways should be easily accessible for household members and their guests, but they should be secure and serve as a buffer between the exterior and the rest of the house*". Given this, the access hierarchy provided from public streets to the private ones can act as a buffer zone between house interiors and exteriors, and the design of this transition affects the degree of social interaction and privacy.

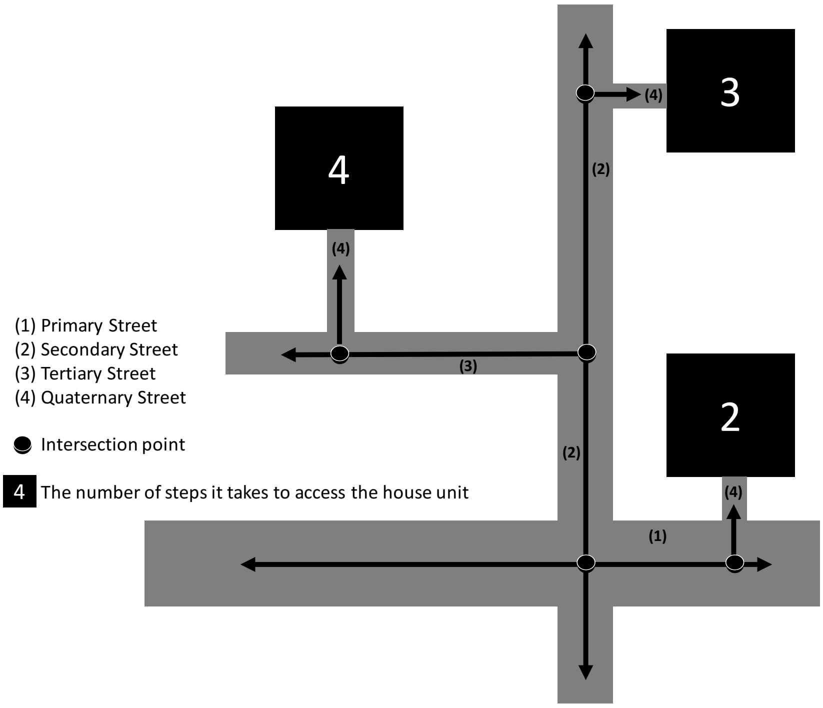


Figure 5.17 Street connectivity and the relatedness

Street connectivity is another important parameter for the morphological analysis at the neighbourhood scale. It plays a determining role on the personal and societal relations, in particular, pedestrian activity (Stangl, 2012). It is mainly associated with "*relatedness*" (Peponis et al., 2008, p.881). The configuration mapping of the street network within the borders of a given housing development is analysed further regarding its connectivity. The perceived distance between two spaces is visually shown by a single line and the directional distance between two lines is measured according to how many intersecting streets exist. From a starting or a carrier point to the arrival point, every intersecting street line adds one more level to this directional distance (Peponis et al., 2008). Figure 5.17 illustrates the different access patterns to the housing units with regard to the street hierarchy. This concept can also be explained by the depth or the number of turns, since it is a perceived distance rather than an actual one (Bafna, 2003).

5.1.2. Defining Typological Process

Typological process is identified based on the systematic analysis of two concepts: the defined morphological phases over time and the spatial types defined at the relevant place scales. The morphological periods, as mentioned earlier, are identified through the changes in social, cultural, political, environmental or economic factors that are in effect in the emergence of a type representing the design concept in a given period and a given location. On the other hand, the types are defined according to how their spatial components aggregate to each other and define a whole at the relevant place scale. The spatial features, the different composition of which creates different spatial types at the building, street and neighbourhood scales, have already been explained in detail in Section 5.1.1 and are summarised in Figure 5.18.

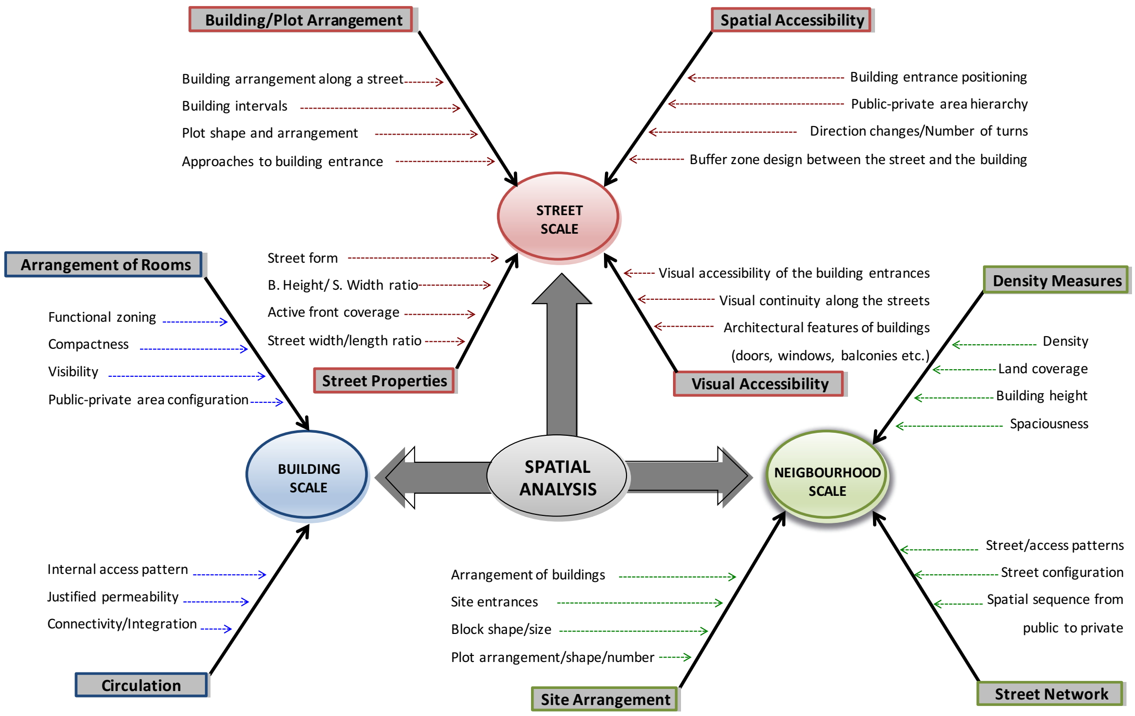


Figure 5.18 Spatial analysis to define spatial types at the three scales

The analysis of a typological process requires the identification of the transformational relations between the chosen spatial types over time. The types can be synchronic or diachronic (Caniggia & Maffei, 2001). The first one refers to types whose production decreases over a period and which remain strictly related to the period they were introduced, while the latter undergo a series of progressive changes for a significant period of time (Marzot, 2001). In this regard, some types can be observed at different places in one certain period whilst some others can survive over consecutive periods of time in the same place (Chen & Thwaites, 2013). The typological process is relevant to the latter concept where the modified type evolves by keeping the essential characteristics of the previous type. It represents "*the progressive relation of a series of types at a certain scale*" (Chen & Thwaites, 2013, p.74). In brief, the analysis of typological process is performed at three basic steps (Moudon, 1994, p.305 cited in Caliskan, 2009, p.45):

1) The scale at which the analysis is conducted is chosen: the building, the parcels, the city block or the group of blocks,
2) The main criteria of the typological frame, which define the basic characteristics of the original type, are selected: volume, function, density, architectural style, etc.
3) One type is related to the others to generate a typology.

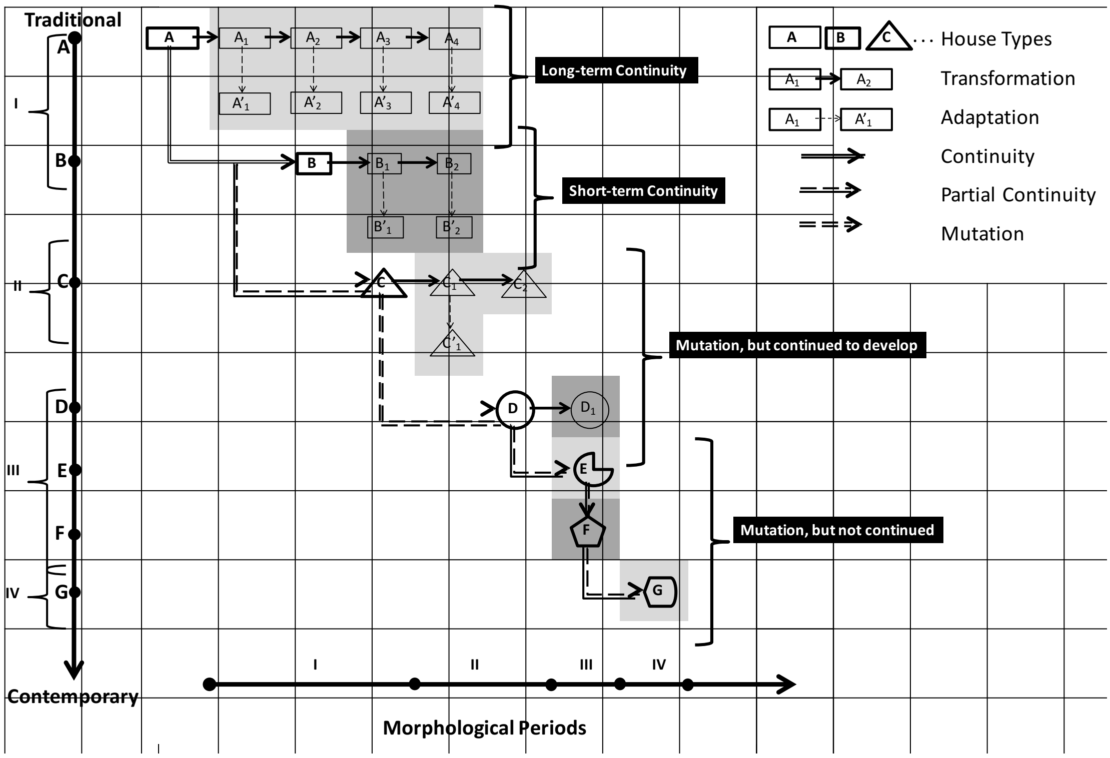


Figure 5.19 Defining typological process

In this research, the typological process is explained by a series of house types, the characteristics of which are adapted from one and the other during their evolution so that the process of adaptation can be traced through time. However, "*[o]bviously typological process cannot always be observed throughout time: when a mutation occurred to a type, the typological process stopped. It is possible that a typological process starts again, and contemporary types have certain connections with previous types*" (Chen & Thwaites, 2013, p.74). Therefore, this continuous change can be at different levels and depicts changes representing continuity and slight/moderate/extreme changes or mutations. The degree of change is examined through the similarities and differences of the newly introduced house types to the previously introduced house types. Special attention is paid to whether the house types have followed a typological process or not and, if they have not, where this process has stopped and the mutation has occurred. Figure 5.19 above conceptually represents these changes.

Following this examination, this study identifies three types of transformation between the house types chosen as case studies: continuity, partial continuity and mutation. The relation between the cases is defined as **continuity** where all or most of the spatial characteristics continued in the following case. Partial continuity refers to the cases that have gone through partial changes but some characteristics have continued or partly continued. Where all or most of the spatial characteristics have mutated in the following case, the transformation is defined as a **mutation**.

5.2. Sense of Place Assessment

The understanding of urban design measures from secondary sources is often criticised and therefore it is suggested that the data has to be *"collected through field observation or interviews*" (Clifton et al., 2008, p.34). Satisfaction with the urban environment is thus generally measured through the assessment of its subjective evaluation by "*using surveys of residents' perceptions, evaluations and satisfaction with urban living"* (McCrea et al., 2006, p.79). Given this, this research adopts the interview method to assess SoP, which is the subjective indicator of satisfaction with the living environment.

As seen in Figure 5.20, the assessment first requires a review of the SoP literature regarding SoP definitions, its measurement and the proposed SoP models and indicators (see Section 3.2). As a result of this review, both social and physical factors affecting SoP and the SoP indicators are determined. This theoretical foundation is then used to design interview questions. The interview assesses SoP through the 10-dimensional, multi-conceptual SoP model proposed earlier in Chapter 3. This research has chosen to quantify the assessment by conducting highly structured interviews with a fixed format for all interviewees and analyse the survey data through the SPSS statistical tool. This is to provide a well-tested empirical assessment of SoP and to collect comparable data from a number of people on such a subjective concept as SoP. The following section will provide the details for the application of the interview method for the intended SoP assessment regarding survey method, interview design, the interview items, rating, sample size, participant profile, interview delivery, data collection and statistical data analysis.

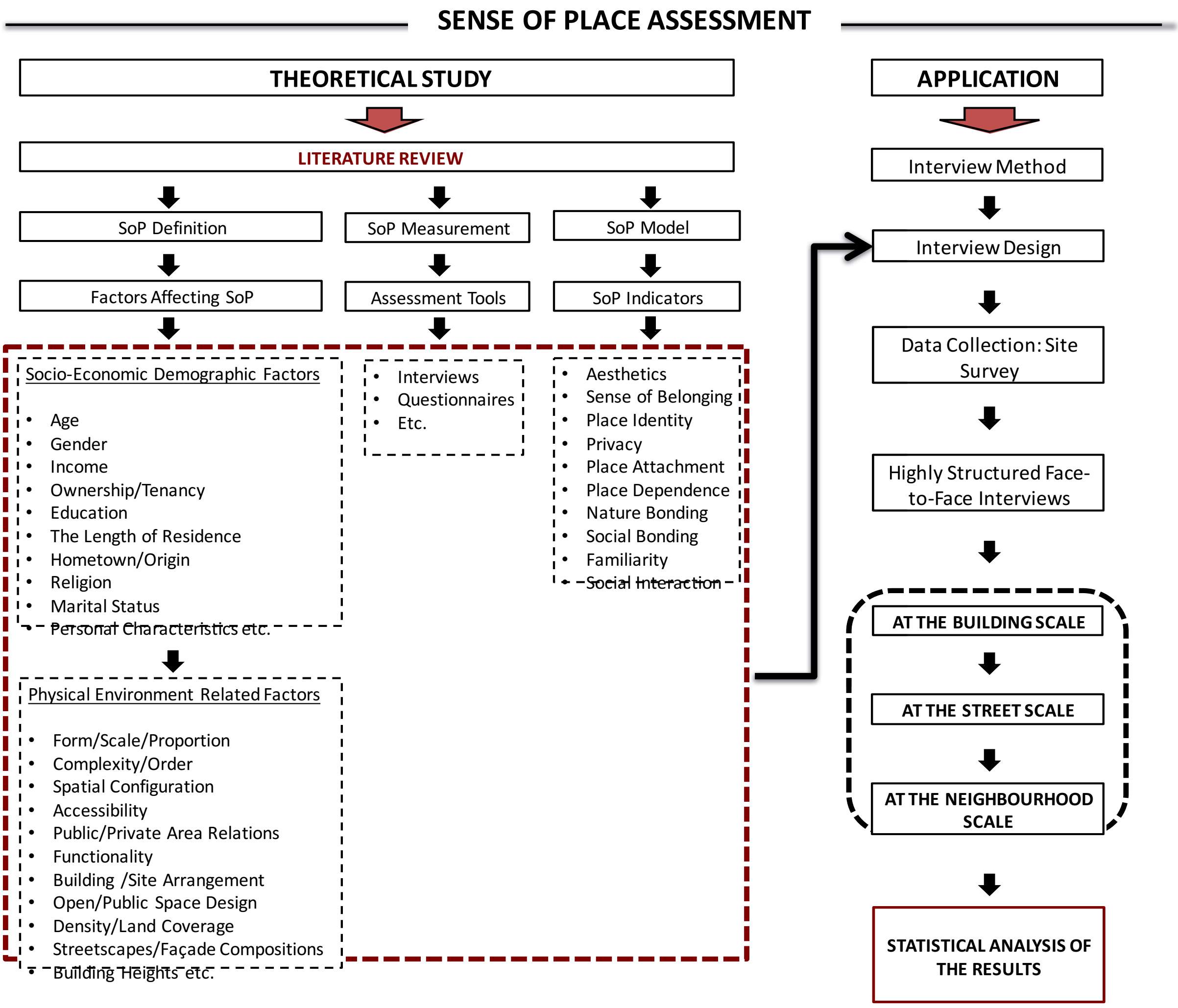


Figure 5.20 Sense of place assessment

5.2.1. The Survey Method

Structured, fixed-format, face-to-face interviews, where all questions are asked to the participants in the same order, were conducted for the SoP assessment rather than using a self-administered questionnaire. This is for a number of reasons.

For example, in the latter type, it is difficult to trust the respondents' answers since it is not easy to ensure that they will reply to the questions honestly or interpret the questions in the same way as others interpret them (Adams & Cox, 2008; UOS, 2014; Milne, 1998). Moreover, the interviewer would not be able to provide explanations to the interviewees, and hence the quality of the responses could be arguable (Tourangeau

& Plewes, 2013). It is therefore believed that, when a skilled interviewer directs the interviews, the collected data will be more reliable with regard to the quality of the responses. This is also a strategic approach in dealing with subjective concepts like SoP.

This preference is also concerned with the participant profile. It is believed that the ordinary questionnaire method might be reliable as long as the questionnaire is completed by highly educated people (Cargan, 2007). However, in this research, the respondents are members of the general public with different educational and professional backgrounds rather than particular professionals, architects or planners. Moreover, the questions were too complex for a questionnaire survey. For these reasons, this study also avoids asking open-ended questions and focuses more on the precision and reliability of the answers, which it is believed can be obtained through closed-ended questions. Although the adopted structured interview method prevents the interviewees from answering the questions flexibly and thus lacks detail, it is a straightforward way to quantify the responses, and then the reliability of the scores can be tested (McLeod, 2014).

Furthermore, achieving a satisfactory response rate might be more challenging if using self-administrated questionnaires, whereas, in face-to-face interviews, the researcher can rationally approach the potential participants and achieve the intended number of interviews in a shorter period rather than waiting for the required number of questionnaires to be returned (see Duffy et al. 2005; Szolnoki & Hoffmann 2013).

This research sought for consensus among members of the households on their responses to the interview questions. Thus, the influence of personal status on SoP was minimised. In this regard, household consensus is another reason to use structured interviews rather than a questionnaire. In this way, the members of a family could agree on one single answer for each question as a result of their discussions with each other.

Finally, the interview statements were translated into Turkish. The translation quality is particularly important in the research (Zavala-Rojas, 2014). Given this, conducting fixed-format, highly structured interviews is a way of sustaining the quality of the translation of the survey instruments and the measurement at the same level for all interview participants.

5.2.2. The Interview Design

The interview has three structured sections: Section I, Section II and Section III (Figure 5.21). **Section I** asks about the general household information such as age, gender, education, income, ownership status, hometown and the length of residence. The data collected from this section is used to test the impact of demographic variables on SoP.

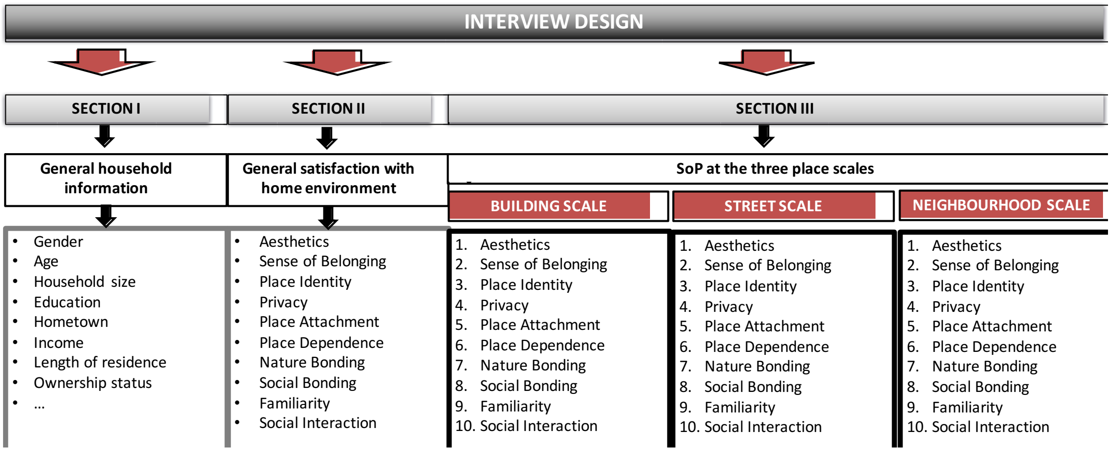


Figure 5.21 Interview structure

Section II asks about the overall view on each of the 10 indicators regardless of place scales. This section firstly provides the interviewees with a general introduction to SoP. Secondly, the results from this section are used to check the consistency of the results generated from **Section III**, which also focuses on the same 10 indicators, but with detailed questions per indicator. Moreover, Section III was specifically designed according to the scale dimension of the typo-morphological analysis and aimed to assess the SoP in detail at the three place scales: building, street, and neighbourhood. This section consists of 155 items in total, the distribution of which is shown in Table 5.2.

Table 5.2 The number of items per indicator and per place scale in Section III

INDICATORS	BUILDING SCALE	STREET SCALE	NEIGHBOURHOOD SCALE	TOTAL
Aesthetic Quality	3	13	7	23
Sense of Belonging	3	4	4	11
Privacy	11	8	11	30
Place Attachment	5	5	5	15
Place Identity	4	4	4	12
Place Dependence	5	5	4	14
Nature Bonding	6	5	3	14
Social Bonding	5	8	5	18
Familiarity	2	3	3	8
Social Interaction	4	3	3	10
TOTAL	**48**	**58**	**49**	**155**

5.2.3. Main Interview Items

The items in Section III of the interview were generated from a number of sources providing valid and reliable quantitative measures of residential satisfaction, place attachment, psychological wellbeing and life quality. Amongst these, the most established and comprehensive ones are PREQIs (Perceived Residential Environment Quality Indicators) and NAS (Neighbourhood Attachment Scale) introduced by Bonaiuto et al. (2003; 1999; Bonaiuto et al., 2015) and Place Attachment Instrument by William and Vaske (2003). These assessment tools have already been utilised and tested as in-depth semi-structured interviews in numerous studies (e.g. Bonaiuto et al., 1999; Bonaiuto et al., 2003; Bonaiuto et al., 2015; Sam et al., 2012; Mao et al., 2015; Fornara et al., 2010). Moreover, very similar content and statements have been proposed/applied by others to measure similar concepts (e.g. Kaltenborn, 1998; Kyle et al., 2004).

Similarly, this study also followed the same nature of these above-mentioned scales; however, the interview structure is specifically designed for this particular research, where the measurement of SoP strictly follows the measurements of the 10 indicators at the three scales. Therefore, only the relevant items were adopted from those scales. The ones outside the scope of this research – such as pollution, transportation, social-health services, cultural-recreational services, commercial services, and maintenance/care – were omitted. The relevant ones are grouped under the relevant SoP indicators at the three scales. Since the previously proposed scales were designed with regard to neighbourhoods, the statements were adjusted accordingly for the building and street scales where applicable. Additionally, the interview has been extended with the new items examining the potential impact of the spatial characteristics of the physical living environment. The full interview questions are presented in Appendix A.

The following will briefly review the definitions of the 10 indicators of SoP adopted for the assessment of SoP in this research. The definitions and the extent of these indicators presented below are mainly universal, although some of the indicators – in particular, privacy and social interaction – are more crucial for the Turkish culture. This is mainly due to Turkey's religious and historic background under the influence of Islam. In addition, aesthetic value, place identity, place dependence (functionality) and nature bonding are also specific to the culture because of the adopted architectural styles and late-nomadic origins of the Turkish society. However, Turkey has experienced significant cultural changes under the influence of modernisation and Westernisation processes of the Ottoman Empire since the early twentieth century. During that period, German rationalism was influential; then the international style became widespread from the 1950s (Yucel, 1991). Yucel (1991) claims that currently Turkey's ideological position is strongly established, Western oriented and following the modernisation trend. Thus, the universal definitions of most of the indicators are also relevant in the Turkish housing context and the Turkish lifestyle.

a. Aesthetic Quality

Aesthetic quality can be defined as the "*presence of attractions and comfort as well as the absence of physical disorder"* (Browson et al., 2009, p.100). It deeply depends on people's tastes, experiences and feelings; therefore, the way of its understanding is mainly subjectivist. The objectivistic way of thinking about aesthetics is through visually organised features, such as colour, line, matter and mass (Sandaker, 2008). Therefore, the tangible source of people's aesthetic experiences is the visual appearance of the built environment. During interaction with the physical environment, people develop evaluative responses against its key visual attributes such as building density, scale and type (Lopez, 2010). For instance, people might find a building or a street façade poor and aesthetically not pleasing, if the façade's composition is flat and not visually interesting (Gjerde & Vale, 2015). These types of evaluations and experiences help people better understand their living environment and find it beautiful by prioritising their aesthetic needs.

Given this, the residents have been asked whether they find the style, form and details of their houses pleasing or not; whether they are oppressed by the buildings nearby regarding their height, width, proximity between them, scale and proportions; whether the openings are well-balanced; whether the buildings are harmonious regarding their forms, styles and details along their streets and in neighbourhoods. Although aesthetic recognition and response to the beauty can be personal and cross-cultural, aesthetic evaluation is mainly culturally relative and therefore, a group of people of the same culture can value the aesthetics in a similar way (Sharman, 1997). In this sense, the evaluation of the aesthetic quality through the questions asked in this study reflects the cultural aesthetics of Turkish people.

b. *Sense of Belonging*

Sense of belonging can be defined differently from different perspectives such as physical, spiritual, sociological or psychological perspectives (Smith, 2011, p.48) (Figure 5.22). It can be associated with place appropriation (Pinet, 1988) or place specificity (Grubbauer, 2011). Although the literature is still vague regarding its definition, numerous scholars and theorists (e.g. Maslow, 1954; Smith, 2011) agree that sense of belonging is a basic human need and contributes to human psychological wellbeing, QoL, residential satisfaction and SoP. Alternatively, in the housing context, sense of belonging can be considered as feeling at home. In this regard, Pinet (1988) argues that home is not simply a shelter, but also the symbolic expression of sense of belonging.

Physical	•The possession of objects, persons or places
Spiritual	•Metaphysical relationship with a place or being that exists at a universal level
Sociological	•One’s membership of a system or group
Psychological	•An internal affective or evaluative feeling or perception

Figure 5.22 Sense of belonging from different perspectives (adapted from Hagerthy et al 1992 cited in Smith, 2011, p.48)

Given this, the residents were asked whether they feel that they belong to their houses, streets and neighbourhoods or not; whether they have a peaceful life rhythm; whether they are satisfied with life; and whether they feel that they are a part of a community.

c. Privacy

It is widely believed that privacy is one of the psychological QoL factors and it has been considered as one of the measures of perceived QoL for a long time (Andrews & Withey, 1974). It can be defined as "*a dialectic and a process of choice and control of information… then an extreme position – being under the control of others – is not simply social isolation but feelings of powerlessness and possibly entrapment*" (Ahrentzen 1992, p.228). Although it is quite subjective, the designed physical setting regulates the level of privacy and plays a key role in obtaining the desired degree of privacy in terms of personal and social borders. Marcus (1992, p.92) also indicates that "*[s]pace is appropriated at such a time of life to claim a setting where privacy can be regulated; to look for nurturance in the natural world; to experience a sense of pride in the act of creating a place; and to imitate adult behaviour*". Therefore, the places where certain activities happen give an idea of the types of activities – which are either appropriate or inappropriate – to be accommodated (Shapiro 1998, p.275).

However, the evaluation of the degree of privacy also depends on whose privacy since privacy occurs at different scales, such as personal, family or household, and community scales (Pellow, 1992). Amongst these, it is believed that household privacy is more crucial than personal privacy since shared values are more appreciated regarding their contribution to the place meaning (Pellow, 1992). Ahrentzen (1992, p.116) also stresses its importance by stating that "*domestic privacy*" is the result of abstract institutionalisation of families. Given this, home is the most important physical entity regulating this privacy and plays an important role in the determination of privacy levels between private and public areas. Shapiro (1998) also indicates that to some extent home is a private space and any changes in its privacy level result in spontaneous changes in the borders of public and private areas. It is generally agreed that satisfaction with a place derives from its ability to "*permit control"* and provide "*opportunities for privacy*" (Low & Altman 1992, p.7). Thus, it is important to understand dynamics of privacy perceptions and behaviour through the investigation of house form and the contribution to the overall SoP.

Given this, the respondents were asked about their feelings about the potential of their physical home environment to regulate their desired sense of privacy at building, street and neighbourhood scales. The suggested items for the measurement included statements about public-private area relations, the spaces defined between buildings, openings, entrances, distances, positioning, size, scale and density, which are the main physical characteristics affecting the degree of privacy.

d. Place Attachment

Place attachment is defined as "*affective bonds between people and their surroundings*", (Tsaur et al., 2014, p.421) and the emotional attachment is formed according to the meaning given to that place through interaction (Milligan, 1998). It is a way of accelerating the process of sense of belonging (Inalhan & Finch, 2004). Low and Altman (1992) describe place as "*a repository of a variety of life experiences*" (p.10) and place attachment "*contributes to individual, group, and cultural self-definition and integrity*" (p.4). Therefore, Low and Altman (1992) also place considerable emphasis on the contribution of emotional attachment to a place to residents' identity. Accordingly, the knowledge gained through experiencing a place contributes to personal and community development. As a result, people obtain satisfaction from their life and establish a strong SoP towards their living environment.

Given this, the interview participants were asked about their desire to stay in their home environment at building, street and neighbourhood scales, with and without their families and neighbours, and whether they feel attached to their home environment.

e. Place Identity

Place identity refers to the symbolic meaning of a place conceptualised as feelings about and connections to the physical settings (Proshansky et al., 1983; Kyle et al., 2005; Raymond et al., 2010). It is one of the primary entities heavily affected by homogenisation of cultures and the fast-changing characteristics of cities caused by rapid transformation (Ozbek-Sonmez, 2012). Place identity is therefore critical in making cities socially and culturally sustainable (Chen & Thwaites, 2013). There is an interactive relation between place identity and an individual/community identity. *"Whether one is* *a long-time resident or a newcomer, spending time in a place creates memories and experiences, which become part of a person's individual and community identity"* (Cross, 2001). The capability of the physical setting to meet the inhabitants' personal preferences determines the level of life satisfaction and contributes to SoP.

Given this, the interview items regarding place identity mainly covered issues such as whether the place is the residents' personal preference; whether the residents feel the place as a part of them; whether the place reflects their identity or is identifiable at building, street and neighbourhood scales compared to any other place.

f. Place Dependence

Place dependence refers to the functionality of a place. The degree of place dependence is dependent on the ability of the physical settings to meet the activity needs (Stokols & Shumaker, 1981; Raymond et al., 2010). According to Hunt (2008, p.112), "*place dependence partly relates to the sustainability of other places for the place in question*". Given this, place dependency is the result of a comparison between the qualities of the owned in a place and the relatively comparable alternatives (Stokols & Shumaker, 1981; White et al., 2008). For this reason, "*place dependence is [are] viewed as a relational component[s] of choice and relates to the deeper needs*" (Mlozi et al., 2012, p.97). It can be therefore assumed that, if the residents have a high degree of place dependence to their homes, the physical setting in question is successful in meeting their life expectations and providing better SoP.

Given this, the residents were asked if they think their home environment is functional; whether it is the best place for what they would like to do; whether it is comparable to other places; whether it gives the desired level of satisfaction or not; and, finally, whether doing what they do in their home environment is more important than doing it any other place at the three scales.

g. Nature Bonding

Nature bonding has always been an important housing design element throughout history, particularly in the Turkish context. Today, it is still believed that connectedness to nature represents a link to the past and locality; what is more, it has become a desire to create liveable environments in the post-modern era (Uslu & Gokce 2010, p.2809). Moreover, this accordingly contributes to place attachment (Raymond et al. 2010, p.423). Although different forms of nature bonding have been introduced over time through the design of new house typologies, their contribution to user satisfaction is questionable.

In the interviews, with regard to nature bonding at the three place scales, the residents were asked whether they feel connected enough to nature or not; the time they spent in the garden/balcony/park; whether they are interested in nature-related activities; whether they prefer, bigger/smaller, private/communal garden/balcony, natural space or not; and whether they are happy with the green area/built-up area ratio, etc.

h. Social Bonding

Places bring families, friends, couples and children together; however, the social attachment that people develop to those places links them to each other. Social bonding is one of the distinct elements of place attachment (Raymond et al., 2010; Kyle et al., 2005; Low & Altman, 1992). Low and Altman (1992, p.6) also support that "*dyads, families, community members, and even whole cultures often consensually or collectively share attachments to places*". These attachments not only contribute to the place identity but also make residents derive satisfaction from life. The degree of satisfaction depends on whether meaningful social relationships have occurred. "*If meaningful social relationships occur and are maintained in specific settings, then it should also be likely that these settings share some of this meaning given that they provide the context for these relationships and shared experiences*" (Kyle et al., 2005, p.156). It is generally agreed that place is a social environment directing social attachments to people who live in that place (Hidalgo & Hernandez, 2001). Given this, it may be assumed that place is only a tool giving family, friends and neighbours the opportunity to reveal social bonds. Therefore, particularly in residential environments, both social dimension and physical dimension are equally important in evaluating residential satisfaction (Hidalgo & Hernandez, 2001). In this investigation, the role of physical components of the residential environment in developing social bonds (mainly family and friend bonds), which makes a house **home** and makes a district **neighbourhood,** is salient.

In this sense, the residents were asked about the contribution of the spatial organisation to family, friend and neighbour togetherness; the time that they spent together in communal spaces; the quality of public places with regard to creating opportunities for social interaction; the quality of social relationships; the impact of size/scale/proportion of the social space on social bonding; and the residents' awareness of the other people living around/neighbourhood, family and friend relations.

i. Familiarity

Familiarity mainly refers to the cultural bonding, because the physical environment is culturally inherited and the cultural continuity or cultural preferences will probably help identify the living areas and improve the life satisfaction of the residents. Finlay (1999, p.10-11) advocates that human culture is the main determinant of city formation regardless of time and scale, and adaptation of cities to new conditions is largely inherited. Culture "*is defined as the collective social values and belief, as well as popular lifestyles*" (Chen & Thwaites, 2013, p.14) and it is *"a contested term"* and *"a vital key to its [a distinctive way of life] understanding"* (Finlay 1999, p.30). Therefore, it is widely believed that *"culture can help deliver improved quality of life and local wellbeing"* (Mirza, 2005, cited in Galloway, 2006, p.324). Moreover, "*urban culture and urban life are significant parameters... of the process of social transformation and change*" (Ozaloglu, 2006, p.3) and give the environment its own peculiar identity. This also makes a significantly important contribution to place attachment by making residents feel belonging to their living area.

In this sense, the residents were asked how familiar their home environment is to them and if it has affected their preference to live in their current living environment. They were also asked how their feelings have changed regarding the familiarity of the living space over time and how satisfied they are with their cultural bonding.

j. Social Interaction

Social contact/interaction is one of the important factors contributing to SoP by leading "*satisfactions, subjective wellbeing and the quality of life*" (Ferriss (2006, p.117). Urban form is the physical environment formed by lived experiences, individual and collective memories, and spatial activities (Ozaloglu 2006; Lefebvre 1991 cited in Lotfi and Koohsari 2009). Moreover, according to Oktay (2001, cited in Uslu & Gokce, 2010), space is the most critical entity facilitating social interaction and therefore fostering social affiliation through its integrated design from a largest scale to the small housing unit. The interaction between space and human activity makes the space both physically and socially important. However, the degree of the interaction can easily affect the residents' satisfaction, and the frequency with which residents gather and the impact of this on people's satisfaction can be monitored by the design of the house units and the residential neighbourhood. For example, the effective use of spaces enriches the daily life and makes people feel a stronger sense of belonging to the physical environment. Therefore, social interaction is an important factor, which needs to be encouraged through the physical design to achieve an improved SoP.

Given this, the residents were asked their opinion on the contribution of the spatial organisation of their house, streets and neighbourhoods to their social interaction. They were also asked how satisfied they are with their relationships with other family members and neighbours.

5.2.4. Rating and the Evaluation Criteria

The interview items measuring the 10 dimensions of SoP are designed as a series of statements, with which the participants might agree or disagree. A multi-dimensional scale has been used for the delivery of this section where the subscales of different but related attributes of each SoP indicator are discussed rather than combining several similar questions brought together because of their close correlation to each other and constructing a single scale (See Shamai & Ilatov, 2005).

A Likert scale was used to rank each item. It is a very common method to measure attitude, where a range of responses are given against a series of statements (Cohen et al., 2000). In addition, it is frequently preferred in human-environment studies, in particular, place attachment and SoP studies, to measure attitude (e.g. Williams et al., 1992; Raymond et al., 2010; Arifwidodo & Chandrasiri, 2013; Tsaur et al., 2014) (Table 5.3). Different rating systems can be applied to the Likert scale, such as 5-point, 7-point, 10-point or more. In this research, since the sample size is small and also to avoid close differences and easily recognise increases and decreases in the satisfaction levels, 7-point Likert scale providing more descrimination compared to commonly used 5-point Likert scale has been chosen. Each item in the interview is rated based on a 7-point Likert scale (Johns, 2010).The categories of the response range from **strongly disagree** (1) to **strongly agree** (7).

The simplest way to calculate the satisfaction with life, in general, is to calculate the weighted sum of the satisfaction levels with the different domains of life (Pacione, 2003). However, what weight to give to any particular component is not clear, and there is also no authority to decide that weighting (Farquar, 1995). Given this, the responses given to the relevant items are aggregated to assess SoP indicators individually at the three scales. The individual satisfaction scores are calculated through the weighted sum of the scores obtained from the relevant questions, while the overall SoP at the three scales is calculated through the weighted sum of the overall scores calculated for each indicator at the relevant place scales. All scores are computed through the mean, equally weighted rating of all statements and the 10 indicators for each scale. Any rating beyond 6 is considered to be *very high*; between 5 and 6 *high*; between 4 and 5 *moderate*; and less than 4 is deemed to be *low*.

5.2.5. Appropriateness/Validity of the Measurement

In the assessment of any measure, it is important that the assessment is appropriate and meaningful for the intended purpose of the measurement. The validity is not associated with the measures themselves but how those measures serve the purpose (Jensen, 2003). The adopted assessment method is appropriate and valid for the following reasons.

First of all, interview is an effective way of gathering subjective data and is frequently used in the assessment of SoP, as seen in the works of Shamai (1991), Williams et al. (1992), Hay (1998a), Eisenhauer (2000), Williams (2009), Raymond et al. (2010), Deutsch et al. (2011), Arifwidodo and Chandrasiri (2013) and Tsaur et al. (2014) (Table 5.3). Some of these studies have preferred to use either questionnaires or interviews, while others combined the two methods. In addition, interviews can be structured with open- or closed-ended questions and/or Likert-scale items (e.g. Williams et al., 1992; Arifwidodo & Chandrasiri, 2013).

Table 5.3 Some examples of studies measuring sense of place

STUDY	AIM	METHOD	DETAIL
Williams (2009)	To measure the physical and emotional displacement: loss of SoP experienced by refugees	In-depth interviews	Open-ended discussion-based interview
Tsaur et al. (2014)	To test the relationship between recreationist-environment fit and place attachment	Interviews + Questionnaires	Face-to-face 5-point Likert scale
Shamai (1991)	To develop a scale for the measurement of SoP	Questionnaires + Interviews	-
Eisenhauer et al. (2000)	To investigate reasons why a place is considered to be special and meaningful and to identify types of connection people might have with places	Questionnaires	Open-ended questions Structured Not face-to-face Drop off-pick up method
Arifwidodo & Chandrasiri (2013)	To investigate the relationship between housing tenure, SoP and environmental management	Interviews	5-point Likert scale
Williams et al. (1992)	To test the reasons why people have emotional relationships to recreation places: place attachment or wilderness attachment	Interviews	5-point Likert scale
Raymond et al. (2010)	To establish a multi-dimensional mode for the measurement of place attachment	Questionnaires	Not face-to-face Distributed by post 5-point Likert scale
Hay (1998a)	To examine how SoP develops; how SoP varies cross-culturally among modern and indigenous peoples; and how it develops among various contexts (home and environs, family, community, and culture)	Questionnaires	-

Secondly, the interview items have already been developed from existing measures, which are well established, adopted and frequently used by many other researchers, as mentioned earlier in Section 5.2.3. Thirdly, the interview design, structure, questions and delivery methods have been discussed and tested before its implementation. The draft version of the interview was prepared during supervisory meetings; and the items were discussed one by one and revised to eliminate any potential misunderstanding from the respondents, whose educational levels vary. Expert views on the format of the interview were also sought. Prior to the main data collection, a test run was conducted and the comprehensiveness of the interview questions and their completion time were tested with five randomly chosen residents, and their feedback was taken in order to consider whether the statements were clear, comprehensive and in a logical order. Based on the participants' feedback, the interview questions were mainly appropriate, and only slight alterations were made regarding some of the wording.

Overall, the interview creates a strong basis for interpreting overall SoP and it is a reliable and valid method for the empirical assessment of SoP among different house groups.

5.2.6. Sample Size

According to Green and Thorogood (2004) and Strauss and Corbin (1990), sample sizes vary depending on the purpose of the study and can be affected by various factors based on research topics. In qualitative research, there is no consensus amongst the scholars regarding the calculation of sample size; therefore, it is suggested that the concept of saturation should be taken into consideration to determine the suitable sample size (Mason, 2010). "*The concept of saturation is helpful at the conceptual level*" (Guest et al., 2006, p.59). On the other hand, although there is a little guidance on the determination of the sample size with saturation (Guest et al., 2006), the most common sample sizes estimated according to saturation are 20 to 30 (Griffin & Hauser, 1993) and these are followed by 40, 10 and 25 (Mason, 2010). Irrespective of methodology, 15 is the smallest acceptable sample size for all qualitative research, and different factors are responsible for decreasing the sample size (Mason, 2010). The factors affecting the sample size in this research are as follows:

1. <u>The use of more than one method:</u> the outcome of this study is drawn from the combined results of the typo-morphological analysis and the SoP assessment through the interview method.
2. <u>A multiple case study approach:</u> multiple samples are tested within one study (seven different house types), each of which requires equal sampling.
3. <u>Particular participant profile:</u> the study does not aim to interview randomly chosen people but explicitly choose the residents of the particular house types.
4. <u>The in-depth nature of the interviews:</u> the interviews are in depth and consist of over 150 items to be discussed.

5. The number of interviewers: to maintain the quality and the standard of the responses, the author herself carried out all the interviews. Therefore, only one interview could be conducted at a time.
6. Time constraints: the allowed duration for the undertaken PhD programme was another reason for not to choose a high sample size. In addition, the above-mentioned factors were also influential, which have – directly or indirectly – an increasing effect on the time.

As a result of the purposive sampling according to the above-mentioned factors, this study determined to have 20 interviews for each of the seven different house developments. This is a number above 15 and is amongst the most popular sample size used in most PhD studies adopting the interview method.

5.2.7. Response Rate

The response rate is the percentage of the number of the valid/returned/completed surveys amongst all the surveys (Houston & Nevin, 1977; Hox et al., 1991, cited in Webster, 1997). Since the target population might refuse to participate in the surveys, it might be hard to complete the intended data collection (Baruch, 1999). A good response rate should be achieved to reach more accurate and reliable results (Baruch, 1999). Depending on the survey type, this rate varies, and it is 80-85% for face-to-face interviews (Hughes & Hayhoe, 2009). In this research, the interviews were conducted door-by-door until the target number, 20 participants per house type, was reached. From the very beginning, after explaining what the interview was about, a small number of residents refused to participate in the interviews. Some others who accepted to take part at the beginning, soon after withdrew because they found the interview was lengthy and time demanding (three for Case I and Case II, nine for Case III, five for Case IV, six for Case V, seven for Case VI and two for Case VII). Given these values, the response rate in this research is 81.38% (140 out of 172). However, even though it is in an acceptable range, the response rate concept is less relevant since the un-completed interviews were omitted in the analysis, which was carried out still based on 20 interviews per house type.

5.2.8. Respondents Category

The interviews were conducted explicitly with the residents of the seven house developments, which were previously chosen as the potential case studies for typo-morphological analysis. The interview results were therefore examined under the seven categories, and the participant names are coded for anonymity.

5.2.9. The Interview Delivery

The interview questions were printed as a hard-copy booklet per household and manually distributed. As mentioned earlier, although the questions are questionnaire oriented, the interviews were not self-administrated. They were carried out face-to-face, and the researcher recruited the participants via door knocking. Mail distribution or telephone contact methods were disregarded. This is mainly because the interview participants were the general public. This was also necessary to provide more reliable results (see Adams & Cox 2008) in the case that the respondents might misunderstand the items or each interpret them differently, since the evaluation of SoP is quite subjective.

Prior to the data collection, an ethical application was made to the University of Liverpool Research and Ethics Committee. Before each interview commenced, the participant was provided with an information letter, which outlined the aims and objectives of the study, the extent of the interviews and the researcher's contact details for further clarification, if a participant needed to discuss any problem he/she came across during the interview. The participant consent form was also provided, which stressed that their participation was voluntary, and they could withdraw at any time without any excuses. Although the name and signature were requested for the participant consent forms, the responses were kept confidential, as stated in the provided information letter.

During the interviews, an assistant accompanied the researcher all the time for security reasons because the interviews required the researcher to enter the participants' houses. The interviews were conducted at various times and days including Sundays. They started at around 09:30 and were completed by 23:00, depending on the availability of the residents who were willing to participate in the study.

Structured interviews were occasionally followed by further discussions with the interview participants on their problems with their living environment and some positive feedback was received about the research design and its social implications which are presented in Chapter 8.

5.2.10. Data Collection Period and Analysis Method

The data collection began in mid-June 2014 and was completed by early September 2014. The collected data was analysed through SPSS (Statistical Package for the Social Sciences).

5.2.11. The Statistical Analysis through SPSS

The interview was not intended to develop a scale for the measurement of SoP. Rather, it aimed to find out how the level of general satisfaction was affected by the typo-morphological transformation of house form over time. The results were used to provide a comparative analysis of the satisfaction scores among the cases. The data was first examined in SPSS regarding its normality and compared in relation to the mean, standard deviation and skewness scores against each of the SoP indicators amongst the seven case studies. Then, the main and sub-hypotheses of the research were tested using Kruskal-Wallis test, one-way Analysis of Variance (ANOVA) and two-way ANOVA procedures. Since the sample sizes were the same, one-way ANOVA was first used to test the main research hypothesis concerning the interplay between the house types with their different spatial relations at the three place scales and the SoP satisfaction. These results were validated through a non-parametric test, namely the Kruskal-Wallis test, since the data could not qualify all the assumptions of the parametric test, one-way ANOVA. The two-way ANOVA was used to test whether the differences between the groups are affected by a third variable or the interaction of a third variable with the independent variable (spatial typology). In other words, because of the potential impact of the demographic variables such as age, gender, tenancy and years of occupancy on SoP, the impact of each variable alone and interacted with the main house type variable was tested. These procedures will be better understood where they are applied to the interview responses in Section 7.2.6.

5.2.12. Reliability Test

The scales and subscales designed to measure the same construct in the interviews were tested regarding its reliability. As Tavakol and Dennick (2011) state, this is an obligation to add validity and accuracy to the interpretation of the gathered data in the assessment of the results. Cronbach's alpha is an effective tool that is mostly used to report the reliability of these multiple items with regard to their internal consistency within the pre-defined bigger variable (Fabrigar et al., 1999; Christmann & Van Aelst, 2006; Cronbach, 1951; Santos, 1999; Barua et al., 2013; Pankhania & Jani, 2012). Cronbach's alpha (α) ranges from 0 to 1 (Connelly, 2011; Adamson & Prion, 2013; Pankhania & Jani, 2012). The higher the value, the more reliable the results (Pankhania & Jani, 2012; Barnes et al., 2014); with the benchmark value of 0.70 (Nunnally & Bernstein, 1994; Revelle & Zinbarg, 2009; Groth-Marnat, 2009). The criteria for evaluating the α value are as follows: excellent if $\alpha>0.9$; good if $\alpha\cong0.8$; acceptable if $\alpha\cong0.7$; questionable if $\alpha\cong0.6$; poor $\alpha \cong0.5$; and unacceptable if $\alpha<0.5$ (George & Mallery, 2002).

Given this, a reliability score was computed using Cronbach's alpha test in SPSS for the multiple variables combined to measure each indicator of SoP for each house type. Before calculating α score for all items, the ordering of the positive and negative items was reversed and all items were worded positively, because Likert-scale theory requires that the negative and positive ends of the scale should be the same to make the items comparable (Symeonaki et al., 2015).

5.3. Rationale for Case Selection

In this study, two distinctly different methodologies are used, as described above. It is of crucial importance to select cases that are consonant with both methodologies. The study follows a multiple intersecting framework and selects cases according to the location, type and the typological process.

<u>Location</u>: case selection initially requires detailed investigation of the morphological phases in a given location. If the cases are selected from the same city, the historical development process of a type can be examined through different morphological phases representing some turning points with regard to social, political, cultural and economic

changes that are in effect in the city's development. The locational choice also benefits the SoP assessment since the perception of satisfaction with life and SoP would vary at different locations because of the socio-cultural differences.

Type: typo-morphological analysis requires the identification of types "at articulated scales" (Chen & Thwaites, 2013, p.59). Therefore, this study identifies the spatial types of houses at building, street and neighbourhood scales according to a series of spatial characteristics explained already in Section 5.1.1.

Typological process: "*A hidden typological process could be revealed through interpreting the basic building types in continuous periods*" (Chen & Thwaites, 2013, p.51). Therefore, this study adopts a multiple case study design where the existing theory is applied to a series of house types, and the result will be drawn on their cross-case comparison. These cases should be chosen according to their potential to construct a complete description of how the topological, social and functional requirements were spatially configured for each morphological period. In this sense, the cases with different spatial characteristics are chosen from different morphological periods and reflect the historical development process of house forms in a given location. As Yang (2011, p.64) stated, this is also the best way "*to develop a keen appreciation of the historical complexity*" of housing with the case selection. The selection should also enable the typological process to be traced. Therefore, the cases are tested with regard to whether they follow a typological process or not and, if they do not, where are the points where they show complete or partial mutation.

In the following chapter, the above-described case selection rationale will be applied to the Turkish Housing context.

CHAPTER VI

6. CASE STUDY

This chapter aims to explain the case selection procedure within the Turkish housing transformation context following the case selection rationale explained above and to introduce the cases chosen from Ankara, Turkey. The following is organised under three main sections. The first section provides a general introcution to the area and reviews the history of urban development in Turkey. The second section focuses on how this urban development process has been reflected in housing transformation of Ankara and how the cases are selected following the identified morphological period of changes. The third section provides a brief and descriptive introduction to the chosen housing developments.

6.1. General Introduction to the Area

6.1.1. Geographical Location

Ankara is the capital city of Turkey and is located in the north-west of Central Anatolia. It is at latitude 39^0 56’ N and longitude 32^0 52’ E (Ankara Development Agency, 2012).

Figure 6.1 Map of Ankara (adapted from Maphill, 2013 and Ankara Development Agency, N.D. b)

Ankara is mainly constituted of plains and plateaus surrounded by tributaries of the important water sources, namely Kizilirmak River and Sakarya River and the mountains running from the south-west to the north-west (Gunay, 2012; Taser, 2011; Ankara Development Agency, 2012). The northern side of Ankara is more mountainous, and the mountains here run parallel to each other, from west to east (Gunay, 2012). Due to its geographical location, Ankara has a continental climate where winters are cold and snowy, and summers are hot and dry (Taser, 2011). Moreover, its water sources, the formation of its mountains, its climate and its accessible agricultural lands are the primary determinants of its current urban form, which has always been protected and stayed enclosed to date due to its strategic location (Gunay, 2012).

6.1.2. Socio-Economic and Political Importance

Although the geomorphological structure has played an important role in the city's formation, Ankara's current importance and peculiarity are mainly derived from its designation as a new capital city after the proclamation of the Republic of Turkey in 1923. The desire and the efforts to create a modern capital embedded with the cultural notion of the new Republic deeply affected the development of this new administrative and political centre of the country (Ankara Development Agency, N.D., pp.16-33). During this process of change, numerous areas (including urban design and human geography) experienced considerable progress, which have made Ankara a city "*identified with the Republic more than any other civilisation or state in history*" (Ankara Development Agency, N.D., p.16).

Ankara can currently be considered one of the successful cities in Turkey in terms of liveability standards, and social, cultural and economic development, despite its on-going urbanisation process and its need to adapt to the changes derived from globalisation. This is also confirmed by several accredited organisations such as SPO, URAK, EDAM and CNBC-e Business Magazine (Table 6.1).

Table 6.1 Socio-economic success of Ankara (adapted from Ankara Development Agency, N.D., p.5)

Ankara…	Research Description	Organisation	Year
Has the second highest level of development in Turkey	Research of Socio-economic Development Ranking of Provinces and Regions in Turkey	State Planning Organisation (SPO)	2003
Is the second most competitive city in Turkey	Inter-province Competitiveness Index	International Competitiveness Research Institute (URAK)	2009/10
Is the most competitive city	A Competitiveness Index for Turkey	The Centre for Economic and Foreign Policy Studies (EDAM)	2009
Is Turkey's most liveable city	Turkey's Liveable Cities	CNBC-e Business Magazine	2011

6.1.3. A Brief History of Urban Development and Housing Formation in Turkey

The transformation in Anatolia started more than 800 years ago under the Seljuks and, by the late 19th century, Anatolia has had an appearance, which is highly rich in architecture (Oktay, 2004). Within the borders of the Ottoman Empire in Rumelia and particularly in Anatolia, the dominant house form was Traditional Turkish Houses, which had already continuously evolved for about 500 years along with social, cultural and economic changes (Eldem, 1968; Bozkurt Azezli, 2009). These houses, the spatial principles of which were adapted from the nomadic lifestyle of Turkish people before their settlement in Anatolia (Bozkurt Azezli, 2009), have been successful for centuries in meeting changing human needs (Kuban, 1976). Despite the recession of the Ottoman Empire in the late 19th century, their development still continued under the influence of Eastern European residential architecture in the 18th and 19th centuries (Kahraman, 1997, cited in Bozkurt, 2013).

However, from the late Ottoman Empire period, Anatolia started to experience morphological changes, in particular, under the influence of the modernity project (Ozbek-Sonmez, 2012; Tekeli, 1998). Urban planning projects in this period were implemented by foreign topographical engineers, and they were limited to small districts in Istanbul that were frequently suffering from fire damage (Tekeli, 1998; Sey, 1998a). By the early 20th century, as a result of the increasing relations with Europe, the changes in urban form became more prominent, particularly under the influence of the City Beautiful approach, which aimed to plan cities as a whole unit (Tekeli, 1998; Ozbek-

Sonmez, 2012). The holistic city plans were implemented, but only in Istanbul and by foreign city planners and architects (Tekeli, 1998).

Social, cultural and economic changes occurred until after the foundation of the Turkish Republic in 1923 and "*Westernisation has been officially embraced in all aspects of life*" (Oktay, 2004, p.25). Accordingly, the principles of spatial organisation greatly changed (Tekeli, 1998). The City Beautiful approach resulted in less appreciation of traditional urban forms, and the Western-originated garden city approach was adapted to Turkish cities with the construction of groups of houses with gardens (Tekeli, 1998). The impact of modernism and Westernisation on Turkish cities was unexpected, and the consequences of the changes were different from those of the changes undergone by European cities. Tekeli (1998) explains this situation by stating that, while modernity contributed to national identity in Europe, it caused alienation and conflict in Turkish society. Although the impact of Traditional Turkish Houses on housing design was still noticeable by the 1940s (Eldem, 1968; Yildirim & Hidayetoglu, 2009), European planners and architects were dominant in city planning until the 1950s (Ozbek-Sonmez, 2012). Turkey underwent more extreme changes and city growth as a result of the increasing migration rate, particularly after WWII (Burkay, 2006). The solution to the increasing housing shortage, particularly after the war, was the construction of individual housing units on personal lands (Tekeli, 1998).

After the 1950s, modernist projects became more dominant in city planning; however, similarly to the impact of the City Beautiful Movement, these projects also neglected the historic environment (Tekeli, 1998). Traditional city patterns were europeanised with the construction of wider streets called boulevards (Tekeli, 1998). This caused the loss of not only local architectural and urban patterns but also cultural and local values (Tekeli, 1998). From the 1950s, the uncontrolled high urbanisation rate caused the development of cities with the unplanned constructions of slums/squatter developments (Tekeli, 1998). As a result, the cities had dual structures: areas deliberately changed by the modernist projects and spontaneously changing areas (Tekeli 1998). When the slums became the biggest threat for the implementation of the modernity projects in the following years, attention was turned to the introduction of new legislative regulations between the 1960s and the 1980s. However, the governmental support was at the legislative level; the solutions were only policy-based, stayed at the theoretical level and were not adequately reflected in the real practice. Therefore, cities were forced to change without planning. In the 1960s, the main argument was that Turkish cities had to be planned by local planners and architects to eliminate the destructive effects of foreign approaches on local and national values (Tekeli, 1998). For this reason, new efforts were made in urban planning education with the foundation of the first urban planning department in the Middle East Technical University in 1961 in Ankara (Tekeli, 1998).

The Turkish lifestyle also changed simultaneously with the administrative and economic changes. People started dreaming of living in apartments as a new style of modern life (Ozbek-Sonmez, 2012). The construction of mass housing complexes and apartment blocks was the primary solution to meet this need. According to Tekeli (1998), of the proposed solutions for the housing problem – either single-family houses or mass housing complexes or apartment blocks – none has contributed to the life quality or provided quality and sustainable environments. Moreover, the form of city development has often negatively affected the QoL (Tekeli, 1998). The traditional city form was eroded by modern city developments, with huge heritage destruction; however, Turkish cities were not ready to change in order to meet the 20th century's demands (Eldem 1987, p.269, cited in Oktay, 2004). From the 1970s, high population growth and advancing technology caused the standardisation of places and the loss of place identity; accordingly, the city image was negatively affected (Oktay, 2004). The socio-economic and cultural changes triggered the implementation of the standardisation policies; however, the appearance of cities had not changed much by the 1980s (Ozbek-Eren, 2012). The 1980s was a different period for Turkey because of the introduction of neoliberal strategies. In this period, the restructuring process was better understood with the completion of the development of demographic changes and urbanisation (Tekeli, 1998). The mass housing blocks, which were first introduced in the 1950s, became widespread and a new form of housing was adopted by means of the theoretical implications of the legislative changes (Tekeli, 1998). Currently, Turkish city images are rapidly changing as a result of rapid urbanisation. In particular, the residential areas in the entire country are the mostly affected built forms with the wide spread of high-rise apartment buildings constructed both individually and in groups.

6.2. House Form in Ankara and Case Selection

Considering all of these processes mentioned above, Turkey is a significantly important study field where the way in which previous urban forms were affected by modernism can be clearly traced throughout time (Oktay, 2004). In particular, the investigation of evolution processes of the Turkish residential building forms in Ankara is ideal for the purpose of this study, since all the above-mentioned transformation processes were clearly seen in Ankara, as the new capital of the new Republic. The following will first review the housing transformation in Ankara along with the processes identified above. Then, the selection of the cases will be explained according to the identified morphological periods of change.

6.2.1. Evolution of Housing Form in Ankara

Communal life in Ankara can be dated back to prehistoric times (Hittites) and the classical (Romans) and medieval periods (Cansever & Yener, 1966; Gunay, 2012). However, despite its long settlement history, its current formation is mainly the result of the extreme social, economic and political changes undergone after WWI. Since then, Ankara has been continuously inhabited (Gunay, 2012). In particular, the transformation started when Ankara was chosen as the new capital city designed to represent the Turkish national identity after the proclamation of the Republic of Turkey in 1923 (Cansever & Yener, 1966; Gunay, 2012; Batuman, 2013). Therefore, the changes in the urban development of Ankara mainly occurred under the dominant influence of political ideologies (Gunay, 2012) and later on the main influential factor became the rapid population growth. Especially in the 1920s, the early years of the Republican period, Ankara underwent significant transformation, particularly under the influence of European architects and planners after the 1920s (Yerel Net, 2016). Today, Ankara is the second most crowded and the second largest city in Turkey, and has the second highest level of urbanisation after Istanbul (Caliskan, 2009). Although it is a quite young capital designated in the 20th century, it is still amongst the Turkish cities where the most rapid development, transformation and urbanisation rates have occurred (Caliskan, 2009).

The following paragraphs will review the process of housing change in Ankara, starting briefly with the period before the proclamation of the Republic of Turkey. This period refers to the late Ottoman Empire period (particularly from the 1890s to 1923) where the country was in social, economic and political crisis, but the adopted dominant house type was still Traditional Turkish Houses despite the foreign architects' limited attempt to introduce new types. The year 1923 is accepted as the start year of the history of modern Turkey with the foundation of the new political regime. The period from 1923 to date can be divided into four morphological periods: the years between 1923 and 1950, namely the early Republican Period; the periods between 1950-1980, namely the Modernisation Period; 1980-2000, the Liberalisation Period; and the post-2000s, the Contemporary Period (Ozbek-Eren, 2012; Coban, 2012; Ataov & Osmay, 2007). The selection of these five periods is critical since they reflect the periods during which the house form evolved under the important social, cultural, economic and administrative changes.

a. The Late Ottoman Empire Period (1890-1923)

The growing relations with Western countries and the socio-economic changes starting in the 1840s in the Ottoman Empire resulted in important changes in building construction (Sey, 1998a). Starting from the second half of the 19th century, new house typologies such as terraced houses, row houses and apartment buildings emerged (Sey, 1998b). However, the implementation of planned housing activities was limited to big cities, particularly Istanbul, then Ankara and Izmir (Sey, 1998a; Sey, 1998b). This period therefore mainly sustained the custom of constructing the Traditional Turkish Houses, which were developed from the spatial features of the nomadic lifestyle of Turkish people before their settlement in Anatolia and became the dominant house types adopted for hundreds of years.

b. The Early Republican Period (1923-1950)

In the first years of the Republican period, there was a significant housing shortage. Despite this, housing construction was stagnant due to the economic problems that arose after the WWI (Sey, 1998b). The first housing attempts were made in the city of Ankara, due to it being the new capital city and having a high population growth (Sey, 1998a). Ankara was chosen to be a model for the other Anatolian cities in Turkey because of its structural development (Osmay, 1998) and because it was the first planned city of the Republic (Coban, 2012). The initial attempts were limited to the mass housing blocks constructed for the public servants and the new government's officials (Osmay, 1998).

Even though the city development had a dual character differentiated between the old and the new, the new developments were mainly adapted to the existing patterns of the historic fabric (Osmay, 1998). The years between 1930 and 1940 saw the most intensive period of building construction (Sey, 1998a), mainly because of the introduction of the "*cheap housing concept*" (Sey, 1998b, p.276). The first typical example of this concept was the cheap terraced house development constructed by architect Seyfettin Nasif in Ankara (Sey, 1998b) (Figure 6.2). The 1930s was also the period when the slum developments were initiated in Ankara.

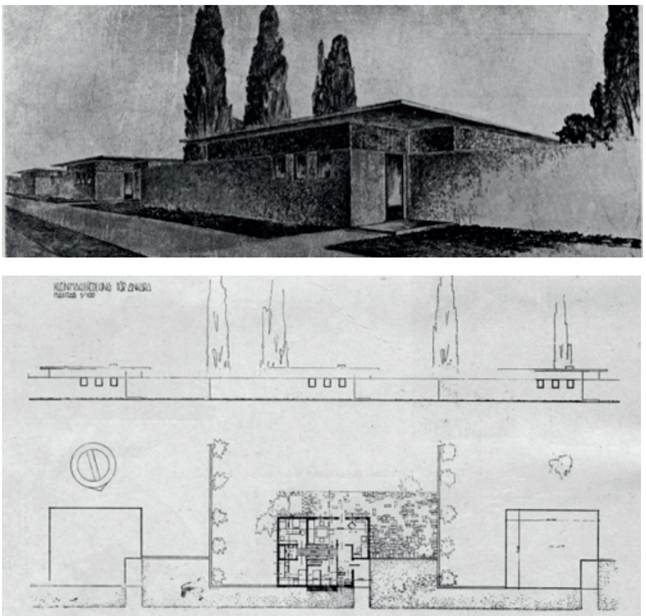


Figure 6.2 Architect Seyfettin Nasih's cheap housing proposal (Nasih, 1933)

Since these efforts were not adequate and the construction of large-scale housing complexes was not economically feasible, building societies were established (Sey, 1998b). The most important large-scale mass housing project, namely 'Bahcelievler' (garden houses), was constructed in Ankara in 1934 (Sey, 1998a) (Figure 6.3). With this project, Ankara became the first garden city in Turkey (Sey, 1998a).

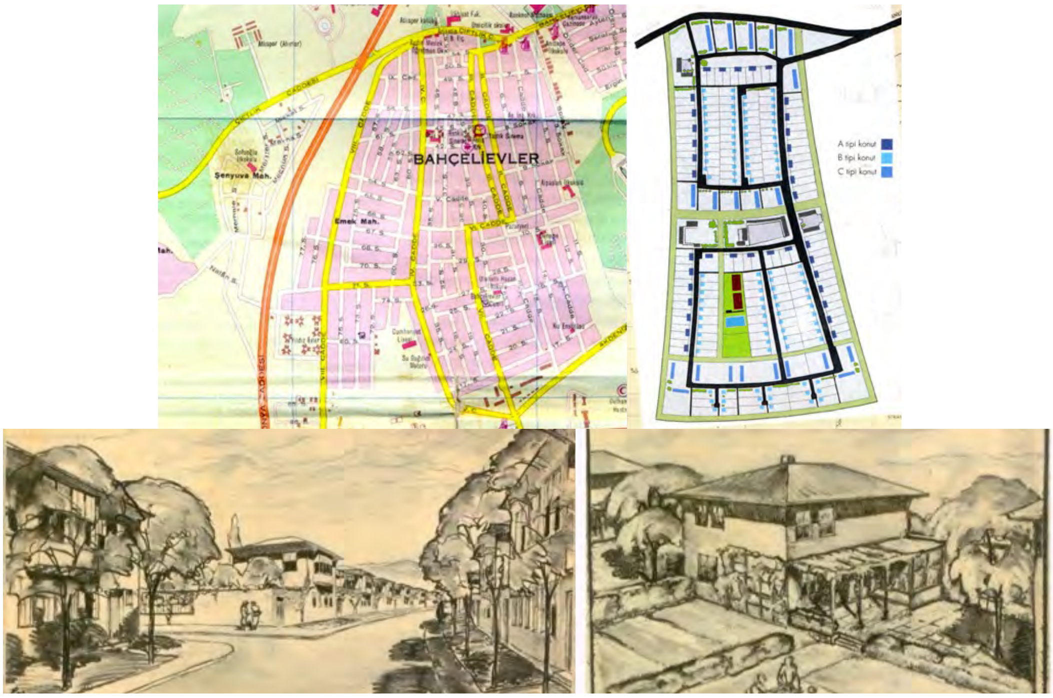


Figure 6.3 Ankara Bahcelievler housing project (1934-39) (Toplumsal Tarih, 2009)

Single-family, one- or two-floor mass houses called 'workers' houses' were another type of housing constructed to accommodate the increasing number of workers moving into the city along with industrialisation (Sey, 1998a) (Figure 6.4).

Figure 6.4 Sumerbank-Hereke worker's houses (left) and Saracoglu Mahallesi (right) (Sey, 1998b, pp.284-5)

After the WWII, there was still a demand for housing construction for government officials, soldiers and military officers (Sey, 1998b). The concept of mass housing, which was proposed in Western countries in the 19^{th} century to ease the housing pressure of the growing migration from the countryside to the city, was introduced to Turkey in this period (Erturk & Ozen, 1987). In the 1940s, these projects became increasingly important, particularly in meeting the huge housing shortage after the WWII (Erturk & Ozen, 1987). The first collective housing blocks, namely Saracoglu Mahallesi (Figure 6.4), were constructed with 434 houses in Ankara in 1940 (Altaban, 1998, p.47). However, these attempts were also not adequate since there was no working planning regulation. Therefore, no significant growth in the number of houses could occur in the 1940s (Sey, 1998b). Moreover, the prominent improvements could not be seen until the foundation of the Mass Housing Administration in 1984 (Burkay, 2006).

c. House Form between 1950 and 1980

From the 1950s to the 1980s, Ankara experienced unprecedented population growth unlike the rest of Turkey, as shown in Figure 6.5. Moreover, the urbanisation rate, which was 18.5% in 1950, increased to 45.5% in 1980 (Keles et al., 2009, cited in Coban, 2012). These changes resulted in two dominant house types in Ankara: slums and apartment buildings (Sey, 1998a).

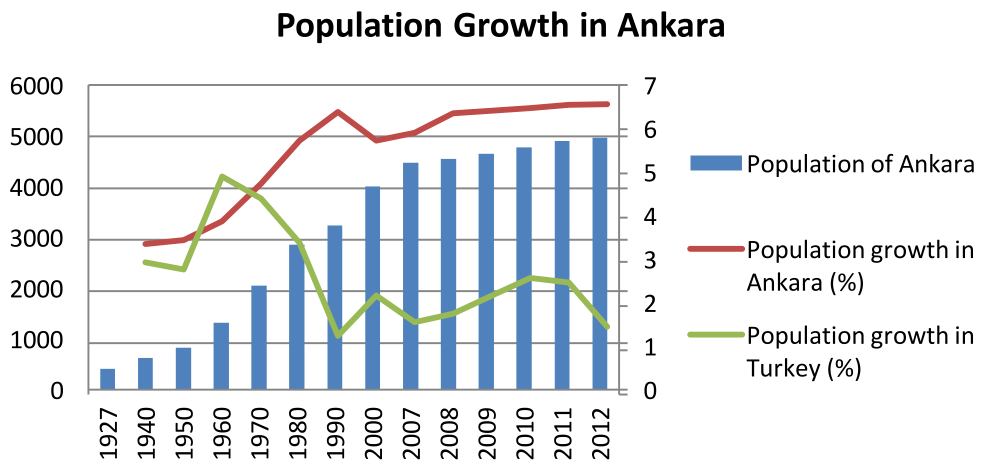


Figure 6.5 Population growth in Ankara (adapted from TUIK Statistics ADNKS result 2007-2012, cited in Ankara Development Agency, 2013)

After WWII, the number of slums increased dramatically (Burkay, 2006; Sey, 1998a) and, in the 1950s, the population living in slums comprised almost one-third (around 100,000) of the whole population in Ankara (Yavuz, 1952). New housing legislation introduced at the time attempted to deal with this unwanted city development (the enactment of Law No.5218 and Law No.5228) (Coban, 2012). Accordingly, a new residential neighbourhood, namely Yenimahalle (translation: New District), was constructed in Ankara between the years 1949 and 1953 (Altaban, 1998). This housing development targeted the low-income groups; however, instead, the mid-income groups occupied the houses (Aribas-Tokman, 1985). Despite this, the development has been considered to be successful as a planned city development (Coban, 2012). It consisted of one- or two-floor single-family houses, as detached, semi-detached or terraced housing developments. The construction of single or terraced houses with gardens was very common in the 1950s (Sey, 1998b). In the following years, with the new regulations, the construction of three-, four- and five-floor apartment buildings was also allowed in the different regions of Ankara (Altaban, 1998). Previously, the law allowed the construction of only one house per plot; therefore, the landowner was only able to construct a house for his own use. However, in the 1950s, when the law was amended to allow floor ownership in multi-floor apartment buildings, people started constructing multi-floor apartment buildings and then selling flats individually to make a high profit (Coban, 2012). Therefore, multi-floor concrete apartment buildings suddenly became widespread in Ankara and replaced the garden houses (Sey, 1998b). Even in this period, a report written in 1960 by Nihat Yucel, who was the consultant during the preparation of the city development plan for Ankara in 1957, defined Ankara as “the city of apartment blocks” (Altaban, 1998, p.54). However, this profit-oriented housing construction approach was not an effective housing strategy because it targeted only the high-income groups and avoided eliminating the existing slum-based housing problems (Tekeli, 1982).

From the 1960s, a new concept called social housing appeared on the political agenda (Sey, 1998a), to produce healthy and cheap houses for low-income groups and to eliminate the rapid increase in the number of slums (Sey, 1998b). However, the project could not be successful (Sey, 1998b). The number of low-density and low-rise garden houses experienced a drastic decrease in this period (Altaban, 1998). Moreover, the number of squatter developments disproportionately increased, despite the housing cooperatives and the municipalities’ extensive construction of large-scale housing projects and multi-floor apartment buildings (Sey, 1998a).

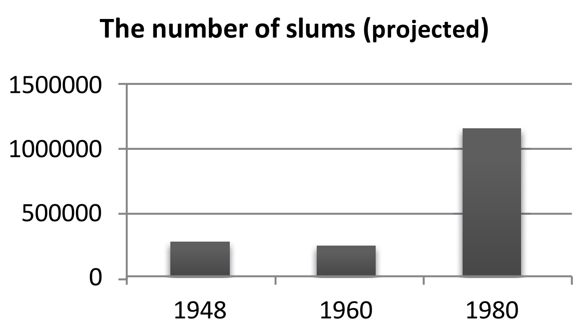


Figure 6.6 The slum developments between 1950 and 1980 (adapted from Coban, 2012, p.84)

In the 1970s, the majority of houses were not being constructed for long-term purposes because of land speculation. People built more multi-floor housing units for profit making; therefore, house types varied. An extreme example of this is the buildings demolished and re-built three times in the same plot, and therefore the oldest house forms lasted for only 15 years (Altaban, 1998). It is evident that the importance given to a particular house form decreased. There was no plan for healthy and sustainable development in residential areas and people became less respectful of the past. Despite all the construction processes, disproportionate slum growth was observed in 1980 (see Figure 6.6), which also clearly indicates that the housing policies and planning practice failed in Ankara even though it was chosen to be the model city for planning in Turkey (Coban, 2012).

d. House Form between 1980 and 2000

In the late 1970s, not only the housing sector but also the economy was in crisis (Coban, 2012; Burkay, 2006). The main challenge for the low-income groups was to own affordable houses (Burkay, 2006). This situation continued into the early 1980s, because of the high inflation rates (Pulat, 1992). However, later on, the liberalisation of the market significantly affected the housing sector in a way that had never been important in the Turkish economy before. The private sector was also deeply involved within the housing market and played an important role in the construction of houses for middle- to high-income groups (Burkay, 2006). Slum construction was therefore still popular amongst the poor and still problematic in the 1980s. However, the slum construction concept after the 1980s was quite different from that before the 1980s, since the land-mafia took over the squatter development market and commercialised it (Burkay, 2006). This situation also caused a dramatic decrease in the socio-economic level of the residents of this type of house, and the 1980s' slum practice was aimed at the urban poor (Erman, 2001). Governmental policies played a central role in dealing with the housing problem in this period (Coban, 2012). The Mass Housing Law in 1982 (Law No.2487) was introduced for the first time in the 1980s (Burkay, 2006). Its aim was to provide housing for both middle- and low-income groups and eliminate the poor living conditions in squatter developments (Burkay, 2006). This law brought about a significant decline in the ratio of slums to other types of houses (Altaban, 1998). However, its implementation was not totally as planned and the changes in the Turkish housing policy did not offer systematic and practical strategies to deal with slum developments at the urban scale until 2000 (Burkay, 2006; Coban, 2012). Thus, the government started allocating funds for the public housing sector where the private sector was dominant (Coban, 2012; Burkay, 2006). However, these efforts were also not enough for the implementation of large-scale housing at a great extent (Burkay, 2006).

After the 1980s, the government's perspective on housing and urban planning changed; it had previously focused on the technical and administrative side of planning and economic aspects rather than the social significance of housing design (Burkay, 2006). A new Mass Housing Law enacted in 1984 (Law No. 2985) enabled the government to provide Mass Housing Funds through the tax values added to the sale prices of various goods instead of the funds being allocated from the governmental budget (Coban, 2012). Although the law enabled other constructors and private firms to benefit from this fund, the main aim was to support the housing cooperatives. As a result, the housing cooperatives had become the major sources of housing supply as collective housing developments by the 1990s (Sey, 1998a; Burkay, 2006) (Figure 6.7 and Figure 6.8).

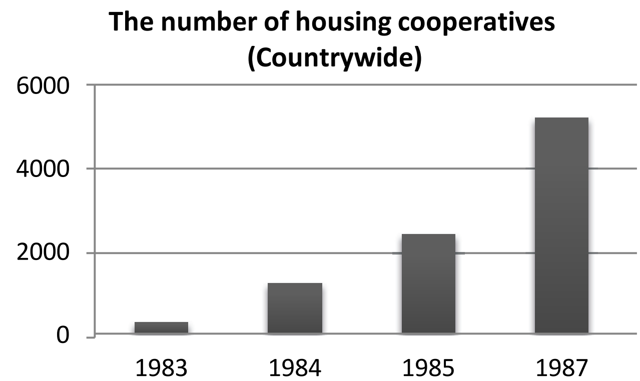


Figure 6.7 The increasing number of housing cooperatives in the 1980s (adapted from Burkay, 2006)

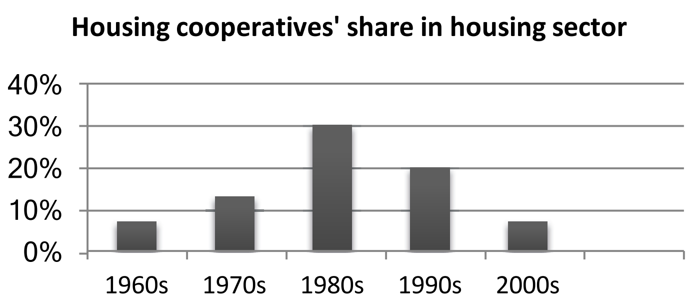


Figure 6.8 Housing cooperatives' share over years (adapted from Coban, 2012)

However, the target population was limited to high- and mid-income groups (Sey, 1998a) and low-income mass housing developments could not be initiated until 2000 (Burkay, 2006). One of the important housing cooperative attempts was applied to Batikent (Ankara) under the hands of the Council (Coban, 2012). With this project, 55,000 housing units were constructed starting from 1974 (Coban, 2012). Except for the failure in the target group change from the low-income groups to the mid-income groups, Batikent housing cooperative's efforts have been found to be successful in the housing history of Ankara (Keskinok, 2005, cited in Coban, 2012).

Apart from these projects, a new form of housing complex called 'site' in Turkish (referring to gated communities) was introduced, and its target group was also high-income groups (Sey, 1998a). Its main aim was to increase the QoL with the preservation of historical, social, cultural and natural resources and the national identity (Tapan, 1998). However, the rapid growth in the housing activities of the mass housing developments negatively affected the city's image and caused a lack of 'vitality' and 'liveability' (Oktay, 2004). This impact has continued, particularly after 1995, with new problems affecting life quality emerging such as traffic condition, crowdedness, noise, a lack of parks and gardens and leisure areas and so on (Oktay, 2004).

e. House Form in the 2000s

The 2000s were not radically different from the 1980s regarding urbanisation rate (Burkay, 2006). The housing cooperatives were still dominant in the housing sector in the early 2000s (Coban, 2012). However, the 2000s' housing approach was different since its stress was more on providing housing for low-income groups at a large scale (Burkay, 2006). Particularly after 2004, urban regeneration projects, the first examples of which were initiated in Ankara in the 1990s, were accelerated by the official mass housing institution of Turkey, TOKI (Coban, 2012). In a short time, new apartment buildings with 80-90 m^2-flats replaced the squatter houses. However, the construction quality was low, and the flat sizes were not adequate for the extended families moving from the informal settlements (Coban, 2012). In addition, the apartment lifestyle was quite new for them and contrasted with their social and cultural values. Moreover, the construction of the mass housing developments for different income groups caused societal stratification, which then motivated the low-income groups to move out from this newly created living environment since they did not feel a sense of belonging. This initiated the gentrification process and in a short time gated communities protected with a special security system that creates social isolation in urban settings became widespread (Coban, 2012).

6.2.2. Case Selection Process and Field Survey

Referring back to the rationale for the case selection explained in the methodology chapter, it was decided to choose all the cases from the same city, Ankara. Then, the housing transformation history in Ankara was reviewed above and five morphological periods from the late 19th century to the present were identified. Table 6.2 below summarises the major factors and housing trends identified in each period.

Table 6.2. Changing Turkish housing context over time (adapted from Guney & Wineman, 2008; Balamir, 1994; Batuman, 2006; Toker & Toker, 2003; Dikmen, 2012; Sey, 1998b).

MORPHOLOGICAL PHASES AND CHANGING HOUSING TRENDS	
A	**1890s-1923 → The Late Ottoman Empire Period**
	New house types emerging under the influence of Western countries were unwelcome. People were still in favour of traditional houses following the spatial principles of nomadic lifestyle.
B	**1923-1950s →The Early Republican Period**
	There was a significant housing shortage after WWI. The ideal housing types were Garden City Houses. However, unwanted apartment buildings became widespread. Apartmentalisation was heavily criticised.
C	**1950s-1980s → The Modernisation Period**
	The construction of informal houses increased dramatically. Apartment buildings became widespread and replaced the garden houses. The apartment lifestyle was well promoted and adopted by Turkish culture.
D	**1980s-2000 →The Liberalisation Period**
	This is the period of recession for housing production. There was a significant decline in the ratio of slums. Housing cooperatives were established. Gated communities were initiated.
E	**2000 to date → The Contemporary Period**
	Urban regeneration projects are on the agenda. Gated communities have become widespread. Current trend is the widespread of mixed-use housing developments.
* A, B, C, D, E represent the identified morphological phases in chronological order and are used in brackets within the text to indicate what period the cases represent.	

According to the periods identified above, firstly, the Turkish housing literature was reviewed and the potential house types for each corresponding period were determined from the secondary sources before the site visit. Then, the chosen housing developments were visited, and their appropriateness as case studies was considered against two criteria: first, the houses should still be functioning as residential use; second, the number of existing house units should be enough to allow a sufficient number of interviews to be conducted. For these reasons, the research has to disregard the traditional Turkish houses located in central Ankara and representing the late Ottoman Empire period (A) and the other two chosen housing developments, namely Bahcelievler (B) and 14 Mayis (C) representing the housing concepts in the 1930s (the early Republican period) (B) and in the 1950s (the Modernisation period) (C) respectively.

The design of the Traditional Turkish Houses is developed based on two main elements: rooms and a hall (called 'sofa' in Turkish) (Tavsan & Sonmez, 2013; Oztank, 2010). According to the location of the hall, there are three main types developed over time: the houses with outer hall, inner hall and central hall respectively. The one with an outer hall is the most primitive one, which is currently difficult to find within Ankara. In contrast, the most developed and widespread ones are houses with inner (Case I) (A) and central hall (Case II) (A). However, most of these that are located in central Ankara are not currently used for residential purposes but as restaurants, cafés, shops and hotels for touristic purposes (Figure 6.9). Therefore, these house types, the examples of which date back to the late 19th century and early 20th century, were chosen from Beypazari, a historical district of Ankara located 100km west of the city centre (Ankara Development Agency, 2012).

Figure 6.9 The renovated traditional Turkish houses in central Ankara

Bahcelievler (B) and 14 Mayis (C) housing developments were located in a place where the regeneration projects had a strong effect. Thus, they were mainly replaced by the new housing developments, and the existing ones are mostly used for commercial purposes (Figure 6.10 and Figure 6.11). Since the sample size was not large enough and the existing ones could not give a sense of neighbourhood, these cases had to be disregarded.

(a) (b) (c)

Figure 6.10 The existing housing units of Bahcelievler Housing Development (a: currently used as a café, b: currently used by an association, c: still used as a house – the last existing housing unit)

Figure 6.11 Examples of the existing 14 Mayis Houses (the photo on the left shows how the area was occupied by high-rise apartment buildings which replaced the low-rise, medium-coverage existing housing tissue)

Instead of these types, the apartment buildings (Case III) (C), which were built in the 1950s and became the widespread house type representing Ankara's housing concept until the 1980s, were selected. This house type represents the period when the public embraced the apartment lifestyle. Therefore, it is an important transition from the traditional houses (A) to the low-rise apartment buildings (C). In addition, this house type replaced the garden houses (B), which were introduced in the 1930s and then adopted as the ideal house types after the traditional houses (A) in the following period. The replacement was also an important indication of how single-family lifestyles sustained in the garden houses (B) adapted to the apartments (C). Given all these points, to overcome the case selection limitation, the 1950s apartment buildings (C) were the most suitable choice, fulfilling the requirements of the case selection by relating the cases in different periods (Figure 6.12). To establish a link at some degree between the cases in different periods and to allow a sensible comparative analysis with different degrees of continuity and mutation, three housing developments (Cases IV, V and VI)

(D) were chosen in the following period (1980-2000). Case IV, Case V and Case VI are three different house types commonly constructed by the housing cooperatives. These three house types were chosen because of their similarities in some spatial characteristics that can be linked to the previous house forms at different degrees and levels (These will be identified in detail in the next chapter). The selection of the three cases from the same period is also to indicate that the housing implementations of the period did not follow a common house type. The contemporary housing development (Case VII) (E) in the following morphological period was also chosen in association with the previous cases. Case VII is a gated community; this type became widespread after 2000. A private construction company built this housing development in 2007. The built date means that the residents have had an adequate number of years to develop SoP by the time of this research.

The case studies were selected initially according to their housing layouts in line with the corresponding morphological periods. However, they also represent a variety of street and neighbourhood typologies. In addition, these cases were deliberately selected to present some similarities and differences with each other concerning the spatial characteristics at building, street and neighbourhood scales so that the logical transition and transformation between them can be easily traced. Figure 6.12 below shows the final case selection and the possible transformational links between the cases according to the identified morphological periods (A→E), which will then be examined in detail in Chapter VII.

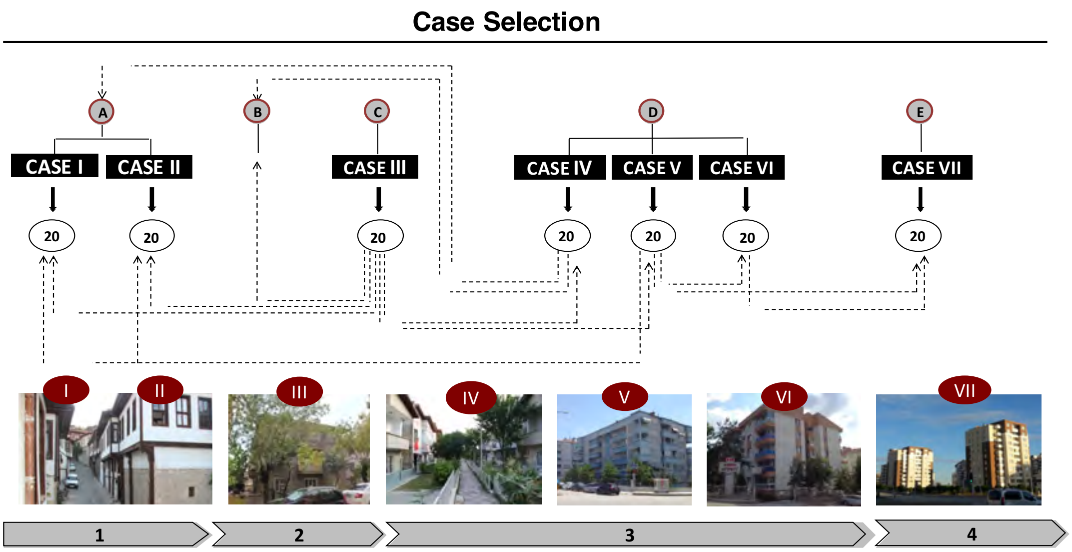


Figure 6.12 Case selection within the morphological framework

In total, seven house types representing different spatial characteristics of the four morphological periods, and different levels of transformation and change, were chosen from two different boroughs of the city of Ankara. As mentioned above, Case I and Case II are from Beypazari and the others are from Yenimahalle. The houses of Case I and Case II are distributed randomly within the conservation area in Beypazari. The proximity between the other five cases located in Yenimahalle is as shown in Figure 6.13. To a feasible extent, the researchers deliberately selected cases in a close vicinity where possible, to ensure the cases have similar land or house prices so that the residents have broadly similar socio-economic and cultural status. This was to minimise the potential impact of participants' socio-economic cultural conditions on SoP (the details of the socio-economic and demographic data and differences through the cases will be presented in Chapter VII).

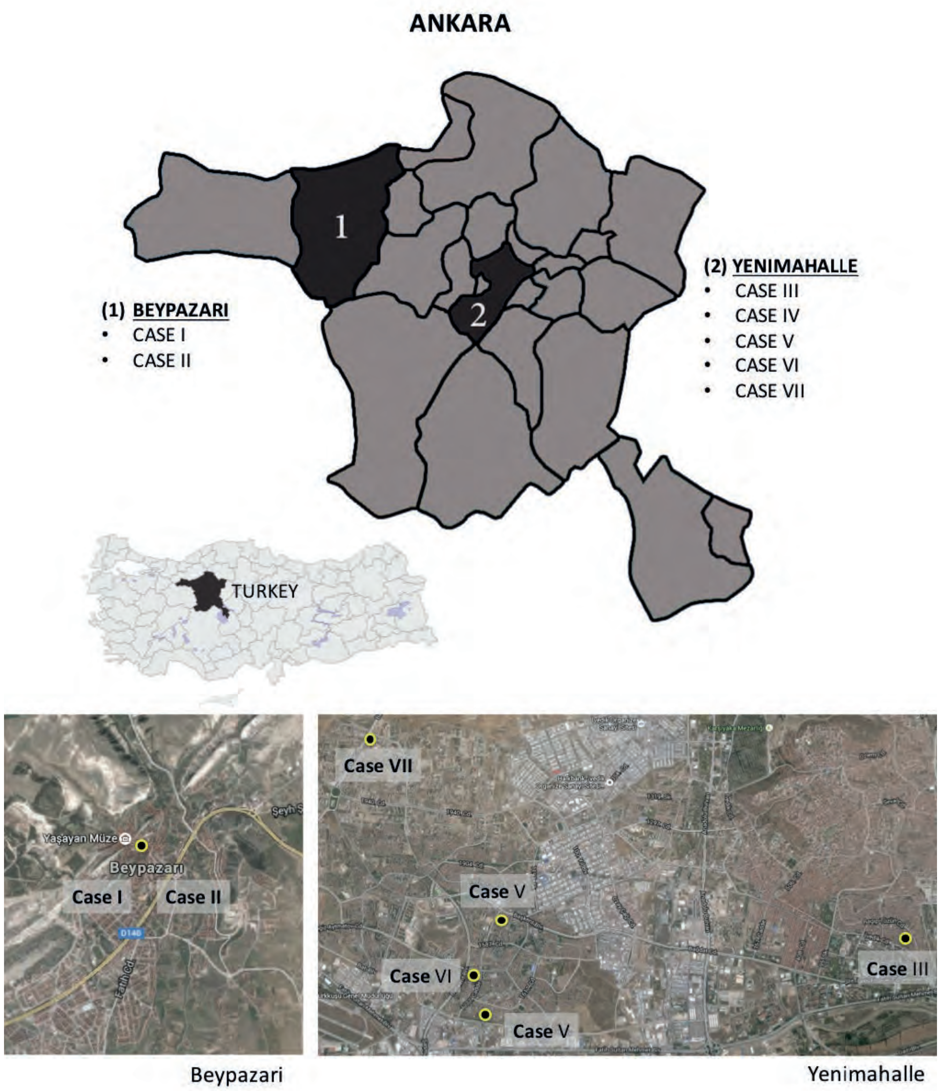


Figure 6.13 Case location map (Google Maps, 2016; Turizmajani, 2015; MGM, 2016)

The site visit continued with the interviews and 20 residents were recruited for each case for the assessment of SoP (Figure 6.12). A field survey was completed with the documentation and collection of the architectural drawings, plans and maps from the municipality archives and photographs of the cases were taken.

6.3. General Introduction to the Case Studies

This section will introduce the seven case studies, which are named from Case I to Case VII, representing the housing development process in Ankara from traditional to contemporary in chronological order according to their built date.

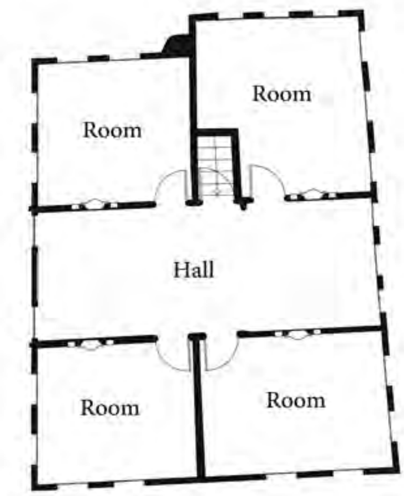
6.3.1. Case I: House Type with Interior Hall

Case I is the most common type of Traditional Turkish Houses; it was introduced in the 18^{th} century but became widespread in the 19^{th} century (Bozkurt Azezli, 2009). In this type, the rooms are arranged along the two sides of the hall; therefore, the hall is internally located (Bozkurt Azezli, 2009). The hall is used as a living room and one or two sides of it directly open to the outside. (See also Figure 6.14).

CASE I: House Type with Interior Hall

Built Period:	The late Ottoman Empire Period (1890s-1923)
Age:	Approximately 100 years
Location:	Beypazarı

House Layout



Neighbourhood Layout

Interior View

Street View

Neighbourhood View

Figure 6.14 General introduction to Case I

6.3.2. Case II: House Type with Central Hall

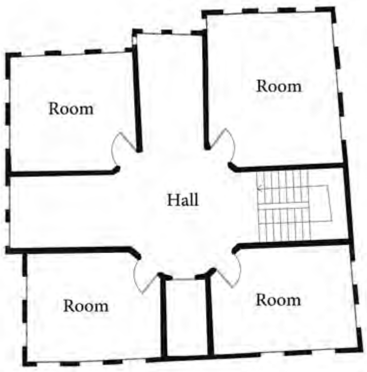
Case II house type was introduced in the 18^{th} century and developed by the mid-19^{th} century. It was first constructed in big cities for administrative staff (Bozkurt Azezli, 2009). However, such interior hall-type housing (Case I) then became more dominant and widespread (Bozkurt Azezli, 2009). The hall is located centrally between the other functional areas. The house layout is square or a rectangular, the corners of which serve as rooms, and the other serving functions such as staircases, kitchen and bathroom are located in-between the rooms (Bozkurt Azezli, 2009). The shape of the hall can be quadrangular, octagonal, polygonal or oval/elliptical (Bozkurt Azezli, 2009). Since the hall is located in the middle of the house and daylight cannot penetrate thoroughly inside, there are 'eyvans' located between the rooms to provide day lighting in the central hall. (See also Figure 6.15).

Case I and Case II type houses offer slightly different housing layouts, but their associated streets and neighbourhoods share the same spatial characteristics. In both cases, the number of rooms and the size of the houses vary depending on their residents' needs, family size and socio-economic situations. Thus, there is no fixed/rigid house plans for them. Although similar spatial design principles are applied, they follow the natural topography and create their own physical unit. Sofa/hall is the main living space accommodating all daily activities. Although each room was designed to serve one family and accommodate extended families, the current usage of the rooms has been adapted to the nuclear family lifestyle with the use of modern furniture. The residents use their streets actively and spend their free time mainly in their house fronts with their neighbours living nearby, since the streets are mainly pedestrianised, or traffic calmed.

CASE II: House Type with Central Hall

Built Period:	The late Ottoman Empire Period (1890s-1923)	
Age:	Approximately 100 years	
Location:	Beypazarı	

House Layout



Neighbourhood Layout

Interior View

Street View

Neighbourhood View

Figure 6.15 General introduction to Case II

6.3.3. Case III: 1950s’ Individual Apartment Blocks

Case III is a mid-rise, high-coverage residential development consisting of three-floor apartment buildings. They were constructed in the 1950s. Their spatial features are similar to traditional houses in terms of the central location of the main living area (sofa), and to the 1930s’ garden houses regarding plot/street design. Currently, in many streets, most of the apartments have been knocked down and replaced by the new apartment buildings. However, the new formation also follows the previous plot pattern even though they slightly vary in their building footprint size. The field survey was however carried out in the street where the last examples of the 1950s apartment buildings were still dominant. The use of houses and the streets was quite similar to the traditional cases. The houses currently serve both extended and nuclear families. The active street life is currently lessened by the less frequent use of the public front gardens facing the streets with car parking at both sides of the road. (See also Figure 6.16).

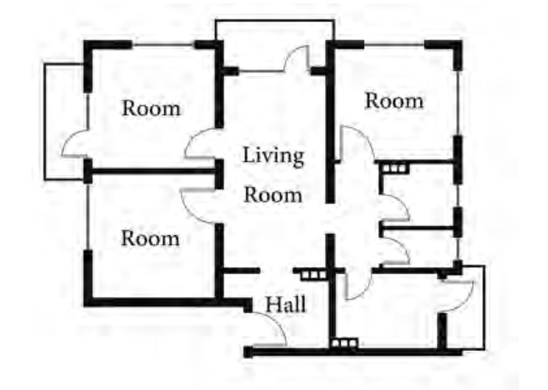
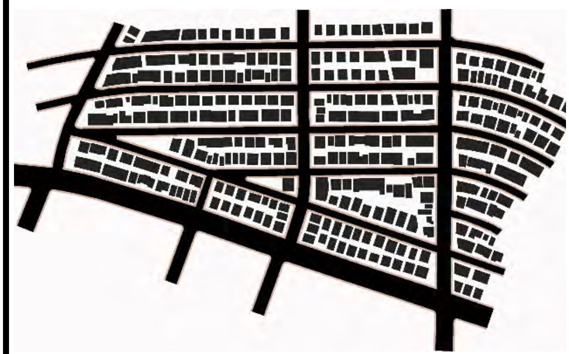
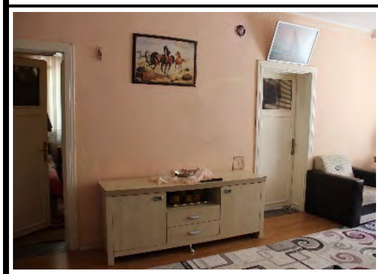
<table>
<tr><th colspan="6">CASE III: 1950s’ Apartment</th></tr>
<tr><td colspan="2">Built Period:</td><td colspan="2">1950s</td><td colspan="2" rowspan="3">
</td></tr>
<tr><td colspan="2">Age:</td><td colspan="2">Approximately 60 years</td></tr>
<tr><td colspan="2">Location:</td><td colspan="2">Ragip Tuzun District,
Yenimahalle</td></tr>
<tr><th colspan="3">House Layout</th><th colspan="3">Neighbourhood Layout</th></tr>
<tr><td colspan="3">
</td><td colspan="3"></td></tr>
<tr><th colspan="2">Interior View</th><th colspan="2">Street View</th><th colspan="2">Neighbourhood View</th></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
<tr><td colspan="2"></td><td colspan="2"></td><td colspan="2"></td></tr>
</table>

Figure 6.16 General introduction to Case III

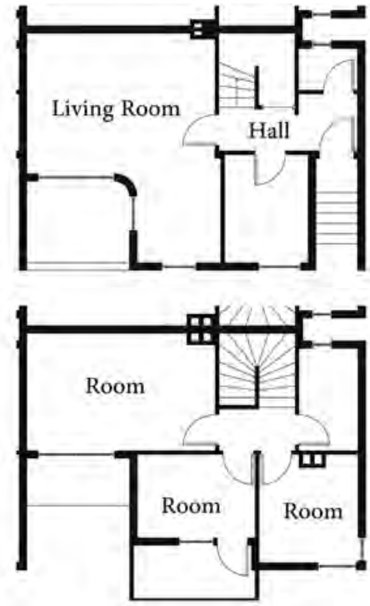
6.3.4. Case IV: Baskent Housing Cooperative

This is a low-rise, high-coverage mass housing development built in 1988. It consists of approximately 300 single-family terraced housing units arranged adjacent to each other and back-to-back. The individual units are two/three-floor and arranged along the pedestrian streets. The houses face either west or east through the routes lying north to south. Their front gardens serve as a buffer zone between the housing unit and the pedestrian street. The residents mainly spend their time in their private gardens and therefore their social interaction mainly limited to their streets. The ground floor of the houses is for the common use of the family members and its use is integrated with the garden during daytime, while private bedrooms are located on the upper floors for individuals' usage. (See also Figure 6.17).

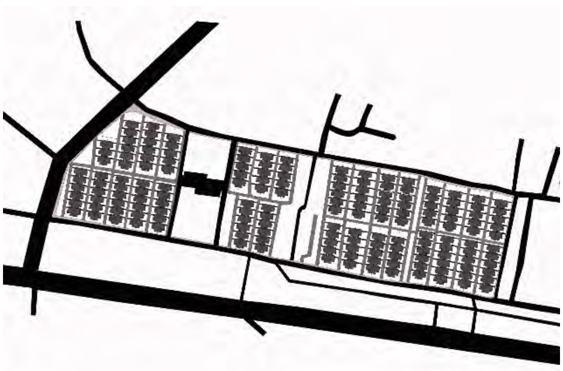
CASE IV: Baskent Housing Cooperative

Built Period:	1988
Age:	28 years
Location:	Inonu District, (Batikent)Yenimahalle

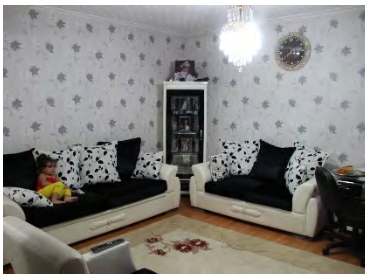
House Layout

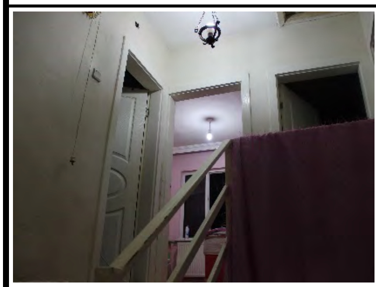


Neighbourhood Layout



Interior View





Street View

Neighbourhood View

Figure 6.17 General introduction to Case IV

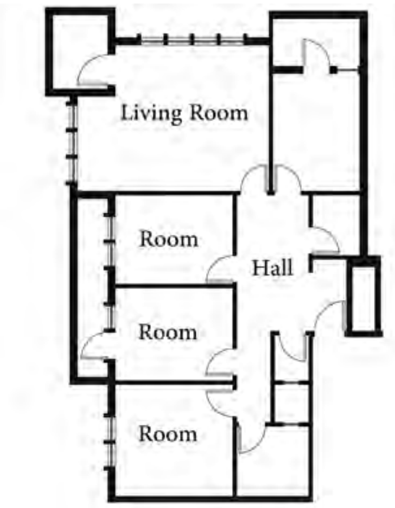
6.3.5. Case V: Ozyuvam Housing Cooperative

This is an example of a mid-rise, medium-coverage mass housing development from the early 1990s. The borders of the site are clearly defined, and the site access is partly restricted by the site administration. There are five identical buildings with five floors and each floor consists of four flats. The residents are mostly nuclear families. Within the borders of the site, there is car parking, a playground area and a meeting point, which is generally occupied by the men living there. The social life is withdrawn from the streets and partly accommodated within the site borders and the balconies. (See also Figure 6.18).

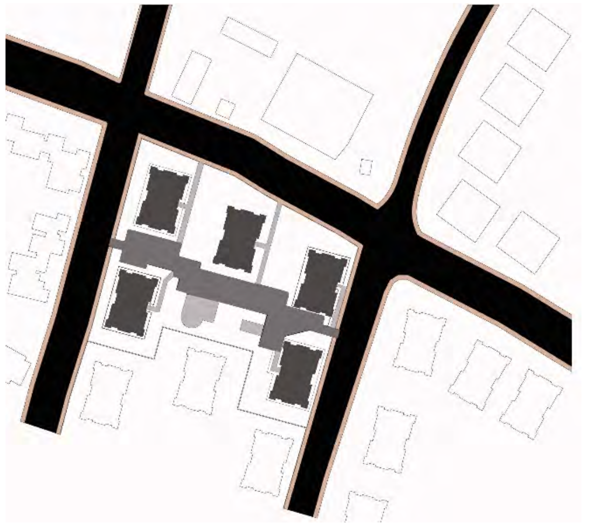
CASE V: Ozyuvam Housing Cooperative

Built Period:	1990-1991
Age:	26 years
Location:	Kentkoop District, (Batikent) Yenimahalle

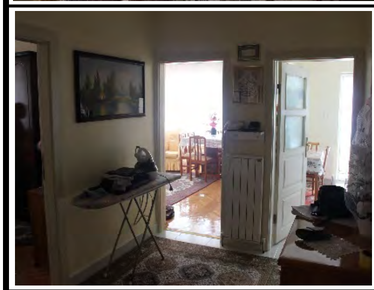
House Layout



Neighbourhood Layout



Interior View



Street View

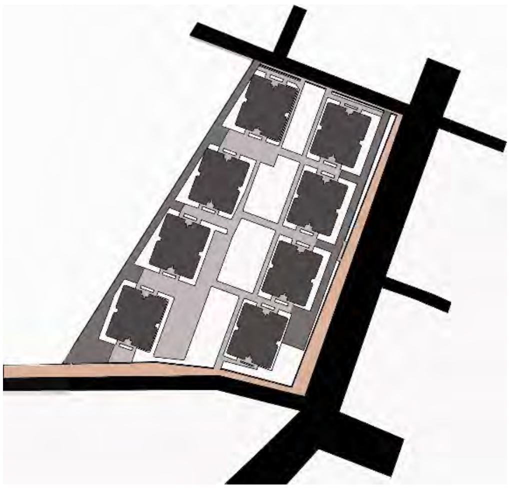
Neighbourhood View

Figure 6.18 General introduction to Case V

6.3.6. Case VI: Apak Housing Cooperative

This is a mid-rise, medium-coverage mass housing development from the early 1990s. Similar to Case V, the borders of the site are clearly defined, and the site access is partly restricted by the site administration. Within the site, there are eight identical blocks linearly arranged in two rows. The blocks are five floors, and each floor consists of four flats. The development provides a limited number of car parking spaces and many sitting/resting facilities with well-managed vegetation and gardening. The social life is withdrawn from the main public streets; however, it is within the borders of the site and it is therefore encouraged. Balconies are also frequently used for small gatherings or shared amongst the members of the family the majority of which are nuclear. (See also Figure 6.19).

CASE VI: Apak Housing Cooperative		
Built Period:	1992	
Age:	24 years	
Location:	Inonu District, (Batikent) Yenimahalle	

House Layout	**Neighbourhood Layout**
	

Interior View	**Street View**	**Neighbourhood View**
		
		

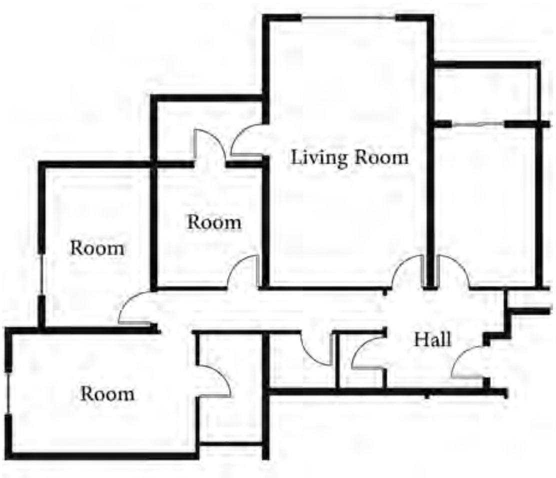
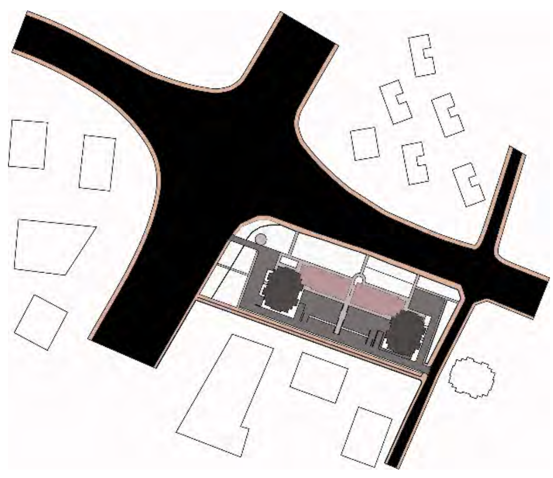
Figure 6.19 General introduction to Case VI

6.3.7. Case VII: Anatolya Ikizleri Housing Development

It is a mixed-use housing development consisting of two 12-floor apartment buildings accommodating 80 flats in total. A car park and a commercial development are located between the two buildings. It is located in a new residential neighbourhood. It is important to point out that this neighbourhood has become an alternative living environment for those who earlier lived in the nearby neighbourhood where Cases IV, V and VII are located. In this case, the family and social life are mainly withdrawn from the streets. Even the common spaces within the borders of the housing developments are rarely used. (See also Figure 6.20).

CASE VII: Anatolya Ikizleri Housing Development

Built Period:	2007	
Age:	9 years	
Location:	Turgut Ozal District, (Batikent) Yenimahalle	

House Layout	**Neighbourhood Layout**
	

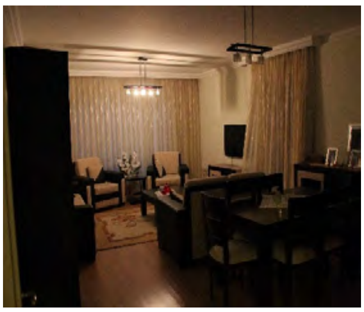
Interior View	**Street View**	**Neighbourhood View**
		

Figure 6.20 General introduction to Case VII

6.4. Summary of the Chapter

This chapter first briefly introduced the general area of research, Ankara, regarding its geo-morphological structure and social and economic level, and briefly described the urban development history of Turkey. Attention then turned to the housing transformation process in Ankara. Accordingly, the morphological periods of change were identified from the 19th century to date. According to the identified periods, the case selection process was explained, and then the seven selected cases were described in order. The next chapter will present the results, where the analysis of the spatial characteristics of the cases is carried out in more detail.

CHAPTER VII

7. RESULTS

Following the case selection procedure explained above, this chapter carries out typo-morphological analysis of the selected housing developments and assesses SoP through the interview method as required by the adopted research methodology. The analyses and the results are presented below in two main sections.

7.1. Typo-Morphological Analysis

This section analyses the spatial characteristics of the cases at the three scales. It will first present the results of the comparative assessment at the building, street and neighbourhood scales respectively and then will define the typological process between the cases at the three scales. The implications of the results will be discussed in Chapter VIII together with the results of the SoP assessment.

7.1.1. Building Scale Analysis

At this scale, the house layouts are analysed regarding the arrangement of rooms and the internal circulation. Since some parameters, shown earlier in Figure 5.18, intersect or overlap with each other, the following analysis is organised into four sections:

a. Functional zoning, spatial sequence and visibility
b. Internal access pattern and compactness
c. Justified permeability
d. Connectivity and integration

The differences presented below in the house layouts are representative. In other words, the diagrams showing spatial relations are typical of the house layouts in their respective periods.

a. Functional Zoning, Spatial Sequence and Visibility

Regarding functional zoning, in Cases I and II, there was no clearly separated/clustered functional zoning of day and night activities. Moreover, the functions were not specifically determined. In Case III, the private zone is partly separated from the main living space by an additional corridor, which also leads to some shared spaces such as kitchen and bathroom. In contrast, Case IV has a strictly separated private zone. The daily usage spaces are independent of this private zone. In Cases V and VI, the functions are partly grouped into clusters; however, these clusters accommodate mixed uses of shared and private spaces. Finally, in Case VII, the functions and the zones are clearly defined; the functional zone used during the daytime is strictly separated from the zone used at night-time. Table 7.1 explains functional zoning further with regard to the spatial sequence and transition between the shared spaces (public) and individual spaces (private) within the house layout. The relations in the table are defined according to the organisation between the entrance hall (E), living space (L), circulation (C) and room(s) (R).

Table 7.1 Special sequence between the public and private areas

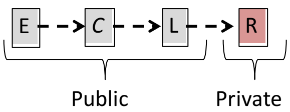
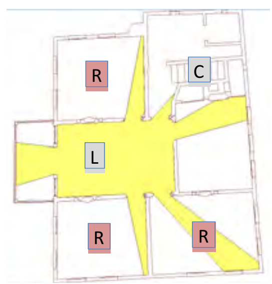
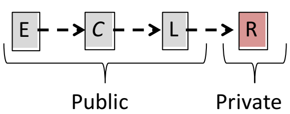
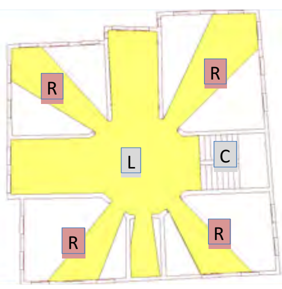
	SPATIAL SEQUENCE	VISUAL ACCESS PATH	DESCRIPTION
CASE I	 **Private zone is not separated.**		• There is a linear transition from public to private. • The living room is independent of the entrance. • The private rooms are only accessed through the living room. • The layout is mainly visually controlled from the living space.
CASE II	 **Private zone is not separated.**		• There is a linear transition from public to private. • The living room is independent of the entrance and serves as a central circulation point to access other function areas. • Since the living room is an extension of the central hall, it receives less circulation. • The layout is mainly visually controlled from the living space.

Table 7.1 Special sequence between the public and private areas *(Continued)*

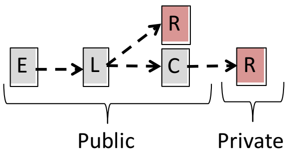
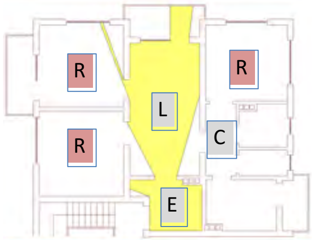
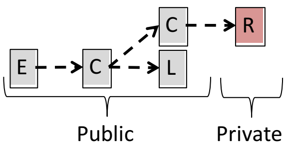
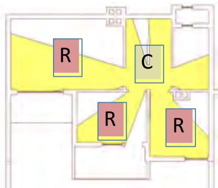
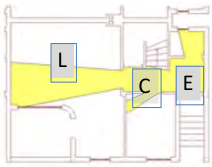
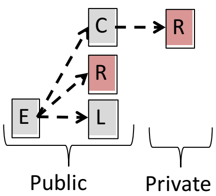
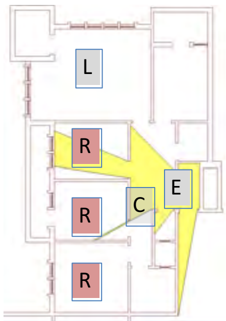
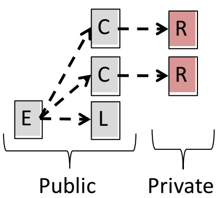
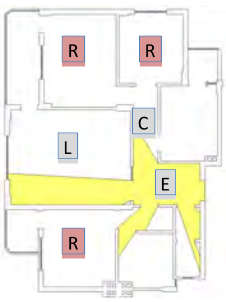
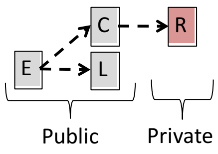
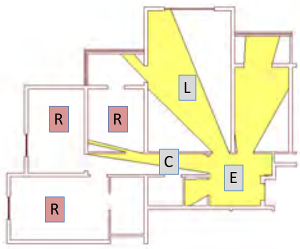
	SPATIAL SEQUENCE	VISUAL ACCESS PATH	DESCRIPTION
CASE III	 **Private zone is partly separated.**		• The transition is mainly from public to private. • The entrance hall only leads to the living area. • The living area provides the main access for both private and public spaces. • The layout is partly visually controlled from the living space.
CASE IV	 **Private zone is strictly separated.**	 First Floor  Ground floor	• The transition in the layout is either public-to-public or public-to-private. • Individual rooms are clustered together, independent of the living room. • There is no other function area accessed through the living room. • The layout is dominantly controlled from the circulation areas.
CASE V	 **Private zone is partly separated.**		• The entrance serves as a central circulation hall and provides multiple accesses to both public and private areas. • There is no clearly clustered private or public zone. • The layout is partly visually controlled from the entrance hall.
CASE VI	 **Private zone is partly separated.**		• The transition in the layout can be clearly defined from either public-to-public or public-to-private. • The entrance directly leads to the living area. • No private space is accessed from the entrance hall. • Alternative circulation routes lead to more private rooms on two opposite sides of the layout. • The layout is partly visually controlled from the entrance hall.

Table 7.1 Special sequence between the public and private areas *(Continued)*

	SPATIAL SEQUENCE	VISUAL ACCESS PATH	DESCRIPTION
CASE VII	 **Private zone is strictly separated.**		• The transition in the arrangement can be clearly defined from either public-to-public or public-to-private. • Public and private zones are strictly defined and separated. • The layout is partly visually controlled from the entrance hall.

b. Internal Access Pattern and Compactness

The internal access patterns and compactness of the cases are briefly explained in Table 7.2.

Table 7.2 Internal access pattern and compactness of the cases

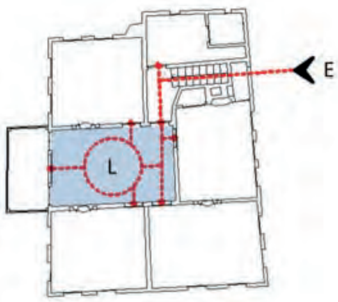
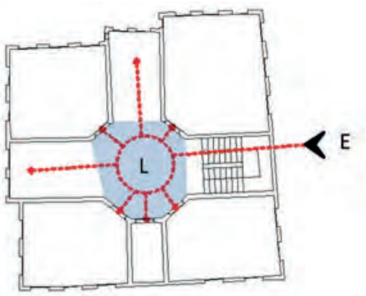
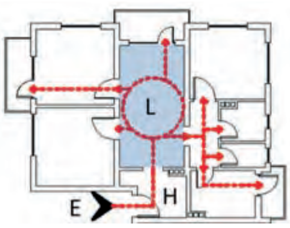
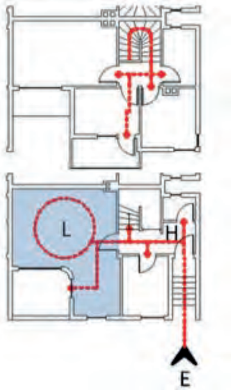
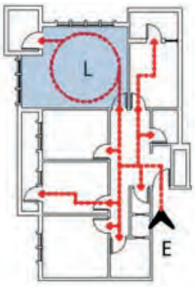
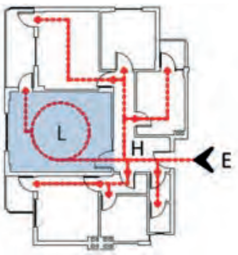
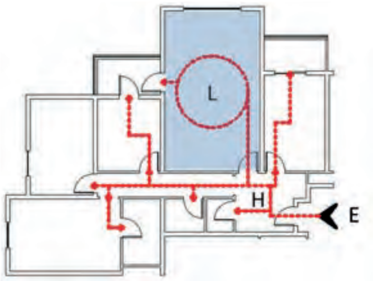
	INTERNAL ACCESS PATTERNS	DESCRIPTION
CASE I	 **(Compact)**	• After the entrance, the first point of contact is the living room. • However, it is not only a living room but also a passageway. • The layout is considered as compact since the other function areas are mainly clustered around the living space.
CASE II	 **(More Compact)**	• After the entrance, the first point of contact is the central hall that accommodates both living and circulation to other rooms. • The centrally located circulation area makes the layout very compact.
CASE III	 **(Less Compact)**	• After the entrance, the first point of contact is the entrance hall. • The centrally located living room provides all the primary access within the home. • There is a secondary circulation zone leading to other function areas; therefore, the layout is partly compact.

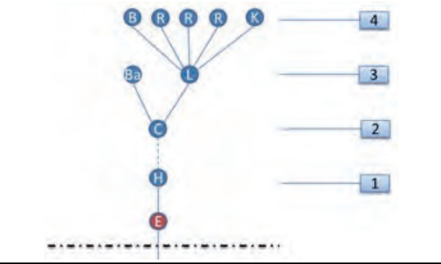
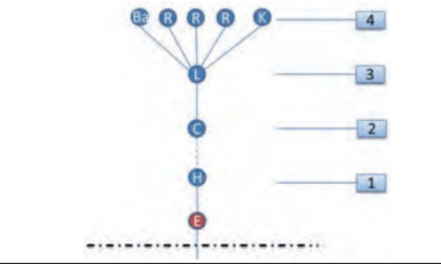
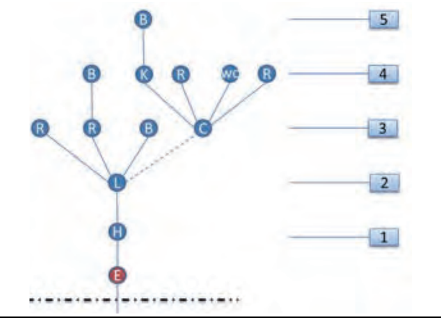
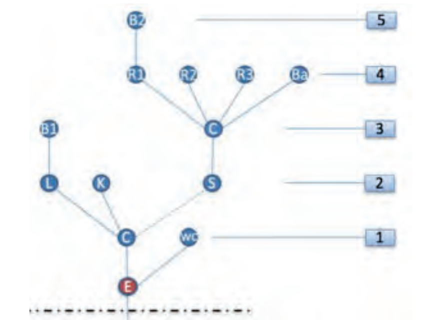
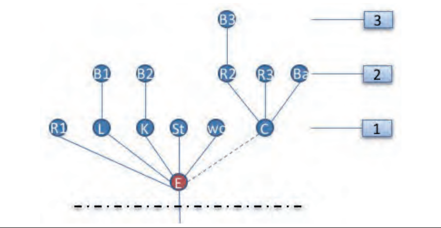
Table 7.2 Internal access pattern and compactness of the cases *(Continued)*

	INTERNAL ACCESS PATTERNS	DESCRIPTION
CASE IV	 **(Compact)**	• The layout design is distributed over two floors. • The entrance hall leads to multiple access points including living room and a secondary circulation space. • Living room is not centrally located and it is free from circulation. • The central location of the staircase provides a sense of compactness.
CASE V	 **(Not Compact)**	• The entrance leads to a centrally located hall where all the primary circulation is provided. • However, the linear arrangement of rooms decreases the compactness of the layout.
CASE VI	 **(Compact)**	• The entrance hall is centrally located and leads to the living room and another two corridors serving only as passageways. • This circulation pattern divides the layout into three sectors. • Since the living room is centrally located within this pattern, the layout is compact.
CASE VII	 **(Not Compact)**	• The entrance hall provides the primary access points and opens to a corridor leading to the private zone of the house. • The distant location of this private zone makes the layout not compact.

c. Justified Permeability

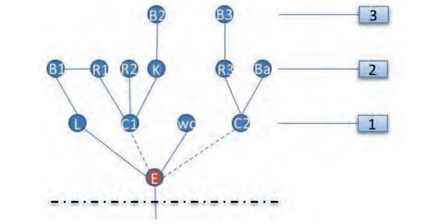
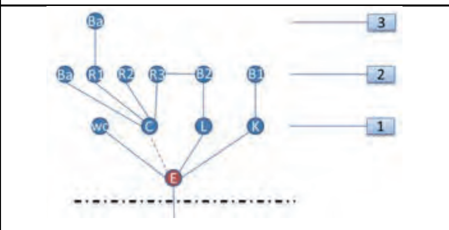
The j-graphs were drawn according to the space syntax theory following the topological relationships of the spaces. Table 7.3 demonstrates the depth of each layout, showing the number of steps that are required to pass through from the house entrance to discover the entire layout.

Table 7.3 Justified permeability graph analysis

	JUSTIFIED PERMEABILITY GRAPH ANALYSIS	DESCRIPTION
CASE I		• Four steps from the entrance. • Linear access through transitional space until the living room. • The living room is located at the third step. • There is one step after the living room.
CASE II		• Four steps from the entrance. • Linear access through transitional space until the living room. • The living room is located at the third step. • There is one step after the living room.
CASE III		• Five steps from the entrance. • Linear access through transitional space until the living room. • The living room is located at the second step. • Tree-like pattern after the living room. • There are three steps after the living room.
CASE IV		• Five steps from the entrance. • Tree-like access pattern. • The living room is located at the second step. • There are three steps after the living room.
CASE V		• Three steps from the entrance. • Tree-like access pattern. • The living room is located at the first step after the entrance. • There are two steps after the living room.

* E: Entrance, L: Living room, C: Corridor, R: Room, K: Kitchen, Ba: Bathroom, WC: Toilet, B: Balcony, St: Storage, H: Hall/Transitional space

Table 7.3 Justified permeability graph analysis *(Continued)*

	JUSTIFIED PERMEABILITY GRAPH ANALYSIS	DESCRIPTION
CASE VI		• Three steps from the entrance. • Tree-like access pattern. • The living room is located at the first step. • There are two steps after the living room.
CASE VII		• Three steps from the entrance. • Tree-like access pattern. • The living room is located at the first step. • There are two steps after the living room.

* E: Entrance, L: Living room, C: Corridor, R: Room, K: Kitchen, Ba: Bathroom, WC: Toilet, B: Balcony, St: Storage, H: Hall/Transitional space

d. Connectivity and Integration

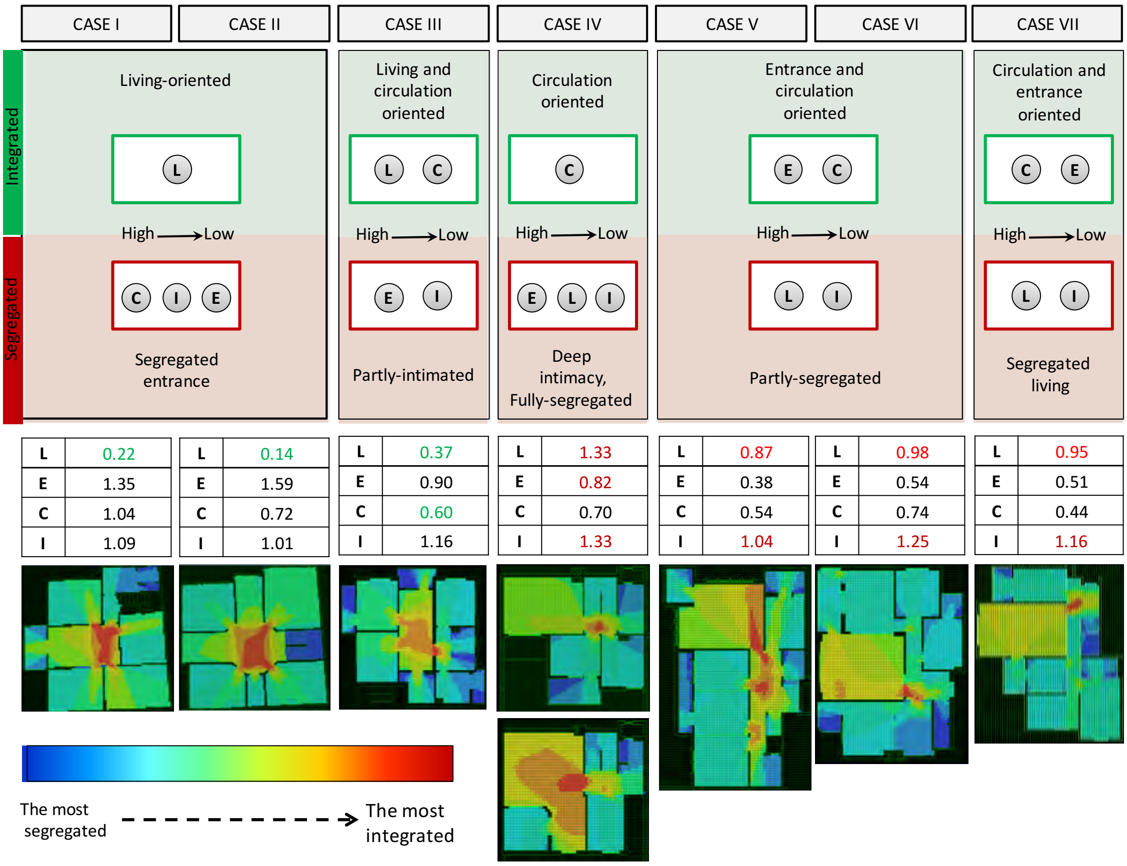


Figure 7.1 The analysis of the functional zoning with respect to functional integration values
(L: Living space, C: Circulation, E: Entrance hall, I: Intimacy areas such as bedrooms, WCs, bathrooms)
(RRA values tending to 0 refer to integration, while those tending to 1 and above refer to segregation)

Connectivity and integration analysis of the cases showed that the most connected and integrated area was the living room in the traditional cases, Case I and Case II. Case III was half living oriented, half circulation oriented. The living space has become circulation free in the following cases. Figure 7.1 explains this in detail according to the calculated functional integration values and VGA maps representing well-integrated and well-segregated spaces with a colour scale (see Appendix B for the full list of space syntax values).

7.1.2. Street Scale Analysis

a. Building/Plot Arrangement

The arrangement of the buildings, the shape and size of the plots and the building locations within the plots, and the approaches to the building and plot entrances are explained in Figure 7.4.

Table 7.4 Street scale analysis: Building arrangement

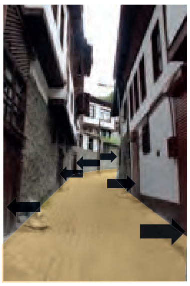
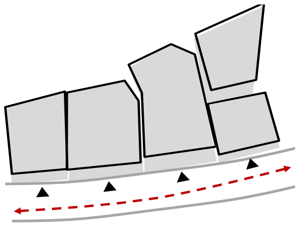
POSITIONING ACCORDING TO THE STREET AND THE BUILDING INTERVALS			
	Building arrangement	**Plot arrangement, plot size and number, building setbacks**	**Approach to the building entrance**
CASE I and CASE II			
	• Linearly arranged buildings with no setback • Building façades are staggered • Continuous façade pattern with no building intervals	• Not identical; irregular polygonal shape • The footprint of the houses also defines the plot boundaries • The private gardens are located within the house boundaries • The number of house units along streets varies. • Average number of plots along the side of a street: 4	• Accessed directly from the street • The entrance leads to either the private garden or the house unit
☐ Plot boundary	Building foot print	▲ Building/Plot entrance	— Street line <- -> Passageway

Table 7.4 Street scale analysis: Building arrangement *(Continued)*

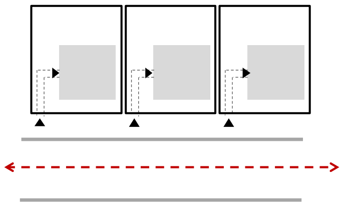
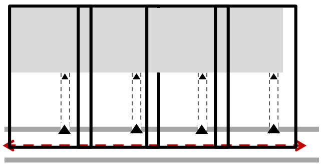
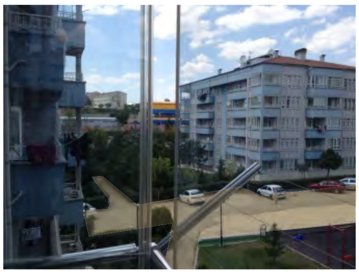
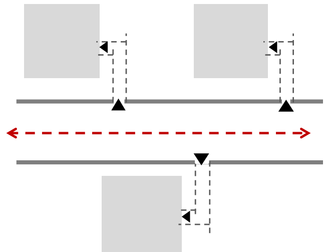
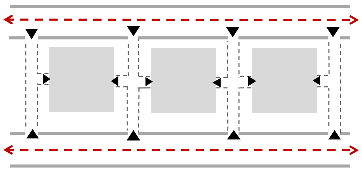
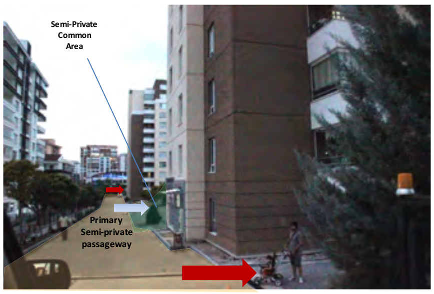
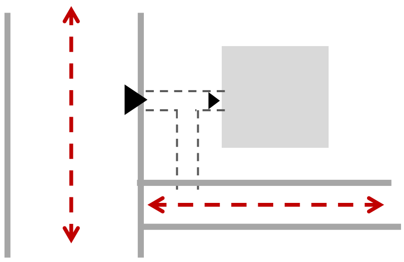
	Building arrangement	Plot arrangement, plot size and number, building setbacks	Approach to the building entrance
CASE III			
	• Linearly arranged apartment buildings with equal intervals • Buffer zone (semi-private front gardens) is created (approx. 3m from the street line) • The fronts of the buildings face the public realm and the private backs of the buildings face each other.	• Identical plots, rectangular shape, but vary in size. • Buildings are located in the middle of the individual plots. • Plot boundaries are clearly defined. • The distance between buildings is around 4-5m. • Average number of plots along the side of a street: approx.13-14.	• The plots are gated and have only one entrance directly accessible from the street side. • Semi-private front gardens with short and permeable front garden walls/fences are at the interface with the public street space. • The building entrances do not face the street • Accessed through a front garden.
CASE IV			
	• The houses are linearly arranged along a pedestrian street and adjacent to each other and back-to-back • The house fronts face each other across the pedestrian route	• Identical plots, rectangular shape, but slightly vary in size • The buildings are located at the back of the plots. • The front gardens separated by fences create a buffer zone in between. • The building setback varies between 3-6m. • Average number of plots along the side of a street: 5-6.	• Private entries to individual plots • House entrances face the pedestrian street
Plot boundary Building foot print ▲ Building/Plot entrance —Street line ← - → Passageway			

Table 7.4 Street scale analysis: Building arrangement *(Continued)*

	Building arrangement	Plot arrangement, plot size and number, building setbacks	Approach to the building entrance
CASE V			
	• Free-standing buildings • Arranged in close proximity with irregular intervals • The arrangement does not explicitly follow the street line	• The plot boundaries are not clearly defined for each apartment building. • Building setbacks varies between 4-10m.	• Private pathways lead to the building entrances • Accessible from one side (single loaded).
CASE VI			
	• Free-standing buildings • Linearly arranged with regular intervals following the street line	• The plot boundaries are not clearly defined for each apartment building. • Building setbacks are approx. 8m.	• Private streets lead to the building entrances • Accessible from two sides (double loaded)
CASE VII			
	• Free-standing buildings • The building arrangement does not precisely define borders of the public spaces or the street	• Plot boundaries are not defined. • The proximity of buildings is approx. 40m from the primary streets and approx. 13m from the secondary streets.	• Private streets lead to the building entrances • Accessible from one side (single loaded)
	☐ Plot boundary Building foot print ▲ Building/Plot entrance —Street line ← - → Passageway		

b. Street Properties

Streets in the traditional cases, Case I and Case II, are asymmetrical, irregular, winding and a mix of curvilinear, broken and dead-end streets with various widths and lengths. The sudden changes in direction result in short views. Streets in the following cases are regular and mostly straight. Case III has side car parking on one side of the street and sidewalks on both sides. In Case IV, streets are pedestrianised and free from traffic. In Case V, the paths leading to each building are pedestrian only. However, the main street serves for both pedestrian and vehicular access and is mainly occupied by car parking. The pedestrian and vehicle zones are separated in Case VI. Car parking and roads for car access with no sidewalks cover the majority of the land in Case VII. Building height-to-street-width ratios and active front coverage of the cases are shown in Table 7.5.

Table 7.5 Street scale analysis: Street properties

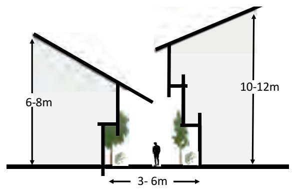
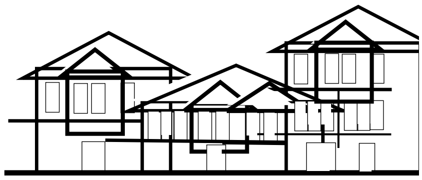
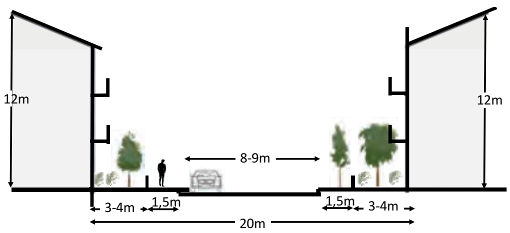
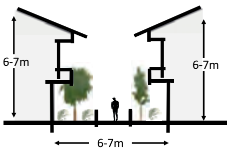
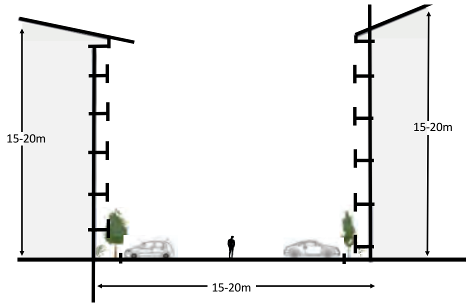
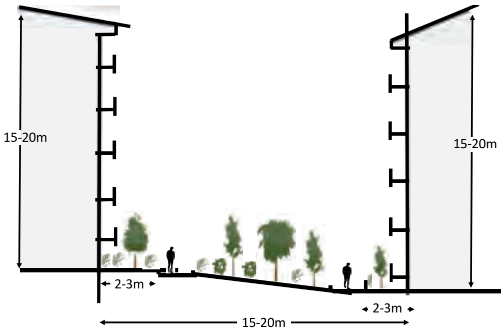
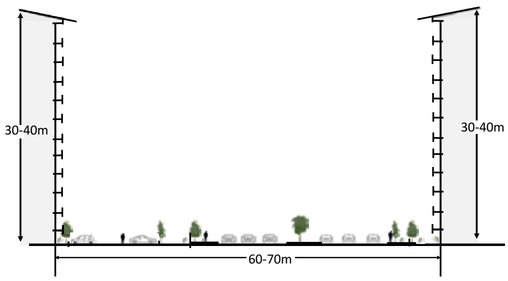
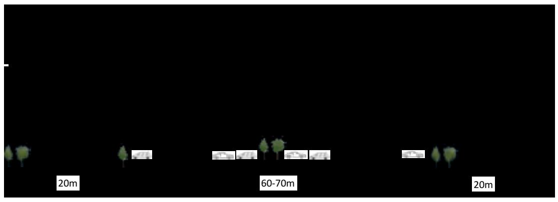
	HEIGHT/WIDTH	ACTIVE FRONT COVERAGE
CASE I-II	 W=H/2, W=H/3	 Approx. 80-100%
CASE III	 W=2H	 Approx. 70%
CASE IV	 W=H	 Approx. 80-100%

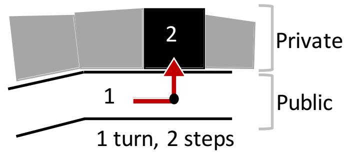
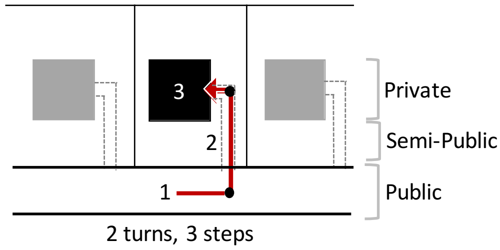
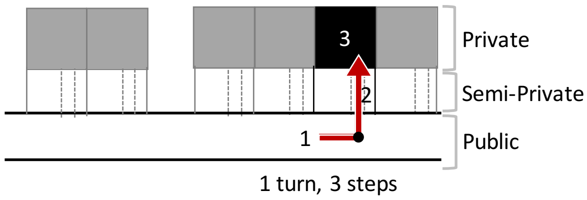
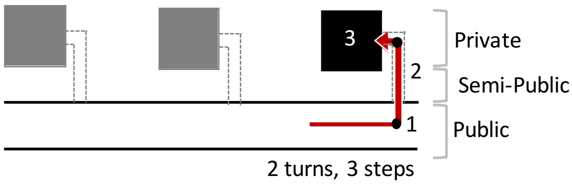
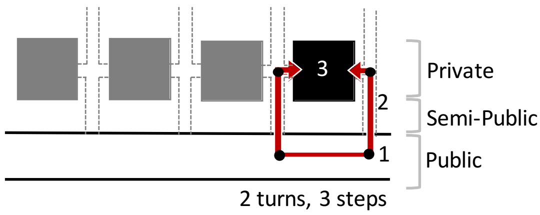
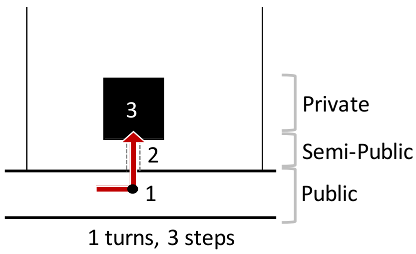
Table 7.5 Street scale analysis: Street properties *(Continued)*

	HEIGHT/WIDTH	ACTIVE FRONT COVERAGE
CASE V	 W=H	 Approx. 50%
CASE VI	 W=H	 Approx. 70%
CASE VII	 W=2H	 Approx. 35%

c. Spatial and Visual Accessibility

Accessibility of the cases has been analysed both spatially and visually. The spatial access was observed with regard to the building entrance positions, public-private area hierarchy, and the direction changes/number of turns (Table 7.6).

Table 7.6 Street scale analysis: Spatial accessibility

	SPATIAL ACCESS
CASES I-II	
CASE III	
CASE IV	
CASE V	
CASE VI	
CASE VII	

The spatial access patterns show some similarities amongst the cases, but the visual access differs because of the design of the open space surrounding the housing units – trees, fences at different heights, and materials, etc.

Table 7.7 Street scale analysis: Visual accessibility

	VISUAL ACCESS	
	Visual accessibility of the building entrances	**Visual continuity along the streets**
CASES I-II	 (a) (b) (c) The entrances mainly directly face the street and are not hidden. They might be elevated with the outdoor staircase (a) or the access can be through a courtyard (b), or the entrances can be from a cul-de-sac (c).	 (a) (b) Visual continuity is interrupted along the streets since they do not follow a grid pattern (a) and they are curvilinear (b).
CASE III	 The building entrances are not visible since they do not face the street. The front gardens are visible because of the low fences.	 The linear street arrangement provides visual continuity along the street. However, the close distance between windows and balconies interferes with privacy.
CASE IV	 (a) (b) The building entrance faces the street but the front garden creates a buffer zone in between (a). Both the garden and the house entrance are clearly visible from the semi-public pedestrian street because of the low fences (b).	 The visual continuity is well maintained along the linear street. The windows, doors and balconies of the houses located two sides of the row face each other.

Table 7.7 Street scale analysis: Visual accessibility *(Continued)*

VISUAL ACCESS		
	Visual accessibility of the building entrances	**Visual continuity along the streets**
CASE V	 (a) (b) The private paths lead to individual buildings (a). Therefore, the building entrances are visually accessible to the residents of those buildings only (b).	 (a) (b) The visual continuity is obstructed towards the building entrances (a). However, the visual continuity in the site is well maintained, both at ground level for pedestrians and vehicles, and from the balconies (b).
CASE VI	 (a) (b) Private paths are flanked by two buildings (a). The building entrances face each other (b).	 The building entrances are not visually accessible but the visual continuity is provided along the linear streets but from time-to-time interrupted by the tree intervals. The visual continuity is traceable from windows and balconies on upper floors.
CASE VII	 The building entrance can be easily identified from the public realm since it directly faces the public street outside the site.	 (a) (b) Visual continuity is achieved along the site with the linear street that leads to private pathways to the building entrances (a). The apartment buildings visually block each other's view, but the distance between them allows a desirable level of privacy (b).

7.1.3. Neighbourhood Scale Analysis

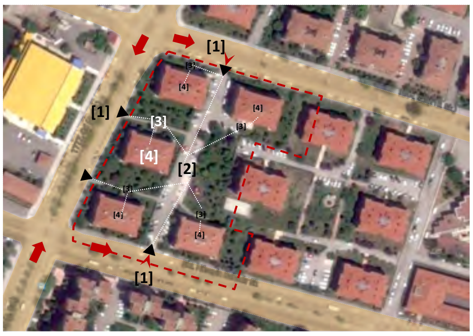
a. Site Arrangement and Density Measures

Table 7.8 briefly describes the arrangement of the house development at the neighbourhood scale, with regard to the arrangement of blocks, block size and shape, number of entrances to the site, average number of plots in a block, etc. The numbers are used in the maps to represent the hierarchy starting from the main public road/street [1] to the private housing unit [4].

Table 7.8 Site arrangement and density measures

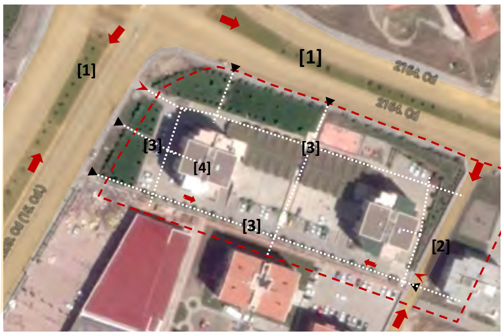
	SITE LAYOUT/DENSITY MEASURES	GENERAL DESCRIPTION OF THE SITE
CASE I and CASE II		• Open site (unplanned development) • Irregular polygonal blocks, vary in size • The footprint of the houses also defines the block boundary since the houses are generally adjacent to each other • Approx. 6 plots per block
	Land coverage:	Approx. 60%
	Building height:	1-2 floors, 3-6 m
	Spaciousness:	Adjacent buildings/Narrow streets/No building setbacks
CASE III		• Open site (planned development) • Grid arrangement • Mainly regular, sometimes deformed, rectangular shape, the block widths are almost identical with 2 plots of a standard length • Block lengths vary in dimensions • Approx. 23-24 plots per block
	Land coverage:	Approx. 50%
	Building height:	3 floors, 10-12m
	Spaciousness:	Close proximity buildings/Approx. 3m setback/Approx.20m street width
▶ Pedestrian Access ➤ Car Access --- Site Borders **[1]** Primary Street/Public Space **[2]** Secondary Street/Semi-Public Space **[3]** Tertiary Street/Semi-Private Space **[4]** Private Space/Housing Unit		

Table 7.8 Site arrangement and density measures *(Continued)*

	SITE LAYOUT/DENSITY MEASURES	GENERAL DESCRIPTION OF THE SITE
CASE IV		• Gated community (planned development) • Grid arrangement • Blocks are rectangular and their widths are almost identical. • The block lengths vary slightly based on the number of houses in a row (5 or 6 house units per row). • The site is accessible from the beginning and the end of each row from the north to the south • 10-12 per block
	Land coverage:	Approx. 45%
	Building height:	2 floors, 6-8m
	Spaciousness:	Adjacent row houses/2-3m narrow pedestrian streets/3-5m building setbacks
CASE V		• Gated community (planned development) • Polygonal shape block • 2 main entrances (both pedestrian and vehicular) + 2 additional pedestrian entrance • There are 5 free-standing apartment blocks
	Land coverage:	Approx. 30%
	Building height:	5 floors, 15m
	Spaciousness:	Free-standing buildings with approx. 20m in between/Approx.15m street width
CASE VI		• Gated community (planned development) • Polygonal shape block • 8 free-standing buildings linearly arranged in two rows • The site is accessed at the three sides. In the north-east, there are 2 entrances for vehicles and 5 entrances for pedestrians. • The site, like in the previous case, shares one block with another housing community in the west. Therefore, the site is not accessible from this site and surrounded by high fences.
	Land coverage:	Approx. 30%
	Building height:	5 floors, 15m
	Spaciousness:	Free-standing buildings with approx. 20m in between/Approx.15m street width

▶ Pedestrian Access ➤ Car Access - - - Site Borders **[1]** Primary Street/Public Space
[2] Secondary Street/Semi-Public Space **[3]** Tertiary Street/Semi-Private Space **[4]** Private Space/Housing Unit

Table 7.8 Site arrangement and density measures *(Continued)*

	SITE LAYOUT/DENSITY MEASURES	GENERAL DESCRIPTION OF THE SITE
CASE VII		• Gated community (planned development) • Free-standing linearly arranged two 12-floor apartment buildings and a single-story commercial development in between. • Rectangular shape block • There are two main gates controlled by staff to monitor car access • There are an additional 6 gates for pedestrians only around the boundaries of the site. • The site shares its boundary with the adjacent housing community.
	Land coverage:	Approx. 20%
	Building height:	12 floors, 35-40m
	Spaciousness:	Free-standing buildings with approx. 65m in between/Approx.65m street width
▶ Pedestrian Access ➤ Car Access - - - Site Borders **[1]** Primary Street/Public Space **[2]** Secondary Street/Semi-Public Space **[3]** Tertiary Street/Semi-Private Space **[4]** Private Space/Housing Unit		

b. Street Network/Hierarchy

Table 7.9 presents the street hierarchy, connectivity and relatedness of the cases through their configurational maps.

Table 7.9 Street network analysis

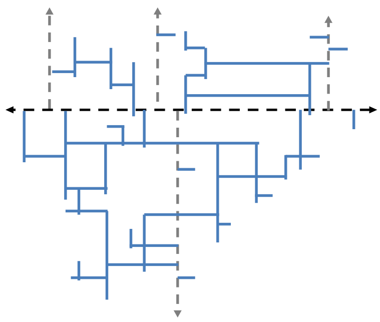
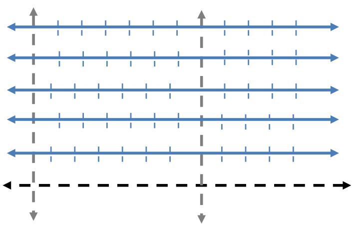
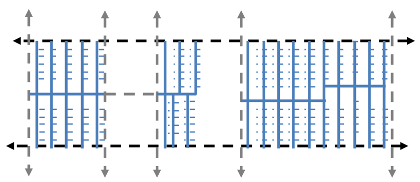
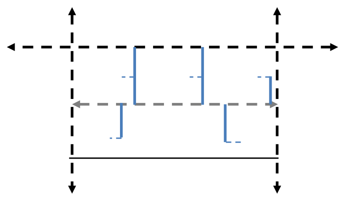
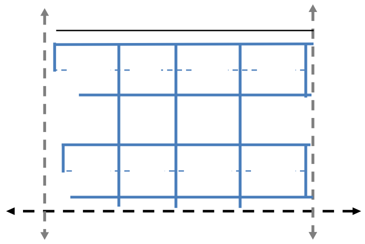
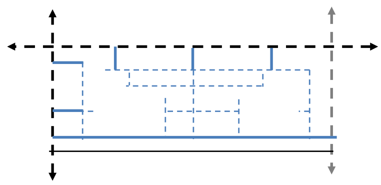
	STREET CONFIGURATION	STREET HIERARCHY
CASES I-II		The main public (primary) street is the widest street. It is used as a market place and leads to both secondary- and tertiary-level streets. The housing units can be accessed after 2 or 3 turns from the main public street at the third or fourth steps: [1] → [2] → 3 [1] → [2] → [3] → 4 [1] → [3] → 3
CASE III		The main road (primary) generally leads to the secondary-level streets, which then lead to the third-level streets. The private pathways from these third-level streets direct people to the building entrances. The housing units are accessed after 4 turns at the fifth step: [1] → [2] → [3] → [4] → 5
◄ - - ► [1] Primary Street ◄ - - ► [2] Secondary Street —— [3] Tertiary Street - - - - [4] Quaternary Street House Unit 1 The number inside the house unit indicates at what step the building entrance is accessed from the primary street		

Table 7.9 Street network analysis *(Continued)*

	STREET CONFIGURATION	STREET HIERARCHY
CASE IV		Primary- and secondary-level streets surround the site; the subsidiary lanes link the primary roads by crossing over the site and lead to private pathways to access the individual buildings. The private housing units are accessed after 2 turns at the fourth step: [1] → [3] → [4] → 4
CASE V		Primary-level streets surround the site. The building entrances are accessed after either 3 or 4 turns at the fourth or fifth steps: [1] → [3] → [4] → 4 [1] → [2] → [3] → [4]→ 5
CASE VI		Primary- and secondary-level streets surround the site. The main site entrances are provided from the secondary street. The houses are accessed after 4 turns at the fifth step from the main primary public road: [1] → [2] → [3] → [4]→ 5
CASE VII		Two primary streets and one secondary street surround the site. The buildings are accessed after 3 or 4 turns at the fourth or fifth steps from the nearest primary main public road: [1] → [3] → [4] → 4 [1] → [2] → [3] → [4]→ 5
[1] Primary Street [2] Secondary Street [3]Tertiary Street [4] Quaternary Street House Unit 1 The number inside the house unit indicates at what step the building entrance is accessed from the primary street		

7.1.4. Defining the Typological Process

The typological transformation between the cases has been defined according to the degree of similarities and differences observed in their spatial characteristics at the three scales. The comparison of the spatial characteristics described above for each relative pair is going to be visually presented chronologically in this section. The aim is to visually trace whether the spatial characteristics of one case continued or discontinued in the following cases, both within the same morphological period and in the following morphological period. Before deciding whether the observed transformation is a typological process or not, each spatial characteristic explained above was compared between the cases at the three scales and described with regard to whether it is continued, partly continued or discontinued. The legend used in the figures is shown below.

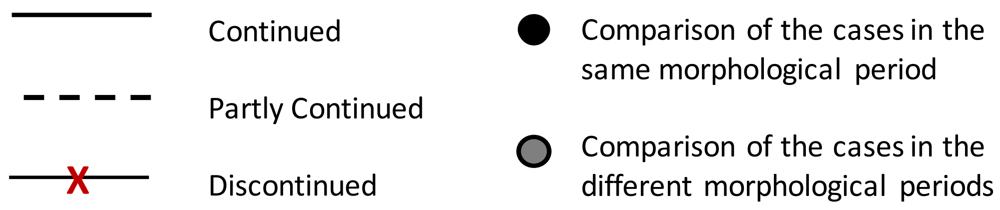


Figure 7.2 The legend for the pairwise comparison of the spatial characteristics to define typological process

As mentioned in Section 5.1.2, according to the number of observed continued, partly continued or discontinued spatial characteristics, the types of transformation between the cases were examined at the three scales. At the building scale, there is a continuous transformation with different degrees of similarities and differences through the chosen cases, from the most traditional one to the most contemporary one (from Phase I to Phase IV). Case I and Case II were identified as the continuity cases introduced in the same morphological period (Phase I) and offering very similar spatial organisations. Case III is the type that was introduced in the following morphological phase (Phase II). Case III can be considered as a type where the traditional layout principles such as having a central hall/living room were reintroduced to multi-storey/multi-family apartment buildings. Therefore, it is taken as the case of partial continuity. There are three types of houses (Cases IV, V, and VI) in the following morphological phase (Phase III). When Case III was separately compared to any of these three types in Phase III (i.e. Case III→ Case IV, Case III→Case V, Case III→Case VI), the relative relations were also noted as partial continuity. Apart from the comparison of Case III to Cases IV, V and VI, these three cases within their group present partial continuity in the same period (Phase III). Similarities in these cases were also observed in Case VII in the following period (Phase IV). However, it was also different in terms of its rigid layout, the strict separation of public-private zoning and the access pattern. Therefore, the relative relations between the cases in Phase III and Case VII in Phase IV (i.e. Case IV → Case VII, Case V → Case VII, and Case VI →Case VII) were also considered to be a partial continuity (see Figure 7.3 and Figure 7.6).

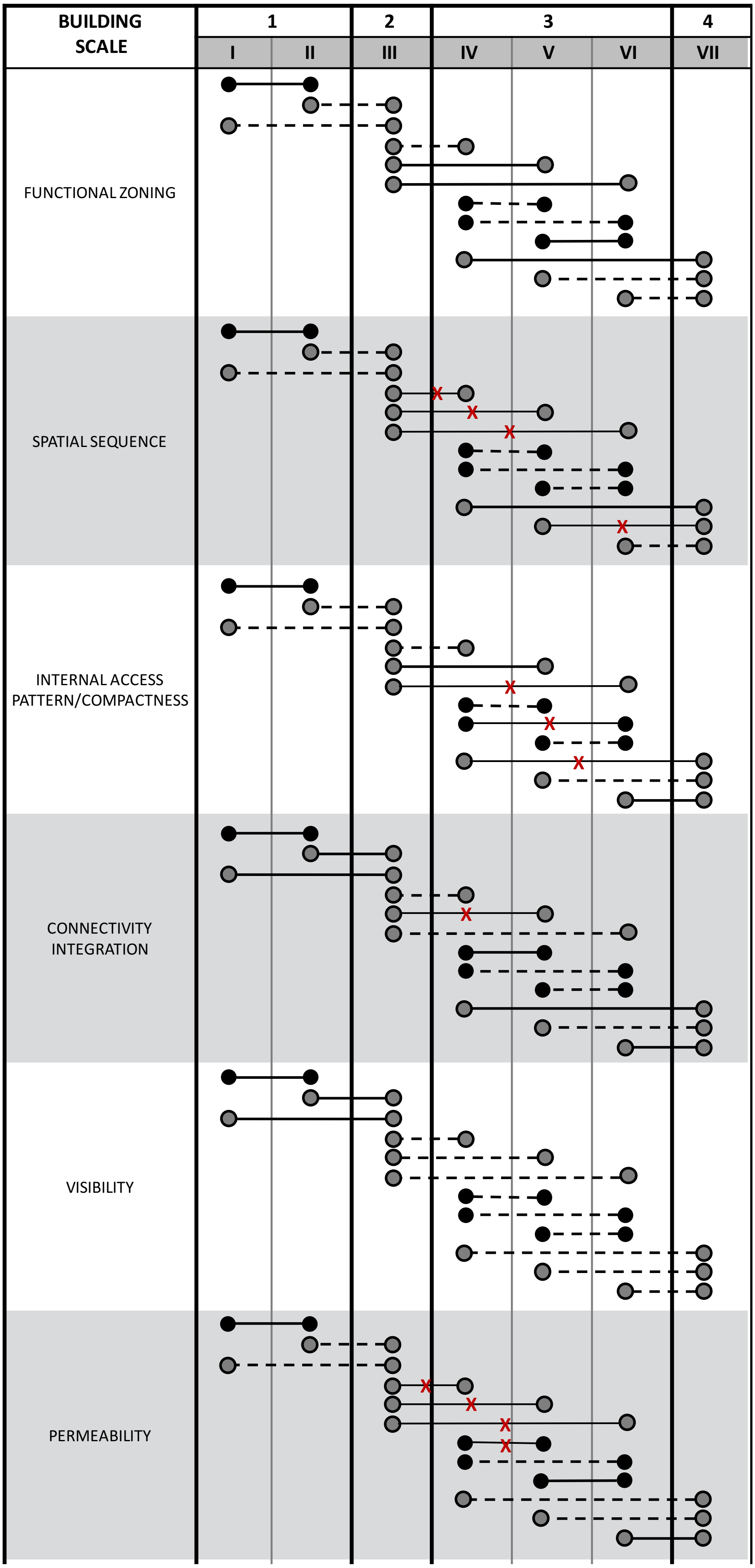


Figure 7.3 Comparison through the cases at the building scale

At the street scale, cases I and II share the same street characteristics in Phase I; therefore, the relation between them was taken as continuity. However, their relative relation to Case III in Phase II was observed as mutation since most of the characteristics such as building arrangement, height/width ratio, entrance positioning and spatial hierarchy did not continue in Case III. Case III was different from Case IV in terms of building entrance positioning and the number of turns; and the other characteristics were either continued or partly continued. Although some characteristics of Case III such as building arrangement along a street and building height/street width ratio mutated in Case V, building entrances, their positioning, spatial hierarchy, direction changes, etc., were continued or partly continued. Similarly, the only mutation observed between Case III and Case VI was observed in building height to street width ratio, while the other characteristics were more or less similar or partly different. Therefore, the transformational relations between Case III and any of the cases IV, V and VI in Phase III were defined as partial continuity. When the three cases (IV, V and VI) were compared to each other, the relation between Case IV and Case V was defined as mutation since all the characteristics except the spatial hierarchy discontinued. However, it was partial continuity for Cases V and VI because all the analysed street scale characteristics were noted as partly continued except that height to street width ratio continued. If Case IV, Case V and Case VI in Phase III are compared to Case VII in Phase IV, it can be seen that most of the characteristics do not continue in Case VII and so the relation was noted as mutation. This was obvious between Case IV and Case VII, since Case IV consists of single-family terraced houses arranged along a street, while Case VII is a free-standing building typology, the arrangements of which do not necessarily depend on the street formation. Case V and Case VI are also free-standing buildings; however, their relations to Case VII are also defined as mutation due to the fact that there were no characteristics noted as continuity – they were either discontinued characteristics such as building entrance positioning, direction changes, building height to street width ratio, or partly continued characteristics such as spatial access hierarchy and active front coverage. In contrast, the relation between Case V and Case VI was partial continuity since there were no mutated characteristics. Moreover, they had the same height to width ratio and partly similar building arrangement, active front coverage, spatial hierarchy, direction changes and so on (see Figure 7.4 and Figure 7.6).

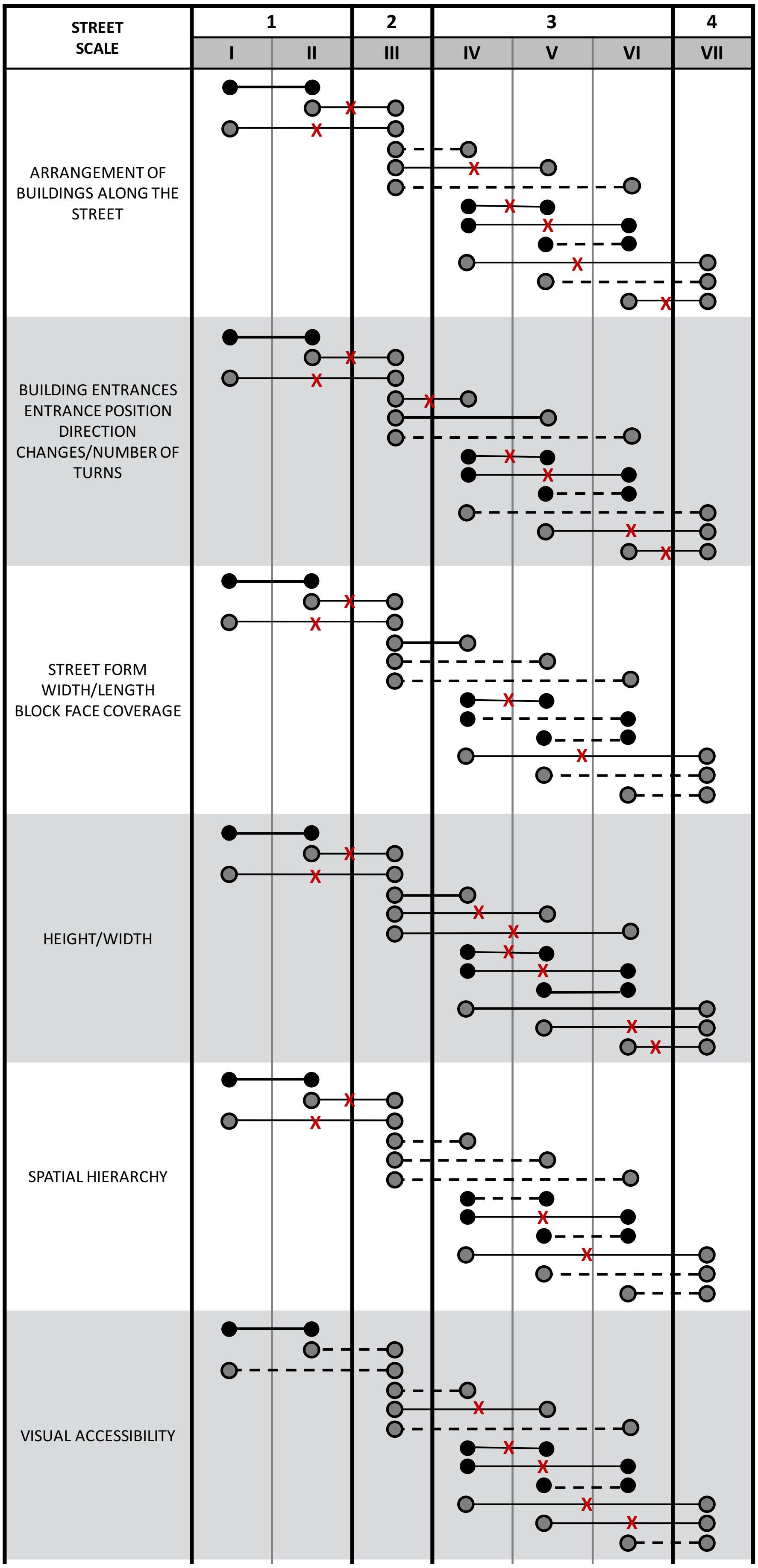


Figure 7.4 Comparison through the cases at the street scale

At the neighbourhood scale, mainly mutational relations were observed between the cases in the different morphological periods. While Case I and Case II were the continuity cases, Case III showed a mutational link to them in the following phase, Phase II, because of the discontinuity observed in all the studied characteristics of the neighbourhoods such as site/block arrangement, block size and shape, spatial sequence, the height of buildings, land coverage and street configuration. The relationships of Case III to the following cases, Case IV, Case V and Case VI in Phase III, were identified as either partial continuity or mutation. The relation between Case III and Case IV was partial continuity because most of the characteristics such as building heights, linear street arrangement, street configuration, etc., were partly similar and only public-private area hierarchy and directional changes were mutated characteristics. However, the relative relation of Case III to either Case V or Case VI was defined as mutation since – except for the spatial sequence and the number of turns – all the characteristics were noted as discontinued in Case V and Case VI. The transformational relation at the neighbourhood scale was mutation between Case IV and Case V owing to the fact that all examined characteristics showed discontinuity. In contrast, it was observed that – except for the mutation seen in street/block arrangement – all the other characteristics partly continued from Case V to Case VI, which was accordingly named as partial continuity. However, the individual relations of the cases in Phase III to Case VII in Phase IV were noted as mutation. All the characteristics mutated from Case IV to Case VII, while there was no continuity noted from either Case V or Case VI to Case VII and the characteristics were either partly continuous or mutated characteristics (see Figure 7.5 and Figure 7.6).

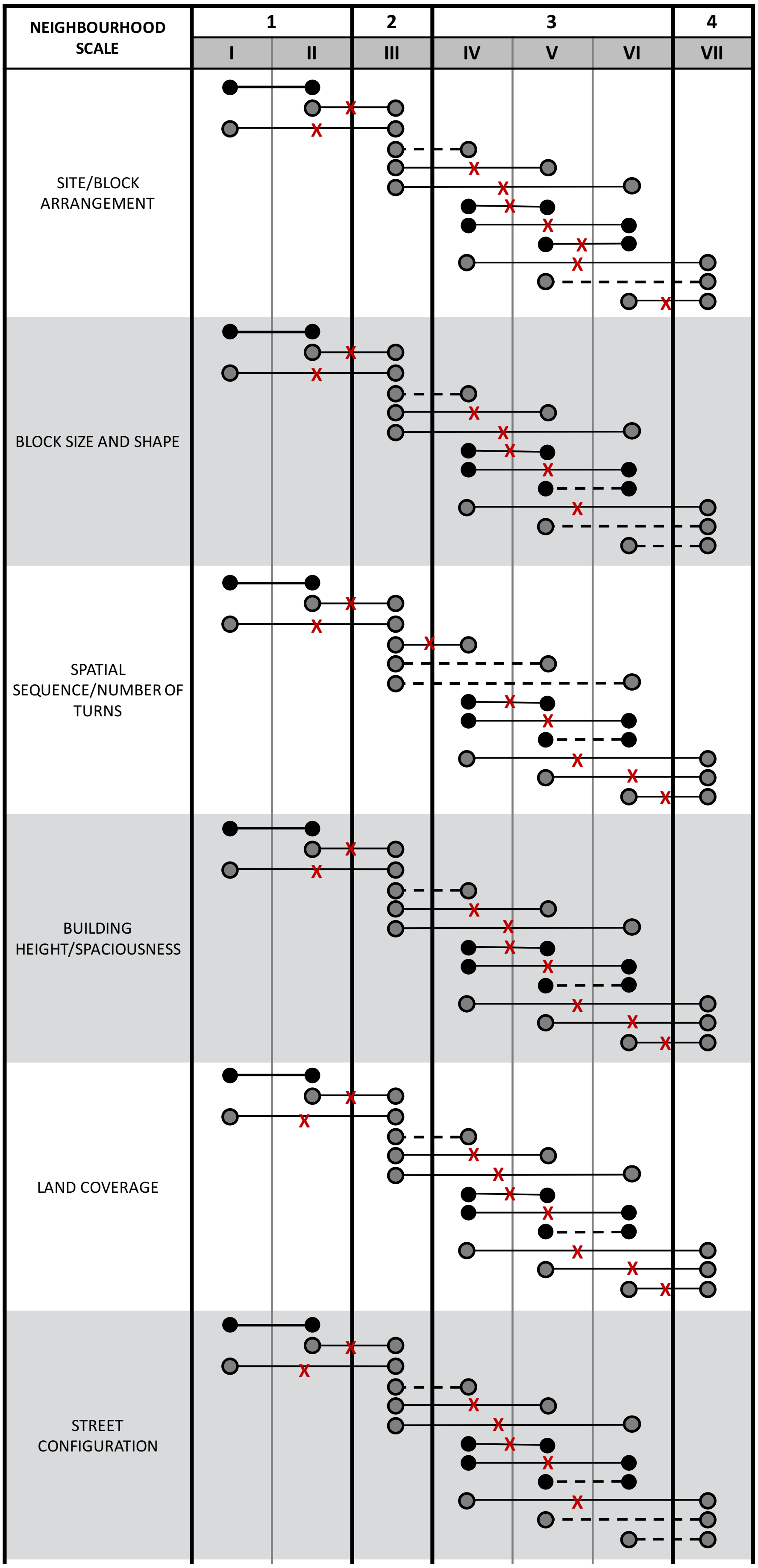


Figure 7.5 Comparison through the cases at the neighbourhood scale

Overall, the study identified three types of transformation between the cases: continuity, partial continuity and mutation, following the analysis of their spatial characteristics summarised in Figure 7.3, Figure 7.4 and Figure 7.5. The relative transformational relations are summarised in Figure 7.6. (See also Appendix C for the detailed comparison, characteristic by characteristic).

TYPOLOGICAL PROCESS ANALYSIS

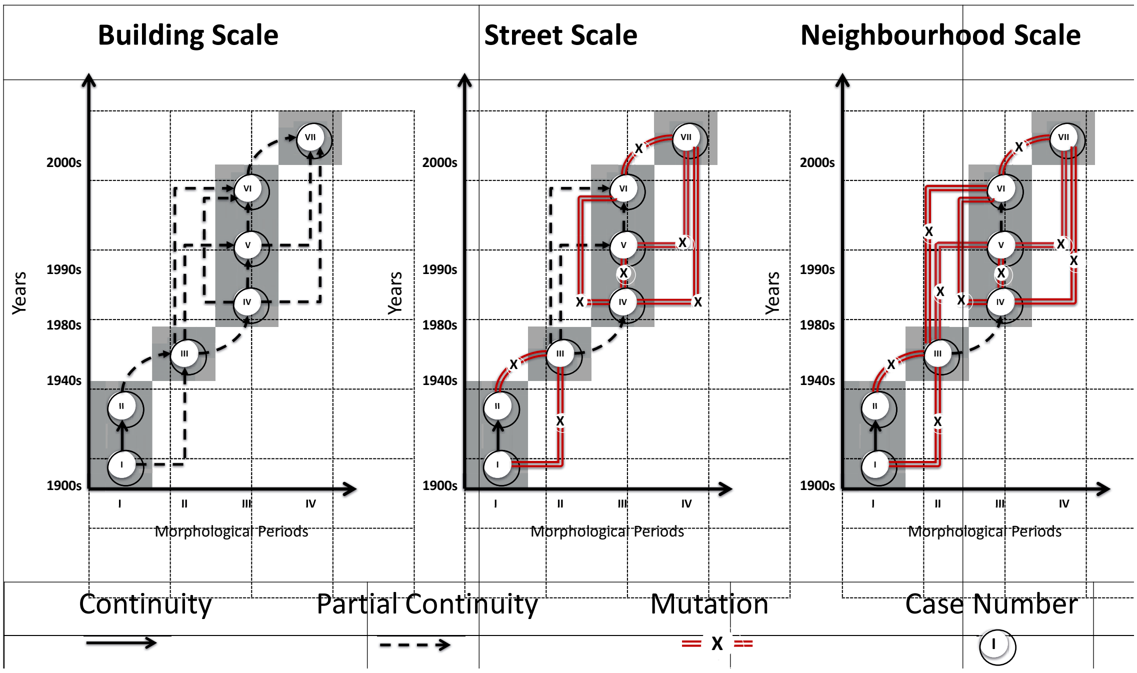


Figure 7.6 Typological process analyses at three scales

7.2. Sense of Place Assessment

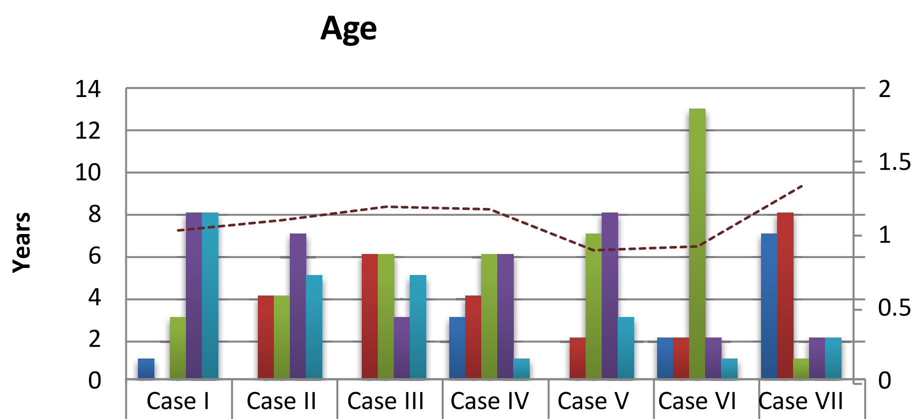
This section will present the data obtained through the interviews. As mentioned in the methodology chapter, the interview consists of three sections. Section I asks questions regarding the socio-economic and demographic variables of the residents; Section II asks residents to evaluate their overall residential living environments in relation to the 10 indicators of SoP; and Section III assesses the SoP in more detail at the three scales. The following will initially present the results for these three main sections with regard to the interviews from the processed data through SPSS. Firstly, the respondents' socio-economic and demographic characteristics will be described together with their means, medians and standard deviations. Secondly, the scores obtained from Section II of the interview concerning each SoP indicator will be presented. Thirdly, SoP scores will be compared through the cases at the three scales respectively. Following the presentation of the raw interview data, the overall SoP will be calculated as the weighted mean value of SoP at the building, street and neighbourhood scales. In addition, the impact of demographic variables on overall SoP scores will be examined. This will be followed by the statistical analysis of the results and the reliability tests of the scores.

7.2.1. The Description of Respondents' Characteristics

This section presents the socio-economic and residential demographics requested from the residents of the seven housing developments at the beginning of the interviews. The information requested comprises age, gender, education level, profession, ownership status, household size, the length of residence at home, in the neighbourhood/distict and the city, and finally, the respondents' hometown (whether Ankara or not).

a. Age

The respondents' ages have been categorised into five groups: 25-34, 35-44, 45-54, 55-64, and 65 and over. Given this categorisation, the bar chart below shows the breakdown of the age groups in the seven cases (Figure 7.7).



	Case I	Case II	Case III	Case IV	Case V	Case VI	Case VII
25-34 years	1	0	0	3	0	2	7
35-44 years	0	4	6	4	2	2	8
45-54 years	3	4	6	6	7	13	1
55-64years	8	7	3	6	8	2	2
65 and over	8	5	5	1	3	1	2
Standard Deviation	1.02084	1.08942	1.1821	1.16529	0.88258	0.91191	1.32188

Figure 7.7 Respondents' age groups per house type

Given the above figure, the standard deviations of all the age groups are more or less in the same range. The majority of the respondents of Case I (80%) and Case II (60%) are

55 years old and over, whilst 60% of the respondents of Case III are between 35 and 54 years old. The most common age group for the respondents of Cases IV, V and VI was 45 years and over, and the percentages are 65%, 90% and 80% respectively. The youngest respondents were from Case VII, 75% of whose respondents were between 25 and 44 years old.

b. Gender

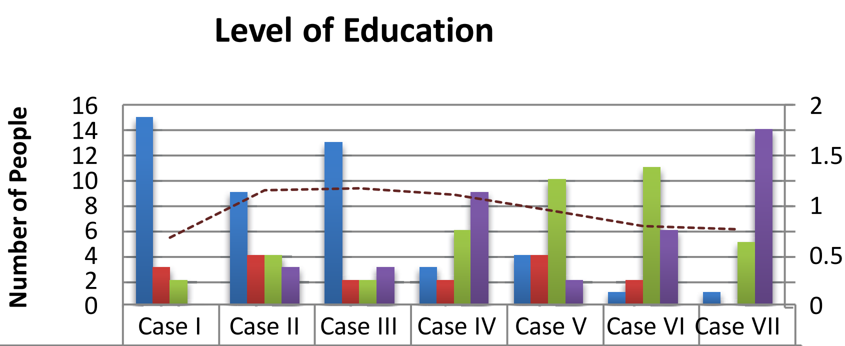
Although the interview aimed to take responses representing the overall view of the households, in reality, the responses were received from only one member of the family (mostly likely the older one) on behalf of all family members. Table 7.10 shows the distribution of females and males interviewed as residents of the seven house types. The majority of the respondents for almost all cases (except Case III) were female. This was mainly because women were available at the time of the interview, while the men were at work. Women were in the majority (at least 60%) in six of the seven cases, and this was 45% in Case III.

Table 7.10 Gender distributions of the cases and standard deviations

GENDER					
	Female	Percentage	Male	Percentage	Stand. Deviation
Case I	12	60%	8	40%	0.50262
Case II	13	65%	7	35%	0.48936
Case III	9	45%	11	55%	0.51042
Case IV	14	70%	6	30%	0.47016
Case V	12	60%	8	40%	0.50262
Case VI	14	70%	6	30%	0.47016
Case VII	13	65%	7	35%	0.48946

c. Education

Although it is claimed that education might have an impact on SoP, there is no empirical research proving this statement. Despite this, the respondents were asked about their education level and the responses were noted at four categories: primary school (the first five years of education), secondary school (the three years following primary school), high school (the three years following secondary school) and university education (generally four years of a Bachelor’s degree). Figure 7.8 shows that the education levels of respondents in the early cases (Cases I, II and III) were low, and the majority of the respondents were educated to primary school level only, while, in the other cases, the majority of the respondents were either high school or university graduates.



	Case I	Case II	Case III	Case IV	Case V	Case VI	Case VII
Primary School (1-5 years)	15	9	13	3	4	1	1
Secondary School (6-8 years)	3	4	2	2	4	2	0
High School (9-11 years)	2	4	2	6	10	11	5
University (Bachelor's degree)	0	3	3	9	2	6	14
Standard Deviation	0.67082	1.14593	1.16416	1.09904	0.94591	0.78807	0.75394

Figure 7.8 Education levels of the respondents

d. Profession

Table 7.11 shows the distribution of the respondents' professions. Despite the variety seen in the occupation groups, the highest percentage in most of the cases (except Case VII) was housewives (as mentioned in the Gender section above, this is perhaps also relevant to the time of the interviews, the majority of which were conducted during working hours). In contrast, there was only one housewife interviewed in Case VII.

Table 7.11 The distribution of professions across the cases

PROFESSION	Case I	Case II	Case III	Case IV	Case V	Case VI	Case VII
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Architect				1(5%)			2(5%)
Barber		1(5%)	1(5%)	1(5%)			
Cook				1(5%)			
Dentist				1(5%)			
Doctor				1(5%)		1(5%)	3(15%)

Table 7.11 The distribution of professions across the cases *(Continued)*

PROFESSION	Case I	Case II	Case III	Case IV	Case V	Case VI	Case VII
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
Driver	1(5%)			1(5%)			
Dry Cleaner			1(5%)				
Employee	2(10%)		3(15%)		2(10%)	5(5%)	3(15%)
Engineer			1(5%)	2(10%)			4(20%)
Estate Agent							1(5%)
Farmer	3(15%)						
Freelancer	2(10%)	1(5%)		3(15%)	3(15%)	2(10%)	
Housewife	7(35%)	10(50%)	10(50%)	5(25%)	8(40%)	9(45%)	1(5%)
Lawyer							1(5%)
Manager							1(5%)
Nurse		1(5%)		1(5%)			
Pilot				1(5%)			
Retired	3(15%)				4(20%)		1(5%)
Shopkeeper	1(5%)	2(10%)	1(5%)				1(5%)
Teacher	1(5%)	1(5%)		2(10%)	2(10%)	1(5%)	
Technician		1(5%)	1(5%)		1(5%)	1(5%)	2(%)
Worker		3(15%)	2(10%)			1(5%)	
TOTAL	20(100%)	20(100%)	20(100%)	20(100%)	20(100%)	20(100%)	20(100%)

e. Ownership Status

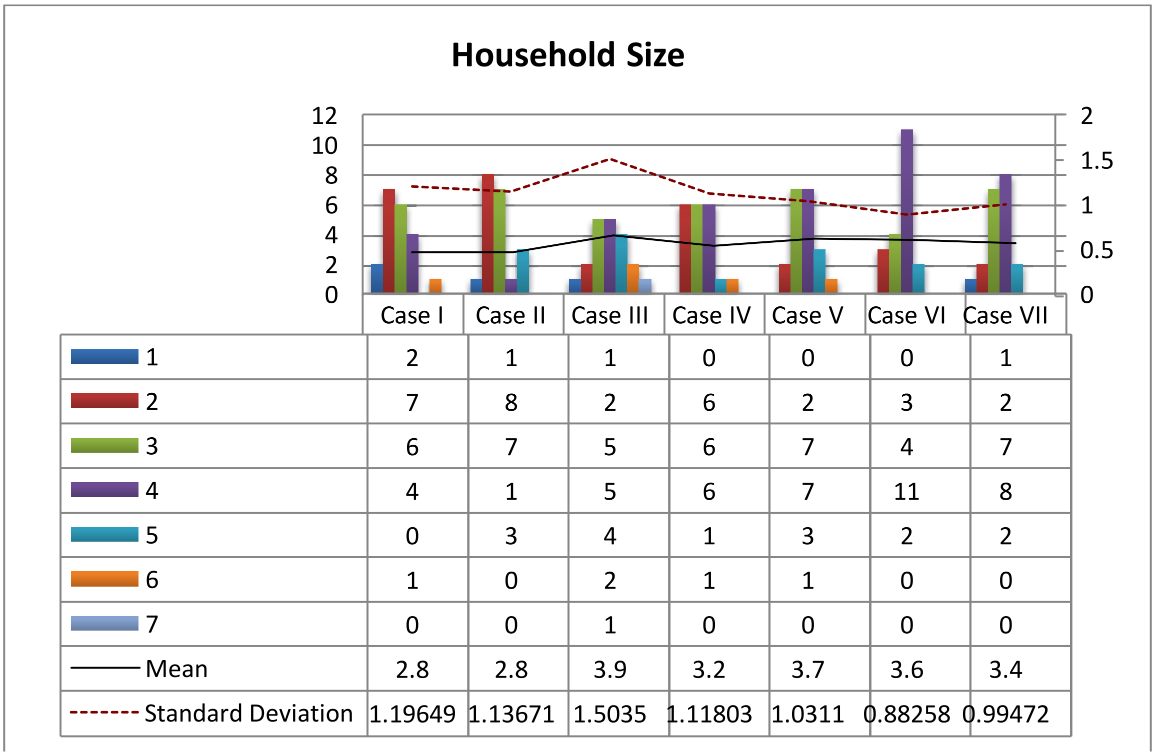
Except for the residents of Case III, at least 65% of the respondents of each case were the house owners. On the other hand, the majority (65%) of the respondents of Case III were the tenants (Table 7.12).

Table 7.12 Ownership status

	OWNERSHIP STATUS				
	Owned	**Percentage**	**Tenant**	**Percentage**	**Standard Deviation**
Case I	19	95%	1	5%	0.22361
Case II	15	75%	5	25%	0.44426
Case III	7	35%	13	65%	0.48936
Case IV	13	65%	7	35%	0.48936
Case V	18	90%	2	10%	0.30779
Case VI	16	80%	4	20%	0.41039
Case VII	16	80%	4	20%	0.41039

f. Household Size

Although the household sizes vary through the cases, the average number of people per household is 3-4 people for all cases (Figure 7.9).



	Case I	Case II	Case III	Case IV	Case V	Case VI	Case VII
1	2	1	1	0	0	0	1
2	7	8	2	6	2	3	2
3	6	7	5	6	7	4	7
4	4	1	5	6	7	11	8
5	0	3	4	1	3	2	2
6	1	0	2	1	1	0	0
7	0	0	1	0	0	0	0
Mean	2.8	2.8	3.9	3.2	3.7	3.6	3.4
Standard Deviation	1.19649	1.13671	1.5035	1.11803	1.0311	0.88258	0.99472

Figure 7.9 The number of people per family, mean and standard deviation scores

g. Length of Residence

The length of residence was asked at three levels: home, district and city. At the home level, while the main trend was 15 years and over for the majority of the cases, the same figure was between five and 15 years for Case III and Case VII (Table 7.13). This is perhaps because Case III residents were mainly tenants and Case VII is the most contemporary case, where the maximum number of years of residence is limited to the building age, which is less than 15 years.

Table 7.13 Length of residence at home

LENGTH OF RESIDENCE AT HOME					
	< 5 years	5-14 years	≥15 years	Median	Standard Deviation
Case I	0 (0%)	0 (0%)	20 (100%)	(>15 years)	.00000
Case II	2 (10%)	6 (30%)	12 (60%)	(>15 years)	.68825
Case III	7 (35%)	6 (30%)	7(35%)	(5 to 15 years)	.85840
Case IV	3 (15%)	8 (40%)	9(45%)	(>15 years)	.73270
Case V	2 (10%)	3 (15%)	15(60%)	(>15 years)	.67082
Case VI	1 (5%)	6 (30%)	13(65%)	(>15 years)	.59824
Case VII	9(45%)	11 (55%)	0(0%)	(5 to 15 years)	.51042

At the district level, most of the residents had previously lived in nearby housing developments so that they had known the surrounding area for over 15 years (Table

7.14). The same figure was slightly lower in Case VII since the area is a newly developing residential zone.

Table 7.14 Length of residence in district

LENGTH OF RESIDENCE IN DISTRICT					
	< 5 years	5-14 years	≥15 years	Median	Standard Deviation
Case I	0 (0%)	0(0%)	20(100%)	(≥15 years)	.00000
Case II	1(5%)	4(20%)	15 (75%)	(≥15 years)	.57124
Case III	4(20%)	4(20%)	12(60%)	(≥15 years)	.82078
Case IV	1(5%)	6(30%)	13(65%)	(≥15 years)	.59824
Case V	1(5%)	2(10%)	17(85%)	(≥15 years)	.52325
Case VI	0(0%)	4(20%)	16 (80%)	(≥15 years)	.41039
Case VII	6(30%)	11(55%)	3(15%)	(5 to 15 years)	.67082

The residents were also asked how long they have lived in the city and the majority of the respondents of all cases reported residency of 15 years or more (Table 7.15).

Table 7.15 Length of residence in city

LENGTH OF RESIDENCE IN CITY					
	< 5 years	5-14 years	≥15 years	Median	Standard Deviation
Case I	0(0%)	0(0%)	20(100%)	(>15 years)	0.00000
Case II	1(5%)	0(0%)	19 (95%)	(>15 years)	0.44721
Case III	1(5%)	4(20%)	15 (75%)	(>15 years)	0.57124
Case IV	0(0%)	0(0%)	20(100%)	(>15 years)	0.00000
Case V	0(0%)	1(5%)	19(95%)	(>15 years)	0.22361
Case VI	0(0%)	0(0%)	20(100%)	(>15 years)	0.00000
Case VII	2(10%)	2(10%)	16(80%)	(>15 years)	0.65695

Overall, the general trends observed in the length of residence were more or less the same through the cases at home, district and city levels, with some slight differences seen in Case III and Case VII. Although the respondents of Case III reported fewer years of occupancy at home, the majority of them were the previous residents of the same type of house located in the same street/neighbourhood. Regarding Case VII, although the lower length of residence can be seen as a weakness, it is important to note that 55% of its residents have lived in this development for eight years, which is the maximum number of years a family can have lived there since it was built. Additionally, 85% of them had previously lived in nearby housing developments.

h. Hometown (Ankara or not)

The majority (55% and more) of the respondents are from Ankara for Cases I, II, IV and VI. Case III follows this with 45%, whilst the majority of the respondents of Case V (70%) and Case VII (65%) are migrants from different cities (Table 7.16).

Table 7.16 Hometown (Ankara or another city)

HOMETOWN			
	Ankara	Another city	Standard Deviation
Case I	18 (90%)	2 (10%)	0.30779
Case II	13 (65%)	7 (35%)	0.48936
Case III	9 (45%)	11 (55%)	0.51042
Case IV	11 (55%)	9 (45%)	0.51042
Case V	6 (30%)	14 (70%)	0.47016
Case VI	16 (80%)	4 (20%)	0.41039
Case VII	7 (35%)	13 (65%)	0.48936

This section has presented the demographic variables for each case. Although the residents were carefully chosen to keep the demographical differences to a minimum, the impact of the observed variety presented above on the scores has also been tested. (See Section 7.2.5 for details).

7.2.2. General Satisfaction with the Home Environment (Section II)

The residents initially rated each indicator of SoP on a general basis concerning their general living environment without considering specific scales. Table 7.17 shows the general satisfaction score that was calculated through equally weighted mean values of the 10 indicators.

Table 7.17 Mean and standard deviation values of general residential satisfaction scores (Section II)

OVERALL SCORE OF THE GENERAL VIEW ON SOP INDICATORS		
	Mean	Standard Deviation
Case I	5.755	0.60217
Case II	5.6875	0.49121
Case III	5.0875	0.57351
Case IV	5.4925	0.54078
Case V	5.3875	0.42392
Case VI	5.125	0.45262
Case VII	4.615	0.65996

As seen from Table 7.17, the standard deviations of the cases are low and similar, which means the responses of each house group were not polarised and therefore the calculated mean values are valuable descriptive measures providing a healthy comparison through the cases. The general trend among cases is to have a mean value between 5 and 6 (on the 7-point rating scale). The respondents of Case I and Case II exceptionally reported a higher score of close to 6. Despite the variations, in a number of cases (Cases III, IV, V, VI), the same figure ranged between 5-5.5. The score was comparatively lower amongst the respondents of Case VII; that is, below 5, indicating a moderate level of satisfaction.

7.2.3. Sense of Place Assessment (Indicator by Indicator) at the Three Scales

The following will assess SoP from the data obtained in Section III of the interview. The respondents' views on the 10 indicators of SoP will be presented comparatively through the cases at the building, street and neighbourhood scales separately. The analysis below shows whether the satisfaction with the different constructs of SoP is significantly different or not in different house types and this is presented through p-values (>.05 indicates no difference; <.05 indicates statistically significant difference).

a. Building Scale Analysis

At the building scale, there is no significant difference in the 'Social Interaction' scores, which range between 5.43 and 5.78 among the cases (p-value=.432). However, the scores of the other nine indicators are significantly different in all cases (p-value<.05), as shown in Figure 7.10.

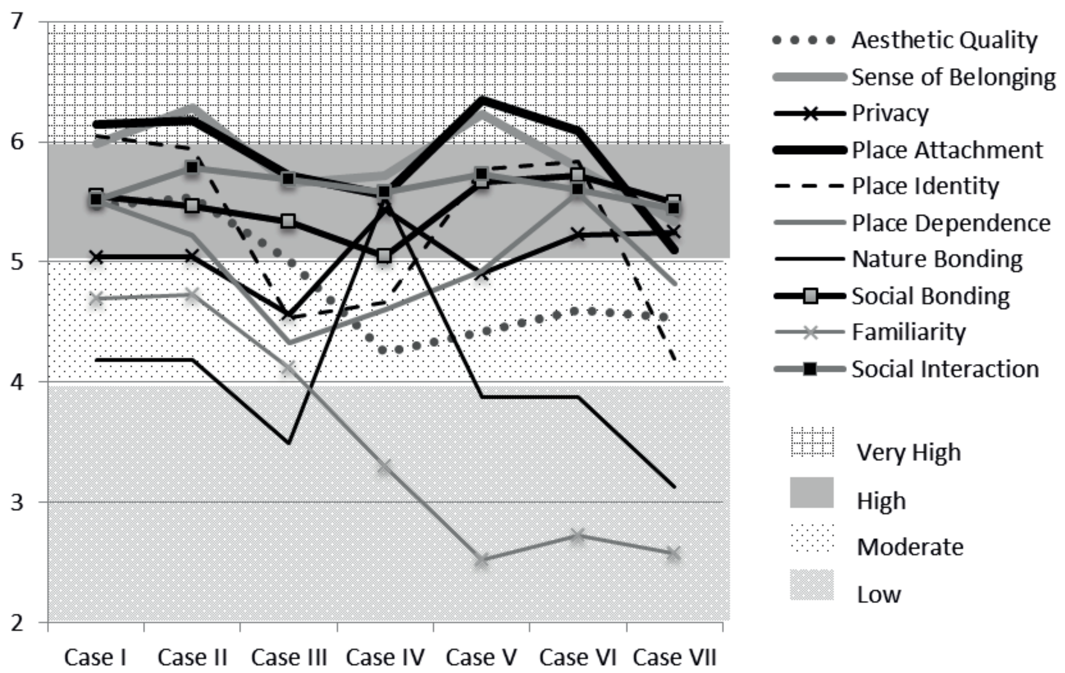


Figure 7.10 SoP assessment at the building scale

The scores for most of the indicators show a slight downward trend over time despite the fluctuations. Privacy, rated as 5.04 for Case I, is the only indicator showing a small improvement of 4% in Case VII. From the earliest case to the most contemporary one, the most dramatic changes are observed in familiarity and place identity, with the decline rates of 45% (from 4.7 to 2.57) and 30% (from 6.05 to 4.2) respectively. Overall, all residents have reported at least a *moderate* level of satisfaction with most of the indicators. Only nature bonding and familiarity indicators fall to the *low* range, while the sense of belonging and the place attachment scores are rated *very high*.

b. Street Scale Analysis

At the street scale, the scores of all indicators are significantly different (p-values<.05) and show a clear, marked decline from Case I to Case VII (Figure 7.11).

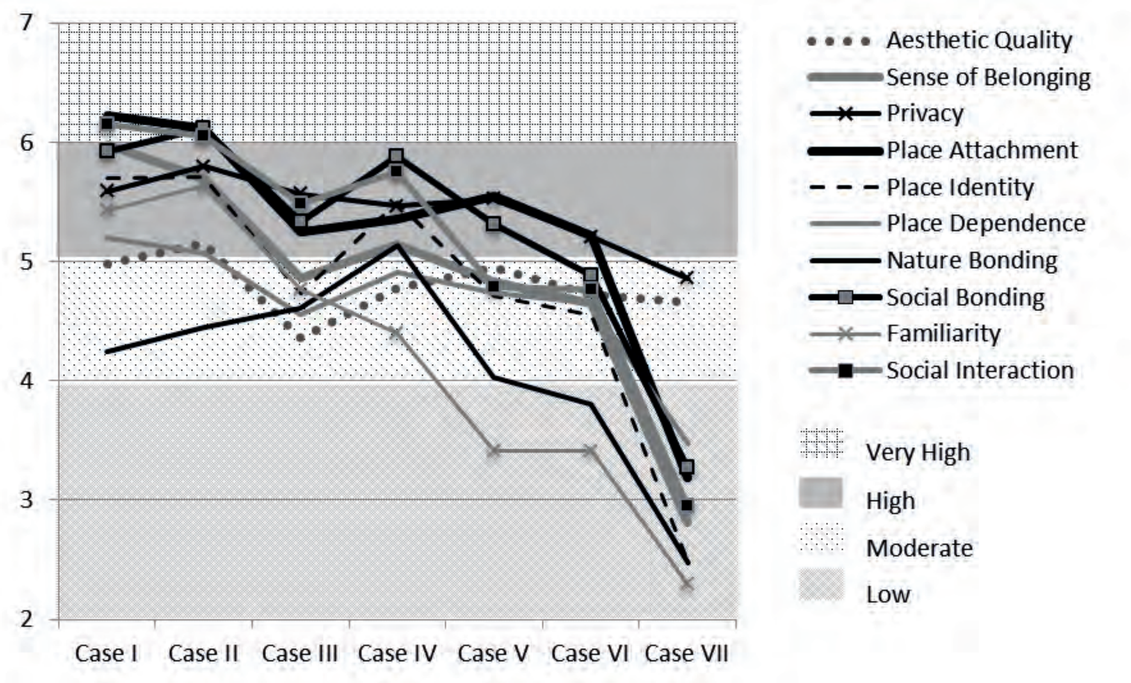


Figure 7.11 SoP assessment at the street scale

Despite the main downward trends, scores in most of the cases are above four, except in Case VII, where all the indicators, except aesthetic and privacy, hit the bottom. Moreover, the least decrease in scores over time is observed in aesthetic quality, which is only 6% (from 4.98 to 4.65), followed by privacy at 12% (from 5.58 to 4.86). Regarding nature bonding at the street level, there is a gradual improvement from Case I to Case IV. Then, it declined and hit the bottom in Case VII. Furthermore, the most drastic decline, which is over 50%, is experienced in social interaction, from *very high* (>6) in

Case I to *low* (<3) in Case VII. Overall, the scores are at the *moderate* level in the first four cases; however, they could not be sustained in later housing developments.

c. Neighbourhood Scale Analysis

At the neighbourhood scale, there are significant differences in the scores of all the SoP indicators amongst the seven house types (p-values<.05). Similar to the results at the street scale, the overall trend is downwards from Case I to Case VII for most of the indicators, despite some fluctuations.

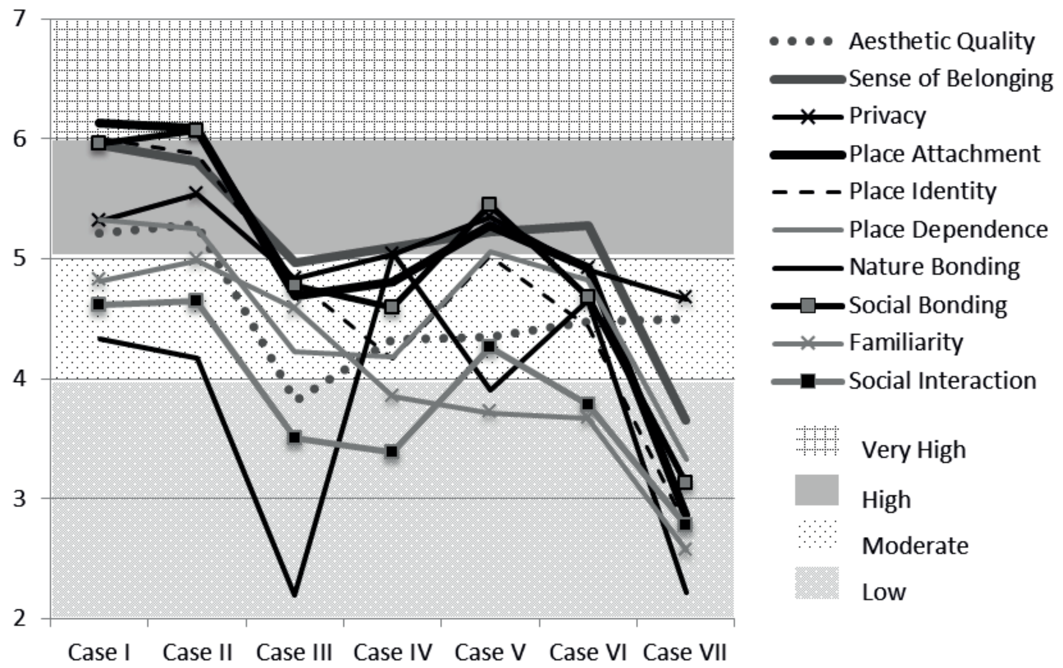


Figure 7.12 SoP assessment at the neighbourhood scale

The scores are markedly stable and comparatively higher in the first two cases. The most dramatic decline is observed in the scores of Case III and VII, and there are fluctuations in between. It is noted that the scores of privacy are relatively stable and have decreased by around 12% (from 5.3 in Case I to 4.6 in Case VII). The most dramatic fall is seen in place attachment, which was scored *very high* (6.13>6) in Case I, then *low* (2.86<4) in Case VII. Place identity and social bonding have also seen radical changes over time and have declined by approximately 50%. Social interaction hit the *lowest* level (2.7<4) in Case VII, and is at the *moderate* level (4.6<5) in Case I. Sense of belonging and place dependence were scored *high* in the traditional cases. However, the scores later dropped substantially and were *low* in the latest case. The scores of aesthetic quality showed a slightly different trend compared to those of the others. Although the decline is noticeable in the first three cases, it stays relatively stable between Case III and Case VII at the *moderate* level. Overall, only in the traditional cases, the scores for all indicators are above four, which is the threshold of satisfaction. This could not be sustained in later cases, except privacy and aesthetic quality, which are at the *moderate* level in the latest case.

7.2.4. Overall Sense of Place

This section presents the overall SoP score for each case, which is calculated by combining the individual scores for the 10 SoP indicators presented in Section 7.2.3 at the three scales.

The mean scores of all SoP indicators are calculated and compared at the three scales (Figure 7.13). SoP scores at all scales are the highest in Cases I and II and both at around 5.5, indicating a *high* level. Then the scores have dropped greatly in Case III and increased slightly in Case IV. The improvement has continued at the building and neighbourhood scales in Case V; however, there has been a sudden decline in SoP score at the street scale. Although the improvement is still noted at the building scale in Case VI, SoP scores at the street and neighbourhood scales are comparatively low in Case VI and Case VII.

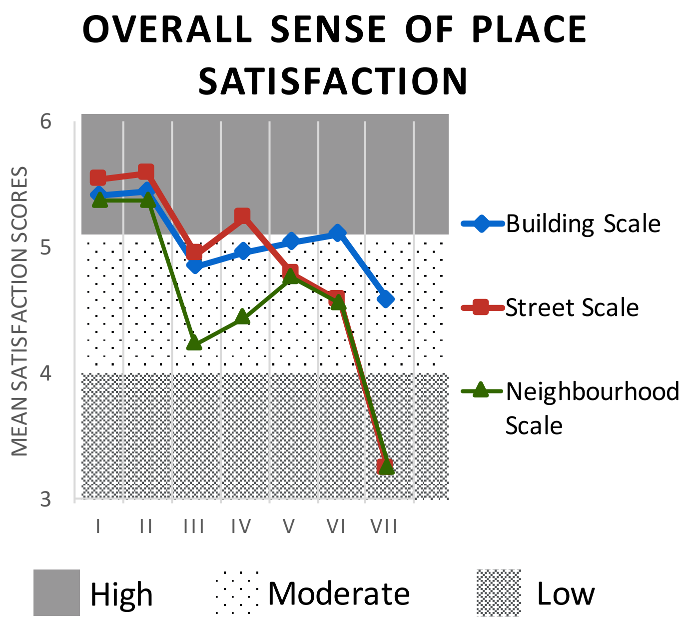


Figure 7.13. Comparison of the overall SoP scores at the three scales

Overall, SoP at all scales shows a downward trend over time but at different degrees of decline. The most dramatic drop is at the street and neighbourhood scales by around 50%, while the decline at the building scale is 18%. Moreover, only at the building scale, SoP scores are at least at the *moderate* level, with the lowest score in Case VII (4.58). In comparison, SoP scores in later cases are relatively *low* at the street and neighbourhood scales. It is also observed that SoP scores are higher at the street scale than those at the building and neighbourhood scales in Cases I, II, III and IV. Cases V, VI and VII have achieved better SoP at the building scale.

7.2.5. The Impact of Demographic Variables on Sense of Place

The research developed strategies to eliminate the impact of socio-economic and demographic variables. The cases were chosen from the same city and were in close vicinity to each other, and the residents have broadly similar socio-economic and cultural status. The research was conducted with mid-income groups living in houses that are more or less similar prices. Additionally, in the interviews, the household consensus was sought. In addition to all these points, in order to emphasise the strength of the results, the research also tested the effects of the demographic variables previously mentioned and also shown in Figure 7.14 at the three place scales.

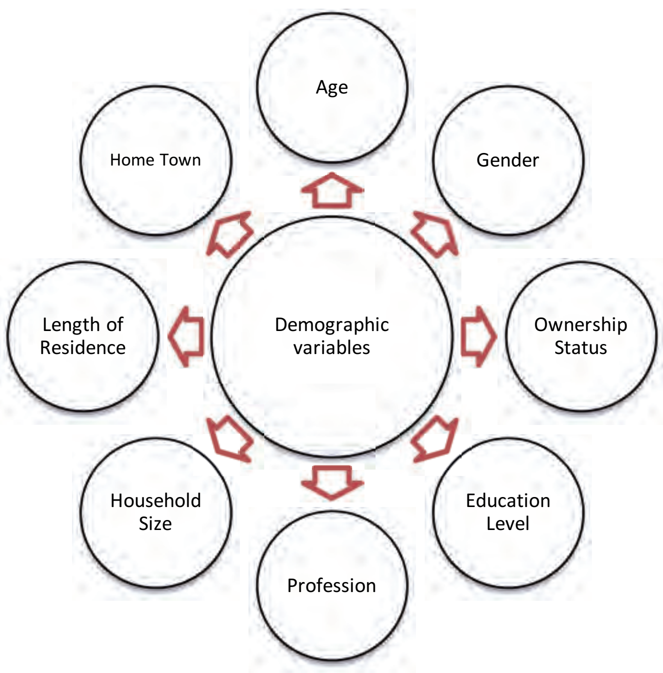


Figure 7.14 Demographic variables affecting sense of place

The testing procedure involves the comparative examination of three impact scores: the demographic variables, spatial typology variable, and the interaction between each variable and spatial typology variable. These impact scores are computed for each demographic variable at the three scales by means of two-way ANOVA tests computed through SPSS software. The insignificant impact was represented by p-value>.05 (Field, 2009).

The analysis showed that the impacts of most of the demographic factors on SoP were insignificant (p-values>.05) compared to those of the spatial typologies (only the impact of *the length of residence in the city* was more apparent, with a p-value of .019, at the street scale). Moreover, the interaction between the majority of the demographic variables and the spatial typologies also had an **insignificant** impact on SoP, except the interaction between spatial typologies and *education level* (p-value=.009), *profession* (p-value=.032), *length of residence in the district* (p-value=.037) and *length of residence in the city* (p-value=.002) at the street scale, as well as, at the neighbourhood scale, the interaction between *education level* (p-value= .028) and spatial typologies.

Table 7.18 The controlled demographic variables

	BUILDING SCALE	STREET SCALE	NEIGHBOURHOOD SCALE
Age	✓	✓	✓
Gender	✓	✓	✓
Education	✓	✗ (60% →23%)	✗ (55% →20%)
Profession	✓	✗ (73% →40%)	✓
Ownership Status	✓	✓	✓
Household Size	✓	✓	✓
Length of Residence (Home)	✓	✓	✓
Length of Residence (District)	✓	✗ (72% →34%)	✓
Length of Residence (City)	✓	✗ (75% →18%)	✓
Hometown	✓	✓	✓
(✓) means that the impact of the relevant variable is controlled and not significant (✗) means that the impact is significant but, when compared to the impact of spatial typology, the impact was found to be less.			

However, from a comparative point of view, the calculated effect sizes showed that the intensity of the aforementioned impacts on SoP was much less than that of spatial typologies. Table 7.18 shows these comparisons in percentages. For instance, at the street scale, while 60% of the differences were explained by the differences in the house type variable, the differences in the education level affected 23% of the results. (See Appendix D for the detailed statistical significance results of all variables at the three scales together with their interaction scores.) Therefore, the evidence is sufficient to support the view that spatial typologies are the main impact factors for SoP in this research. In other words, the impact of the demographic variables has been appropriately managed through the research design and could be disregarded in the discussion.

7.2.6. Statistical Analysis of the Comparisons

The mean values of the 10 indicators of the SoP and overall SoP of the cases have been statistically compared at the three place scales in the SPSS software. The statistical procedure tests two types of hypothesis defined between the independent and dependent variable: the null hypothesis (H_0) and the alternative hypothesis (H_a). The only independent variable used in this statistical analysis is the '*type*' variable, which helps to differentiate between the chosen cases. This is an attribute-independent variable where its categories cannot be changed during the study since the house types are strictly kept the same and the study is looking for the effect of different house/street and neighbourhood typologies on SoP. The hypotheses were formulated between the '*type*' independent variable and one dependent variable that can be either any of the 10 SoP indicators or overall SoP satisfaction at the three scales. Given this, the null and alternative hypotheses were defined as follows:

$$H_0: \mu_{Case\ I} = \mu_{Case\ II} = \mu_{Case\ III} = \mu_{Case\ IV} = \mu_{Case\ V} = \mu_{Case\ VI} = \mu_{Case\ VII}$$

H_a: *There is a statistically significant difference between the seven cases regarding the mean scores of any chosen dependent variable.*

The null hypothesis means that there is no significant difference in the SoP scores between the cases, so the research cannot proceed further with the computed results. That is, therefore, something the study does not want to encounter. On the other hand, in the alternative hypothesis, it is expected that at least one house group mean is significantly different from the means of the other house groups. Given this, the expectation in this study is to prove the alternative hypothesis so that the study could continue as intended. In other words, the alternative hypothesis is also the hypothesis that this study claims at this stage, so that the study can empirically prove that SoP is different because of the differences in house typology at building, street and neighbourhood scales.

The comparison is made according to the p-value computed for each group, and values of less than 0.05 indicate that there is a significant difference between the groups, while values bigger than 0.05 mean the inverse.

The one-way Analysis of Variance (ANOVA) is a statistical procedure used to compare the means of three and more groups according to only one independent variable. The results of ANOVA can be considered reliable if the following assumptions are met (Pmod, 2015; Oak, n.d.; Field, 2009):

1. The assumption of independence (the samples are random and independent, and the means are representative of the populations).
2. The assumption of normality (the response variable (dependent variable) is normally distributed (the F distribution) for each group).
3. The assumption of homogeneity of variance (the variances of distributions of populations are equal).

Following the above assumptions, firstly, the samples of this study are random and their independence, as a methodological concern, has been taken into account when the study was set up at the beginning as a part of the research design. Thus, this assumption was met. Regarding the second assumption (the assumption of normality), the normality was tested by using the Shapiro-Wilks test. Shapiro-Wilks is a kind of normality test that can be run in SPSS and is generally found to be appropriate if the sample size is less than 50 (Laerd Statistics, 2013). The test result indicates normality if the p-value >0.05 (Field, 2009). Given this, although some of the variables failed this normality test, the results were found to be approximately normally distributed (see Appendix E for the test of normality results). The third assumption, the homogeneity of variance, was tested through Levene's F test. This is the most common equality of variances test computed in SPSS, and, if the p-value is lower than 0.05, the assumption is not met (Oak, n.d.). Given this, the data has also been found not to be homogenous. Therefore, the data violated the two assumptions of ANOVA. However, although ANOVA is robust to the above assumptions, it might be still used, if the data is approximately distributed and the sample sizes are equal (Oak, n.d.). To be on the safe side, the results were also tested with Welsh and Kruskal-Wallis tests in addition to ANOVA. The results of the three tests indicated statistically significant differences similarly to the results of ANOVA.

This research will only report the results of the Kruskal-Wallis test, which was used to compare the mean values of each SoP indicator of the seven house types at the three scales. This test is the rank-based, non-parametric equivalent of the ANOVA test and is used when the assumptions of parametric tests like ANOVA are violated; when the dependent variable data sets are continuous or ordinal rather than interval; and when the comparison is between three or more independent groups.

However, the data still needs to be homogenous otherwise the results might be misleading. For this reason, a non-parametric Levene test was computed, and it was noted that the data was homogeneous since the p-values were over 0.05, which indicates no difference and therefore homogeneity (Table 7.19).

Table 7.19 Non-parametric Levene tests for homogeneity of variance for Kruskal-Wallis test

ANOVA

		Sum of Squares	df	Mean Square	F	Sig.
abs_difBuilding Scale	Between Groups	3.213	6	.536	.024	1.000
	Within Groups	2932.072	133	22.046		
	Total	2935.285	139			
abs_difStreet Scale	Between Groups	28.332	6	4.722	.207	.974
	Within Groups	3037.791	133	22.841		
	Total	3066.123	139			
abs_difNeighbourhood Scale	Between Groups	24.059	6	4.010	.168	.985
	Within Groups	3182.951	133	23.932		
	Total	3207.010	139			
abs_difOverallSOP	Between Groups	14.634	6	2.439	.106	.996
	Within Groups	3051.513	133	22.944		
	Total	3066.147	139			

Since the data met the assumption of the homogeneity of variance for the Kruskal-Wallis test, the statistical procedure could be performed further to test the alternative and null hypotheses mentioned above for each indicator and summed-up scores of SoP at the three scales and overall. The results indicated the significant differences as expected in H_a (p-values<.05) (Table 7.20).

Table 7.20 Kruskal-Wallis test results

Test Statistics[a,b]

	SoP at Building Scale	SoP at Street Scale	SoP at Neighbourhood Scale	Overall SoP
Chi-Square	37.447	96.741	96.034	90.229
df	6	6	6	6
Asymp. Sig.	.000	.000	.000	.000

a. Kruskal-Wallis Test
b. Grouping Variable: Type

However, these results only indicate that the differences exist; they do not show exactly which one is different. This requires a further test, namely the post-hoc comparison test, which will help to identify the similar and different groups. This post-hoc comparison has been performed using the Mann-Whitney test that will allow pairwise comparisons of the cases to be carried out. However, it compares only two at one time; therefore, the Mann-Whitney test has been applied with Bonferroni correction. This correction means determining a new critical p-value depending on the number of comparisons. To perform this correction, the p-value, which is normally taken as 0.05, is divided by the number of comparisons. The new p-value is much smaller and lessens the possibility of the results being easily significantly different. In other words, the test is more robust and the differences between the cases based on the new p-value can be sensitively identified.

Following the research design, which focuses on the typological transformation over time and following the same comparison pattern used in the typological process analysis in Section 7.1.4, the cases were firstly compared in chronological order: Case I→Case II, Case II→Case III, Case III→Case IV, Case IV→Case V, Case V→Case VI, Case VI→Case VII. The cases were also compared within the same and different morphological periods. Within the same period, the comparisons were set between Case I→Case II, Case IV→Case V, Case V→Case VI and Case IV→Case VI. Between the different periods, the comparisons are as follows: Case I→Case III, Case II→Case III, Case III→Case IV, Case III→Case V, Case III→Case VI, Case IV→Case VII, Case V→Case VII, Case VI→Case VII.

Table 7.21 Pairwise comparison groups

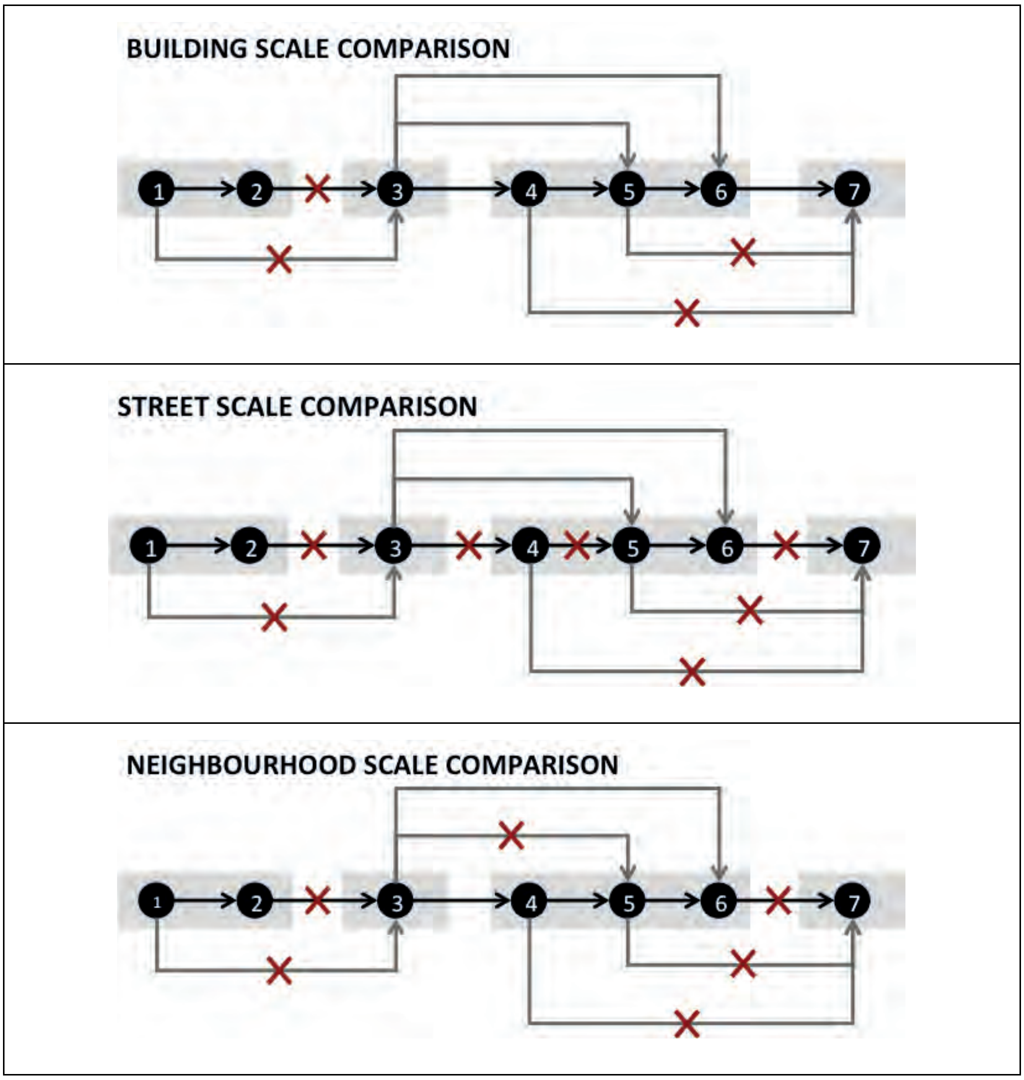
Chronological Order	Within the same morphological period	Between the different morphological periods
Case I→Case II	~~Case I→Case II~~	Case I→Case III
Case II→Case III	~~Case IV→Case V~~	~~Case II→Case III~~
Case III→Case IV	~~Case V→Case VI~~	~~Case III→Case IV~~
Case IV→Case V	Case IV→Case VII	Case III→Case V
Case V→Case VI	Case IV→Case VI	Case III→Case VI
Case VI→Case VII		~~Case IV→Case VII~~
		Case V→Case VII
		~~Case VI→Case VII~~

Table 7.21 briefly shows the pairwise comparisons that were set between the cases following the research design. In the table, the ones that are repeated are struck through and in total there are 12 comparisons. Given this, the new critical p-value is 0.05/12=0.004166. The p-values of the post-hoc tests computed between the defined series of the comparisons are presented in Table 7.22 below, where the significant differences (p-value<.004166) are highlighted in red.

Table 7.22 The p-values of the pairwise comparisons after the post-hoc procedure

Pairwise Comparisons	BUILDING SCALE p-value	STREET SCALE p-value	NEIGHBOURHOOD SCALE p-value
1→2	.267	.589	.957
1→3	.000	.000	.000
2→3	.000	.000	.000
3→4	.317	.025	.552
3→5	.120	.213	.002
3→6	.066	.058	.033
4→5	.957	.000	.033
4→6	.725	.000	.185
4→7	.00483	.000	.000
5→6	.871	.279	.0483
5→7	.00414	.000	.000
6→7	.005	.000	.000

According to the table above, the relations of the scores through the cases are represented by the following diagrams in order to better understand both the relations and the transformation process (Figure 7.15). The diagrams represent the cases in chronological order starting from Case I (the oldest) to Case VII (the newest). The diagrams also highlight the differences in the morphological phases and show the comparisons both within and between the morphological phases.



*X refers to the statistically significant differences between the relevant cases
*Cases within the same morphological periods are shaded grey together

Figure 7.15 Comparisons of the seven cases within and between the morphological phases

Apart from the pairwise comparisons, general conclusions were also drawn on the relationship between the typological transformation and changing SoP satisfaction over time. As noted above, it was statistically proved that the typological differences significantly affected the SoP at the three scales. However, the degree of impact is not clear. Given this, the effect sizes were computed by using the Chi-square (X^2) from Table 7.20 for each category to estimate the degree of impact (see Table 7.23). The computed scores indicated a decent effect size according to Cohen's benchmark; that is, above .138 (Cohen, 1988).

Table 7.23 Estimated effect sizes

	Building Scale	Street Scale	Neighbourhood Scale	Overall
Effect size (eta^2)= $[X^2/ (n-1)]$	0.2694	0.6959	0.6908	0.6491

In addition, the Pearson correlations of coefficients were also computed to find out the strength of the relationship between typological transformation and SoP and whether they are negatively or positively correlated. The correlation scores were computed according to the built date of the chosen housing developments (in chronological order) and also the morphological phases where the scores of the cases that are in the same morphological period were averaged.

Table 7.24 Correlation between typological transformation and SoP

TYPOLOGICAL TRANSFORMATION		Building Scale	Street Scale	Neighbourhood Scale	Overall
Pearson Correlation (r)	Built Date	-.385**	-.756**	-.668**	-.702**
	Morphological Phase	-.430**	-.727**	-.715**	-.706**
	Sig. (2-tailed)	. 000	.000	.000	.000
	N	140	140	140	140

The correlation results are shown in Table 7.24. The results indicate that typological changes according to both the built date and the morphological phase are negatively correlated with the SoP satisfaction over time. The r (correlation values) indicates at least medium to large correlation with the SoP variable at the three place scales and overall (Small= .10, Medium = .20, Large= .50, Very large= .70) (Cohen, 1988; Ellis, 2009). However, building scale changes are less influential compared to those at the street and the neighbourhood scales.

7.2.7. Reliability Test

Internal consistency reliability of the items constructing Section III of the interview was tested by SPSS software by computing Cronbach's coefficient alpha, "*an effective tool for measuring reliability*" (Pankhania & Jani, 2012, p.83) which is "*typically used when you have several Likert-type items that are summed to make a composite score or summated scale*" (Leech et al., 2005, p.63).

Table 7.25 Reliability statistics for SoP items at three scales

SPSS RELIABILITY STATISTICS CRONBACH'S ALPHA VALUE			
	At Building Scale	**At Street Scale**	**At Neighbourhood Scale**
CASE I	0.718	0.645	0.766
CASE II	0.91	0.759	0.79
CASE III	0.846	0.929	0.884
CASE IV	0.943	0.848	0.828
CASE V	0.824	0.812	0.881
CASE VI	0.802	0.894	0.733
CASE VII	0.863	0.85	0.893

Table 7.25 presents the Cronbach's alpha values for the seven case studies at the three scales, and the categories mostly tended to depict around .7 or .8, which indicates good internal consistency (Leech et al., 2005; George & Mallery, 2002; Levesque et al., 2014).

Additionally, the weighted mean value of the 10 indicators at the three scales was calculated as one single overall SoP score for each case and compared to the overall SoP score of each case obtained from the Section II question asking about the overall satisfaction with the same 10 indicators (Figure 7.16).

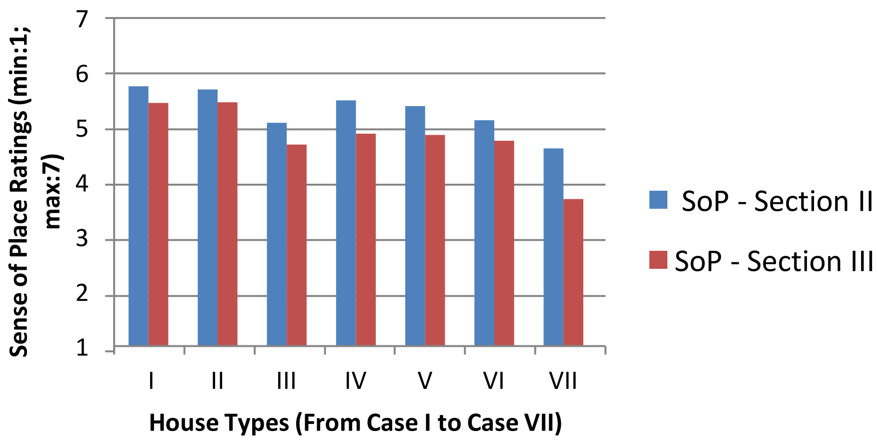


Figure 7.16 Comparison of overall SoP scores of Section II and Section III of the interview

The scores in Section III were slightly lower than those in Section II. It was understandable that the overall score given for each indicator was higher, compared to the synthesised results from the detailed questions of each indicator, as the latter naturally encouraged the participants to think about problems in their home environment. Nevertheless, the consistency check validated the results concluded from both sections, and the results from Section III were used further in the discussion chapter (Chapter VIII) to explain the different trends according to the differences in the typo-morphological characteristics of the cases.

CHAPTER VIII

"The interiors change radically, while exteriors maintain continuity. The space plan is the stage of the human comedy. New scene, new set."

(Brand, 1994, p. 21)

8. DISCUSSION

This chapter discusses the results presented above in four sections. The first section focuses on the main aim of this PhD research and scrutinises the impact of the transformation on the development of SoP assessed through the proposed SoP model and reveals the dynamic interplay between typological process and SoP at the three scales. Secondly, SoP is evaluated in terms of its variability with regard to the different place scales. Thirdly, the prominent changes in individual scores for SoP indicators are examined at the three scales to explain how the contemporary housing design can learn from previous types in terms of maintaining a good level of SoP. These three main sections are finally followed by the social implications of the survey design before moving on to the conclusion chapter.

8.1. Typological Process and Sense of Place

This study has found a close relationship between SoP and typological transformation. The following will discuss the impact of typo-morphological changes on SoP in detail at the three scales. The link between SoP and typological process will be unfolded by means of newly produced graphs for SoP monitoring which combine the graphs showing the SoP scores and the types of transformational links defined between the cases shown earlier in Chapter 7.

8.1.1. Building Scale

At the building scale, the observed fluctuations in the indicators of SoP show that the changes in the spatial characteristics of the house layouts have differently affected the scores for individual indicators of SoP (see Figure 7.10). However, the overall SoP scores at the building scale did not show explicit differences. The scores were noted as either a *moderate* or a *high* level of SoP and did not drop to the *low* level. Meanwhile, the transformational changes between the cases both within and between the morphological phases were defined as either continuity or partial continuity, and there was no mutational relation observed between any pairs (Figure 8.1) (see also Figure 7.3 in Section 7.1.4).

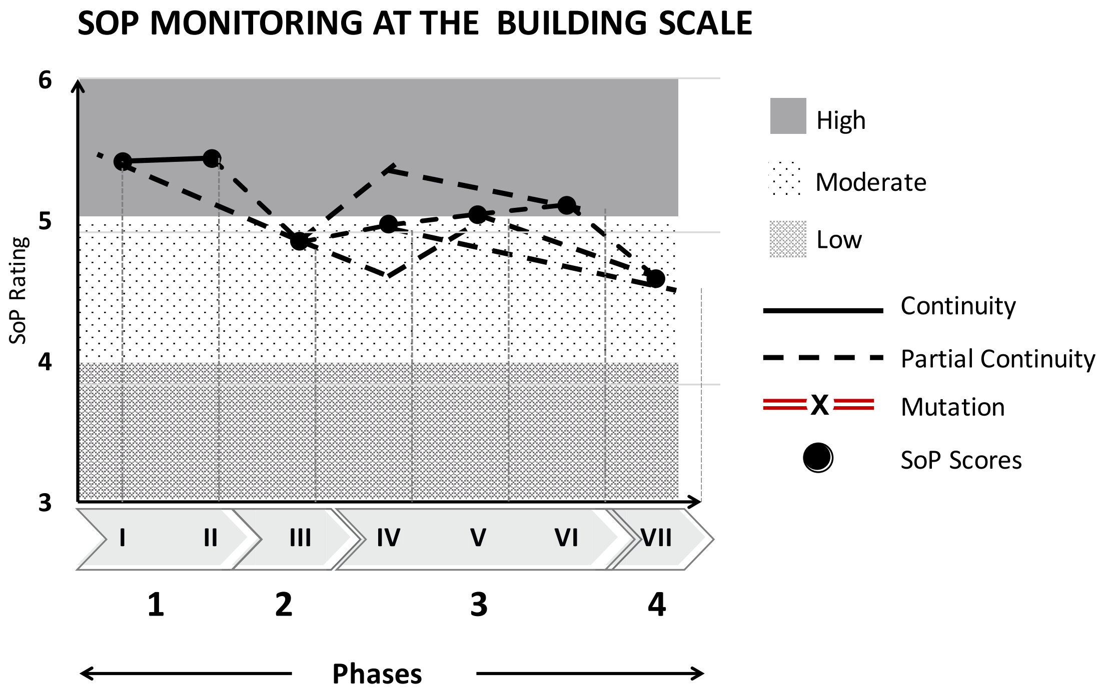


Figure 8.1 SoP monitoring during the typological transformation at the building scale

As shown in Figure 8.1, the SoP scores were at a *high* level where continuity was observed between Case I and Case II, which supports the claim for the positive impact of continuity. The transformational relations for the rest of the cases were defined as partial continuity. However, partial continuity was reflected sometimes as decreases in SoP scores (i.e. Case III and Case VII) and sometimes as slight increases (i.e. Case IV, V and VI). This indicates that typological changes at the building scale did not always coincide with the SoP scores. However, it can also be argued that, since the scores are in close range, they do not explicitly indicate whether the continuity/partial continuity at this scale is vital for a better SoP or not. Nevertheless, the continuity cases achieved the highest SoP scores at this scale and no typological mutation was revealed among any of the cases. This, to some extent, may suggest that the house layouts are appropriate for the residents' changing lifestyles, and that a certain degree of continuity helps stabilise the residents' SoP.

8.1.2. Street Scale

At the street scale, the fluctuations observed in the SoP indicators were more apparent compared to the ones at the building scale. The general trend for most of the indicators was downwards from Case I to Case VII. The scores that were at least at the moderate level in earlier cases dropped greatly and hit the bottom in the latest case and indicated a *low* level of SoP (see Figure 7.11). On the other hand, the typo-morphological analysis showed that street scale changes exhibit all three types of transformation: continuity, partial continuity and mutation, most of which were mutational changes (see also Figure 7.4 in Section 7.1.4).

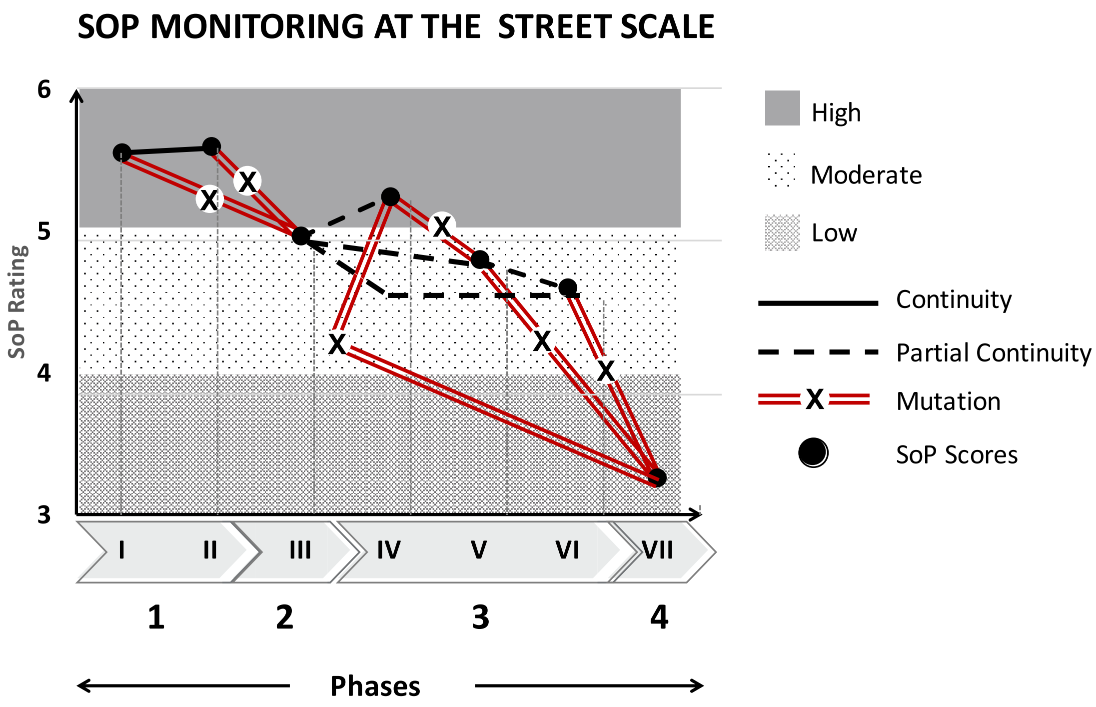


Figure 8.2 SoP monitoring during the typological transformation at the street scale

The combined results in Figure 8.2 showed that drops in SoP scores from Case II to Case III and from Case IV to Case VII coincide with the observed typological mutations. The continuity observed between Case I and Case II and the partial continuity observed between Case III and Case IV coincide with an improvement in SoP. There were some exceptions where partial continuity resulted in decreases in SoP scores, for instance, from Case III to Cases V and VI. However, these were slight decreases and all were at the *moderate* level. Furthermore, it was evident that wherever a mutation was experienced between the cases a drop was observed in the SoP scores at the street scale.

If the cases are compared in terms of the phase sequence, the mutations observed from Phase 1 (either Case I or Case II) to Phase 2 (Case III) and from Phase 3 (either Case IV, Case V or Case VI) to Phase 4 (Case VII) have coincided with the prominent decreases in SoP scores at the street scale. These decreases in the former were from a *high* level to a *moderate* level and in the latter from a *moderate* level to a *low* level. In comparison to these, the drops in SoP scores between Phase 2 and Phase 3 – where the relations between the cases are defined as partial continuity – were not severe and all were in close range at the *moderate* level. It can be further interpreted that a certain degree of continuity might contribute to improving or at least maintaining SoP at a *moderate* level at the street scale.

Overall, it can be claimed that the impact of continuity and mutation on the development of SoP is prominent at the street scale and the transformational relations between the cases mainly coincide with the SoP scores at this scale.

8.1.3. Neighbourhood Scale

At the neighbourhood scale, the trends seen in the scores for the SoP indicators were downwards through the cases and much more dramatic than those at the street scale (see Figure 7.12). In response to the dramatic decreases observed in the SoP scores, mutations were discovered among all cases except the continuity from Case I to Case II and partial continuity from Case III to Case IV and from Case V to VI (see Figure 7.5 in Section 7.1.4).

Similarly to the street scale, the mutations observed between cases of different morphological periods resulted in prominent decreases in SoP scores: from a *high* level to a *moderate* level between Phase 1 and Phase 2, and from a *moderate* level to a *low* level between Phase 3 and Phase 4. In contrast to the street scale, the neighbourhood characteristics were profoundly different between the cases in Phase 2 and Phase 3, despite the fact that their SoP scores were slightly different and in close range at the *moderate* level. This might suggest that certain changes in typo-morphological characteristics may be positive for SoP and desirable considering the fast-changing lifestyles.

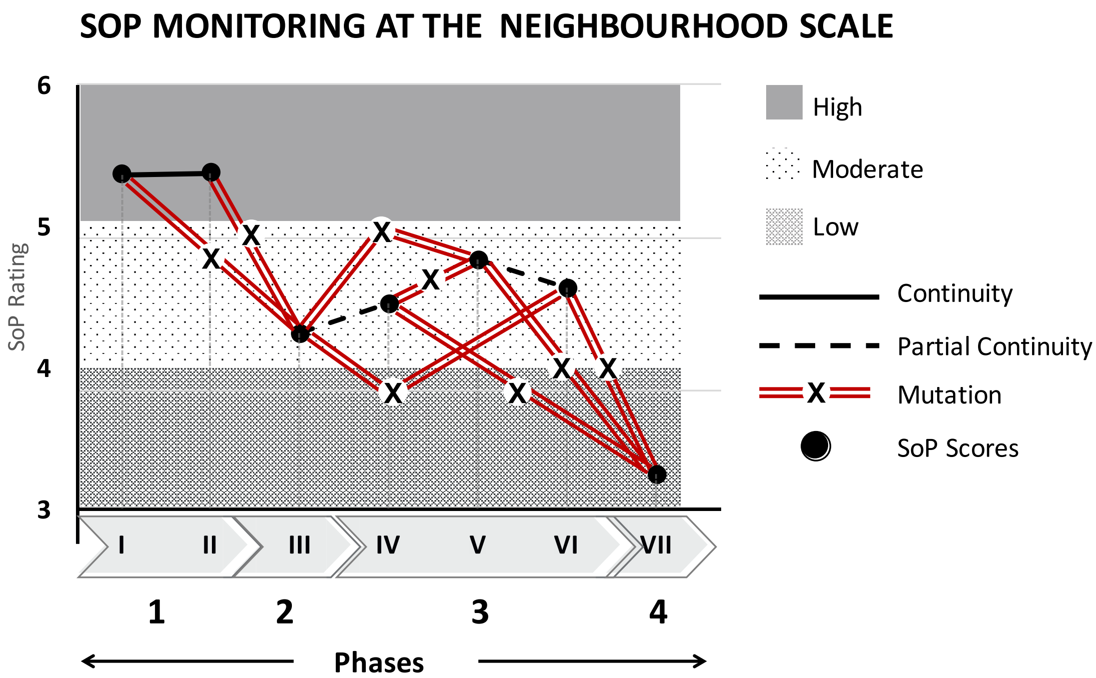


Figure 8.3 SoP monitoring during the typological transformation at the neighbourhood scale

In summary, this study proved that the changes in spatial typologies have been observed as a good predictor of SoP at the three scales during the transformation process of house form. The changes in SoP scores have mainly accorded with the changes observed in the housing transformation process at the three scales, with a few exceptions. For instance, Case I and Case II present continuous development at all scales, which was also reflected in the similar and the highest SoP scores reported by their residents. The declines also mainly accorded with partial continuity and mutation observed during the transformations. However, their real impact was not entirely clear where the SoP scores were similar and in close range. Therefore, there were sometimes non-linear correlations between the intensity of changes and the SoP scores. Given this, in particular at the building scales, the positive impact of continuity on SoP was not entirely clear. This can be further interpreted as suggesting that maintaining the building typology may not be so important, as people's lifestyles do change and they quickly adapt themselves to the spaces at the building level as it is easy for them to customise the interiors following their requirements. However, it might also be because the new housing development may have better facilities and infrastructure so that it is easier to satisfy the residents' needs at a smaller scale. However, this might not be feasible at larger scales. This is also clear from the results: the changes, in particular, the mutational ones, at the street and neighbourhood scales caused more prominent decreases in SoP and jeopardised the possibility of maintaining overall SoP. Therefore, in general, it can be claimed that it is at the large scales where typo-morphological continuity between the traditional and contemporary residential environment generally benefits SoP. Thwaites et al. (2007, p. 160) claim that "*time-conscious urban design is key to the achievement of social sustainability, visual attractiveness, responsiveness to change and evolution and the implementation of a deeper human-environment relationship*". Given this, it is also clear from the results of this study that changes might not always be desirable; however, this does not mean that all changes are bad (Section 8.3 will discuss in detail those positive typological changes). Thus, this study is not against change; it rather focuses more on what should continue and what should not in providing a more socially responsive, sustainable living environment that is more capable of managing change by means of time-conscious design.

8.2. The Impact of Different Place Scales on Sense of Place

The word 'place' in the term SoP is the only tangible source in its understanding. However, the place itself is dimensionless. It may refer to a home, a neighbourhood or a community or maybe a city (Nanzer, 2004). It is described at different sizes and therefore can be as small as a room and as large as a continent (Relph, 1976). Thus, the phenomenologists have seen 'place' itself as a challenge in dealing with the concept of SoP (Najafi & Shariff, 2011; Jiven & Larkham, 2003).

SoP has been studied in relation to a variety of place forms such as homes (e.g. Anton & Lawrence, 2014; Jorgensen & Stedman, 2001, 2006), recreational areas (e.g. Tsaur et al., 2014), apartments (e.g. Lewicka, 2010), streets (e.g. Brown & Werner, 1985), neighbourhoods (e.g. Brown & Werner, 2009; Lewicka, 2010; Brown et al. 2003; Billig 2005), natural areas (e.g. Davenport & Anderson, 2005; Smaldone, et. al. 2005, cited in Deutsch et al., 2011), cities (e.g. Lewicka, 2010), regions (e.g. Lewicka, 2010) and historical places (e.g. Lewicka, 2008). Although these studies can simply indicate that SoP is a concept that can be discussed in relation to a variety of places that are different in their sizes and functions, they do not clearly indicate that the understanding and development of SoP could be different at various place scales. However, conceptually some have claimed that different place scales have different psychological implications (e.g. Montello, 1993; Andrews & Whithey 1976; Carmona et al. 2010). For instance, Andrew and Whitheys (1976, cited in Pacione, 1984, p.65) claim that,

> *It is possible for an individual to be extremely satisfied with a physical structure but at the same time find the neighbourhood, both in physical and/or social terms, to be totally unacceptable. Such a situation could result in dissatisfaction with the total residential environment.*

Carmona et al. (2010, p. 123) also clarify that,

> *Sense of place does not exist in any particular part but the combination of those parts into a greater whole. A building, for example, is part – but only one part – of the place experience.*

These statements also imply that even the definition of SoP differs depending not only on the human factor but also on the scale factor of a place (Shamai, 1991). Given this, it is important to differentiate between different place scales in the study of SoP.

Currently, few studies have empirically differentiated between different place scales and their links to SoP (e.g. Lewicka, 2010; Shamai et al., 2012). Existing studies have mainly indicated that different spatial levels matter in SoP research, and therefore the **scale** factor, should be taken into consideration in examining SoP (Deutsch et al., 2011; Hidalgo & Hernandez, 2001; Jorgensen & Steadman, 2011). In this regard, this study has taken the home environment as representing place and examined its association with the development of SoP at the building, street and neighbourhood scales. The place dimension was not studied geographically, unlike most of the studies focusing on the differences in geographical location. Instead, the place concept has been examined architecturally through the distinct spatial characteristics defining the home environment at the three different scales.

The study has identified the impact of place scales on SoP, which also supported the claim in literature that scales matter to SoP. When the residents' answers were examined at the building, street and neighbourhood scales, the SoP scores were found to be significantly different at the three scales (p-value=.000). The calculated effect sizes also showed that the identified effect of the scale factor was influential on the development of SoP since all the effect sizes were over .138, according to Cohen's (1988) benchmark. The effects were also found to be different. While typological changes at the building scale affected the residents' SoP the least (Effect size: 0.2694), the degree of impact at the street scale (Effect size=0.6959) and the neighbourhood scale (Effect size=0.6908) was comparatively much higher (See Table 7.23 in Section 7.2.6).

The impact of different place scales can also be scrutinised by evaluating the impact of the typological changes on SoP over time. Since the transformation occurs in the longer term at larger scales, it is expected that the potential of the physical living environment to maintain SoP would be different too. Given this, the results initially indicated that typological changes observed through the cases in chronological order according to both the built date and the morphological phase were negatively correlated with the SoP satisfaction over time. In addition, the correlations were found to be notable and different at the three scales. Statistically, according to the built date, there was a medium correlation at the building scale ($r_{\text{Building Scale}}$=-.385, n=140, p=.000), a very large correlation at the street scale ($r_{\text{Street Scale}}$=-.756, n=140, p=.000) and a large correlation at the neighbourhood scale ($r_{\text{Neighbourhood Scale}}$ =-.668, n=140, p=.000), according to Cohen's (1988) standard (Small=.10, Medium = .20, Large=.50, Very large=.70) (Cohen, 1988; Ellis, 2009). Similarly, the impacts of place scales were also examined according to the morphological phases, where the scores of the cases that are in the same morphological period were averaged. The correlations were noted as medium at the building scale ($r_{\text{Building Scale}}$=-.430) and very large both at the street ($r_{\text{Street Scale}}$=-.727) and neighbourhood ($r_{\text{Neighbourhood Scale}}$ =-.715) scales. This can be further interpreted that building scale changes were less influential on the development of SoP compared to those at the street and neighbourhood scales. This can also support the notion that "*smaller places [are] more associated with the self, and larger places [are] associated with others or the environment*" (Jorgensen & Steadman, 2011, p.798).

8.3. The Lessons that Future Housing Design can Learn to Benefit SoP

The research results have partially supported the argument for the continuity in literature. The research has also identified the negative impact of some particular physical characteristics on a few indicators of SoP, which is new to the existing literature. In other words, what could be learnt from the previous types is clarified through the research outcomes.

Each place scale is distinct depending on its spatial characteristics and their potential configurations. This section will discuss the spatial characteristics of the cases regarding their potential contributions to the SoP indicators at the three scales respectively and will also discuss the aforementioned positive typological changes. There is no doubt that there is ambivalence in specifying the design characteristics that describe a better living environment at the building, street and neighbourhood scales. Based on the results, the research will suggest some lessons to be learnt in terms of typological characteristics in relation to future house design in Turkey to help with the maintenance of SoP.

8.3.1. Building Scale

As mentioned earlier, SoP has not changed dramatically through the cases. It declined slightly only in Case III and Case VII (Figure 8.1); however, the transformation process could manage to keep the satisfaction level at least at the moderate level. The most prominent improvements were in Case IV with regard to nature bonding and privacy. In Case III, the scores for all SoP indicators suddenly dropped. In Case VII, privacy was the only indicator that increased slightly, while nature bonding was relatively low compared to other cases and was reported as dissatisfaction. Additionally, the scores for aesthetics also showed a gradual decline after the traditional cases. These results indicate that contemporary housing in Turkey needs to learn from previous experiences, particularly with regard to nature bonding and aesthetics. These experiences can be associated with a variety of spatial characteristics that are different compared to the previous cases such as functional zoning and spatial sequence, compactness of the house layouts, the entrance positioning and the use of private gardens or balconies. The prominent spatial changes observed in these cases are discussed below regarding their potential consequences and their impacts on SoP.

a. Functional Zoning and Spatial Sequence

How the space is divided for its most efficient use is apparently important in particular to provide satisfaction with privacy and place dependence. It was observed that these indicators experienced a drop in Case III, whose general layout configuration at first glance reminds one of the traditional spatial configuration, which has been found to be beneficial for the Turkish lifestyle for many years. Although their compositions look very similar, there is an attempt to create a private zone with a secondary circulation corridor in this case (see the photo on the right in Figure 8.4). In addition, the functions of individual rooms are partly defined in Case III.

Figure 8.4 The centrally located living room and the partly separated private zone in Case III

However, despite the similarities in the spatial characteristics between the traditional and the newer forms, the dissatisfaction scores indicate that the new Turkish lifestyle favours the personalisation of space at the family level. Given this, the layout configuration where some rooms are still accessed via the living space or the offered functional zoning is not solely private and still accommodates shared functions, which is not preferable. This is also validated by the improved privacy and place dependence scores observed particularly in Cases IV, V, VI and VII, where the private zone is partly or strictly defined, and the spatial sequence exhibits a gradual transition from the shared spaces to the individualised spaces (see Figure 8.5 for Case V and Figure 8.6 for Case VI). This can be further interpreted that continuity may not always be necessary for residential satisfaction and changes are necessary to adapt to the changing lifestyles. More importantly, the adaptation should be according to the desired changes and fit the current lifestyle. This also conforms Memken et al. (1997)'s claim that the spatial configuration of the rooms is critical to the overall residential satisfaction as long as the floor plans – which are easy to adapt to changing needs – are ideal.

Figure 8.5 The transitional space between the entrance and the living room in Case V

Figure 8.6 The transitional space between the entrance and the living room in Case VI

Overall, it was observed that the functional zoning and spatial sequence of individual and shared spaces within the house layout have had different implications on residents' life quality in the Turkish context. It is identified that a successful housing design not only requires a gradual adaption of the spatial configurations through time, but also needs to achieve a balance between the spatial changes and the lifestyle changes. Contemporary housing design is mainly in favour of the design of individualised places, with a particular focus on providing a desired level of privacy at a personal level. This is currently well met in contemporary housing developments.

b. Nature Bonding

Connectedness to nature has become an important design quality contributing to healthy living both physically and emotionally. The importance of feeling attached and bonded to nature is particularly more important in Turkish culture because of the Turks' nomadic historical background (Tazebay & Akpinar, 2010). While traditional houses were successful in sustaining these traditions through their design features, such as having a private garden or a courtyard, prominent decreases in the satisfaction with nature bonding were observed in the following cases.

Figure 8.7 Privacy in gardens in traditional cases

In the traditional cases, gardens or courtyards were highly private because of the surrounding high, impermeable garden walls (Figure 8.7). All indicators dropped in Case III; however, nature bonding was the only indicator reported at a low level in Case III where balconies replaced the private gardens in traditional cases and semi-public/private communal gardens with low and permeable fences were introduced (Figure 8.8).

Figure 8.8 Communal front gardens in Case III

The positive contribution of private gardens to the feeling of being connected to nature was also proved by the noticeable increase in the satisfaction scores for this indicator from the residents of Case IV, consisting of single-family houses with private front gardens (Figure 8.9). As reported by most of its residents during the interviews, the balconies were not effectively used since the residents prefer to spend time in their gardens rather than on their balconies.

Figure 8.9 Private front gardens in Case IV

Apparently, balconies in the other cases (Cases V, VI and VII) were not so effective compared to the gardens in terms of facilitating nature bonding as buildings have become taller. In particular, Case VII, the tallest building amongst the cases, is where the residents reported the lowest level of nature bonding. This is because of the ineffective use of communal space, which serves for car parking, and has little vegetation (Figure 8.10).

Figure 8.10 Communal space use in Case VII

As the buildings become taller, the outdoor green spaces are appreciated less and less and become less likely to contribute to QoL (Taib & Abdullah, 2012). Moreover, it is inevitable that, as the population grows and urbanisation intensifies, private gardens are less likely to be provided for apartment buildings. Instead, it is important to develop high-quality communal gardens. Given these, nature bonding needs particular attention in future housing design and the SoP at the building scale has to be enhanced by improvements at the street and neighbourhood scales with regard to nature bonding.

c. Aesthetic Quality

Aesthetic quality has also experienced a prominent decline after the traditional cases, although it is still reported at least at a moderate level in the following cases. The respondents of these cases have mainly found their houses less pleasant in terms of their architectural and artistic merits, form and details. This is understandable because, in traditional Turkish houses, mainly due to the privacy issues, the domestic life is more important and therefore the aesthetic quality might be more desirable, especially for Turkish women spending most of their time at home. Figure 8.11 shows some examples of the interior decorations utilising timber carving in traditional Turkish houses.

Figure 8.11 Some examples of interior decorations used in traditional houses

The arrangement of the openings providing good views outside also contributes to the aesthetic quality inside the houses. This is well achieved in traditional houses where the openings are designed to be exterior-view oriented, as seen in Figure 8.12.

Figure 8.12 Window arrangement in traditional houses

However, the exterior aesthetic is the primary concern in the arrangement of the openings in the contemporary housing developments. This was observed particularly in Case VII, where views outside windows were sometimes disregarded (Figure 8.13).

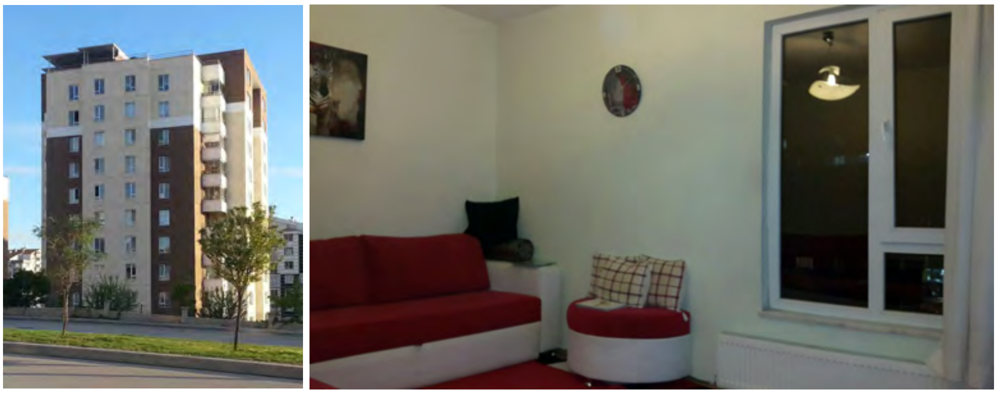


Figure 8.13 The arrangement of openings in Case VII

It is the fact that the Turkish lifestyle has changed over time and this has been accordingly reflected in the design of the house layouts. In particular, under the influence of the international style, both interior and exterior traditional ornamentations and decorations have disappeared. Contemporary development needs to pay more attention to improving the aesthetic qualities of interiors.

8.3.2. Street Scale

The general trend observed in the indicators of SoP scores at the street scale was downwards over time and the majority hit the bottom in Case VII and were reported as low (<3). The scores for privacy and aesthetics did not change substantially and stayed at the moderate level. This suggests that the residents were satisfied in general with these qualities of their street spaces. Case IV was the only case where the most of the indicators (except privacy and familiarity) showed an improvement after the traditional cases. This is probably because of a number of characteristics such as entrance positioning, pedestrianised streets, spatial access hierarchy and access patterns, of which some continued from the traditional cases while some mutated from Case III. These are explained in the following.

a. Entrance Positioning and Surveillance

The improvements observed in Case IV at the street scale – in particular with regard to social bonding, social interaction and sense of belonging scores – can be mainly related to the adjacent building arrangement along the pedestrianised streets where the building entrances face the street, and the front gardens create a buffer zone in between. Surveillance is well achieved in this housing development – like in the traditional cases – because of the frequent use of the front gardens for either leisure or access to the housing unit. In addition, the well-defined boundaries for the private gardens, which are created by the low fences, also help the residents control of the access to their property from the street. Strangers feel that they do not belong and that they are being watched by the inhabitants of the street. This transparency between the private gardens and the semi-public pathways does not jeopardise the privacy of the interiors because the interior layout configuration prevents one from seeing the living space inside (Figure 8.14).

Figure 8.14 The surveillance and access to the housing unit in Case IV

Figure 8.15 Visual access in Case IV both day and night

The type of street arrangement seen in Case IV is also beneficial in providing a sense of security. This accordingly helps the residents develop a sense of belonging and attachment to their streets because they feel responsible for watching the street. However, as reported by many of the residents, security is of concern at nights because the housing development has no other security measures and the streets are not adequately lit, which might encourage crime at night (Figure 8.15).

b. Active Front Coverage

Clearly, the high ratio of active front coverage was beneficial in Case IV, particularly in enhancing the social interaction and social bonding at the street level, compared to Case VII with its free-standing buildings and the least active front coverage. It is also noted that the continuous façade pattern in Cases II and IV has been reflected in an improvement in the scores for aesthetic pleasantness at the street scale (Figure 8.16). Nevertheless, the scores for aesthetics were more or less the same throughout the cases and were reported at around a *moderate* level, except for the scores that just reached the *high* level in the traditional cases (Case I and II). This indicates that aesthetic appreciation of streets in general needs attention in all types of housing development. It is generally believed that contemporary built forms lack historical perspective in terms of aesthetics compared to traditional forms. It is therefore suggested that the aesthetic qualities of traditional architecture should be sustained to protect the local identity in contemporary homes, which will contribute to emotional wellbeing and thus QoL (Shuaib, 2013; Gur, 2012). However, as Smith (1987, p. 10) argues, the view that any form of creation is *"an improvement of the past"* is no longer valid and the way of dealing with aesthetic issues is more than copying the relations between colour, tone, shape and texture. According to him, aesthetic pleasure is a basic human need that needs to be satisfied through complexity and order in architecture. Given this, it is important to find ways to retain the complexity and rhythm in the traditional design elements such as continuous façade pattern, projections, etc., in a modernised way.

Figure 8.16 Continuous façade pattern and openings in Case IV

c. Street Configuration Encouraging Social Interaction

The success of higher-density settings heavily depends on the design of spaces between buildings rather than the domestic interiors (Saraf & Ahlen, 2010) and street configuration is of crucial importance in providing opportunities for social interaction. Case VI, in this sense, is a good example where the land coverage and spatial configuration provide the right balance between higher-density areas and the interaction spaces between the buildings through the street network design (Figure 8.17).

Figure 8.17 Street configuration encouraging social interaction (Case VI)

It was observed that the streets in newer housing developments are becoming a transitional space providing constant movement for the local residents rather than becoming a place where people stay and have a sense of rest. Furthermore, domestic life, which had been withdrawn from the streets, was limited to the interiors because the design efforts focused on the domestic interiors rather than the open space design and social interaction spaces at the street level (Figure 8.10). This was noted in Case VII, the most contemporary house type, where the lowest SoP levels were achieved at the street and neighbourhood scales and the satisfaction was profoundly higher at the building scale. As Carmona et al. (2010, p. 83) noted, the social aspects of the streets have been "*suppressed in favour of movement and circulation*". Biddulph (2007, p. 9) also support that "*[r]esidential areas are places for living, and in this respect, the streets and other spaces within the scheme should allow a social and domestic life to flourish*". Therefore, streets should be a social space rather than merely a transitional space so that they can contribute to the quality of public life.

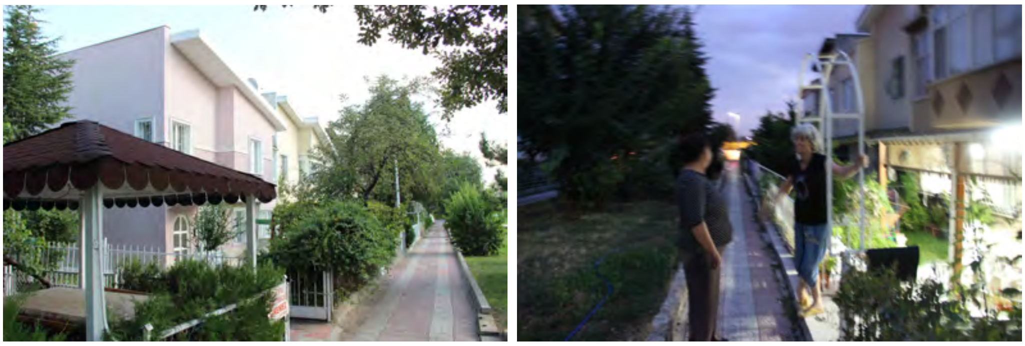


Figure 8.18 Social interaction along streets in Case IV

In addition, in the traditional settings, it was observed that the cul-de-sacs were an alternative way of making streets for social interaction (Figure 8.19). However, as Marshall (2005, p.36) argues, "*conventional tributary (loop and cul-de-sac) networks may be criticised on the basis that they lack a 'clear structure and identity*". However, a grid is also not necessarily clearer or more structured. Moreover, it is also believed that cul-de-sacs can act as social spaces as long as they are not unnecessarily long and do provide enough frontages for the houses (Duany et al., 2003). Barrie et al. (2010) also state that, if the right balance between place and movement is achieved, the street design can be found to be successful in terms of its contribution to SoP. Given these points, it can be claimed that the cul-de-sacs can work well in the Turkish context.

Figure 8.19 Cul-de-sacs shared by 3-4 housing units in traditional settings

d. Pedestrian-Friendly Access Zones

In Case VII, the building entrances face the public roads outside the site boundaries. After the roads, the space between the site entrances and the building entrances is a shared access zone used by both pedestrians and cars and there is no pavement (Figure 8.20). Additionally, the buildings can be alternatively accessed from the underground parking. This is the most preferred access method and is limiting the residents' opportunity to use the communal spaces, and thus discourages social interaction at the street and neighbourhood levels. Pedestrian friendliness and walkability are the important design qualities of the successful streets and it is widely believed that driving in a private car reduces the possibility of meeting other people (Jacobs, 1995).

Figure 8.20 Shared access spaces between pedestrians and vehicles in Case VII

In comparison, the immediate areas outside the buildings in other cases are either fully (Case IV) or partly (Case V) pedestrianised or offer off-road parking (Case VI) (Figure 8.21). In addition, the building entrances in these cases face the pedestrianised streets.

Figure 8.21 Separated pedestrian and vehicular access in Case VI (Left: Car access, Right: Pedestrianised pathway)

Accordingly, it was observed that, compared to Case VII, social interaction, social bonding, privacy, place dependence and sense of belonging scores at the street scale were higher in these cases. This supports the claim in literature that pedestrian-friendly access patterns encourage the sense of community and build up a SoP (Day, 2003; Bookout, 1992, cited in Beidler, 2007).

e. Open Green Space Design

An alternative way to use the streets actively is vegetation/landscaping/tree planting since instinctive connections with nature bring about numerous social, psychological and spiritual benefits and encourage social interaction (Keniger et al., 2013). Cases III and IV are the examples where the streets are flanked with front gardens (Figure 8.22). Accordingly, it was observed that for both cases social interaction and SoP scores were notably higher at the street scale.

Figure 8.22 The use of front gardens along the streets in Case III

It was also observed that the spaces between buildings in Case IV are lined up with well-landscaped private front gardens providing vegetation along the pedestrianised streets. Furthermore, this street-side gardening results in the highest scores in relation to nature bonding in Case IV. Most of the SoP indicators were also higher than the earlier case and the later cases. This supports the claim in literature that health and wellbeing (Gross & Lane, 2007; Maller et al., 2005) can be improved and a sense of community (Comstock et al., 2010; Kurtz, 2001) can be established by natural connectedness and access to gardens (Hunter & Brown, 2012).

f. Street-Based Building Arrangement

Free-standing buildings, like those of Case VII, do not reinforce street characteristics or contribute to a sense of closure. Therefore, the street in the case is less appreciated. However, in traditional houses the building height, the arrangement of buildings and their access pattern and hierarchy contribute to the street's importance (see also Hebbert, 2005, p.42, cited in Carmona et al., 2010, p.88) (Figure 8.23).

Figure 8.23 Street formation in traditional neighbourhoods

This study suggests that streets play a significant role in making successful places in Turkey. Therefore, all roles, particularly the social ones, that streets can play in building a SoP should be emphasised and efficiently applied in contemporary practice. Planners and urban designers should carefully examine the street characteristics, and the reasons behind their formation. This study suggests that the problem of contemporary types is their inability to support social interaction, and therefore urban designers and planners should learn from their traditional counterparts where, in contrast, social interaction is the main driver of the street design.

8.3.3. Neighbourhood Scale

Similar to the street scale, the neighbourhood scale scores dropped greatly in the latest case, but the trend fluctuated more in between. The scores against privacy decreased from *high* in the traditional cases to *moderate* in Case III, then slightly increased in the following cases and remained relatively stable at a *moderate* level. The most dramatic decline at the neighbourhood scale was observed in the place attachment scores (from *very high* in Cases I and II to low in Case VII). The same was noted for familiarity scores, which hit the bottom in Case VII. The following will discuss the spatial design principles at the neighbourhood scale, which might potentially cause these differences.

a. Public-Private Area Relations and Visual Boundaries

Different house typologies require different strategies to achieve a balance between public and private spaces to contribute to SoP. Gated communities are often criticised as being a walled and secured type of neighbourhood setting, encouraging social privatism and causing segregation from the social network of the city (Atkinson & Tranter, 2011; Coiacetto, 2007; Morgan, 2013; Mohd et al., 2015). This study suggests that clear visual boundaries are positive for SoP in the Turkish context. Cases IV, V and VI are neither located on open sites nor strictly gated and one can easily access the sites on foot. These houses have clear physical boundaries (Figure 8.24); however, the physical boundaries are permeable and do not strictly replace the psychological boundaries, and therefore the houses are not strictly segregated. As a result, it was observed that, particularly for the social bonding scores, sense of belonging, place attachment and privacy were notably higher in Cases IV, V and VI than the earlier and later cases.

Figure 8.24 Site entrances and permeable physical boundaries in Case VI

Additionally, other spatial features such as vegetation and curves reducing the visual permeability can create a psychological barrier and discourage non-residents from entering the site (Carmona et al., 2010). Case VI can best exemplify this, where curves and setbacks in building arrangements, and vegetation create visual barriers and discourage non-residents' access to the site, even though it is open to access (Figure 8.25). In other words, the site boundaries are neither too strictly nor too weakly defined, but rather strengthened psychologically through the other design elements.

Figure 8.25 Physical and visual barriers in Case VI

These observations suggest that perhaps visual barriers rather than physical barriers are sufficient for the middle-class Turkish residents to establish a sense of safety and community when confronting the tension from the low-income groups in the city. Lynch (1960) also states that districts should have boundaries to form a clear, cognitive map of the place in people's minds. According to Alexander et al. (1977, p. 87), "*the strength of the boundary is essential to a neighbourhood. If the boundary is too weak the neighbourhood will not be able to maintain its own identifiable character*". Clear boundaries can also help to make a distinction between public and private areas and therefore contribute to the sense of belonging. Biddulph (2007, p. 171) states that, "*people feel more secure where there is a clear distinction between public and (semi) private spaces, and where the difference reinforced by a sensible boundary*". This separation will help residents feel some degree of control over a specific type of place they have and make the space personal to them so that they can build a SoP.

b. Density/Land Coverage and Communal Space Design

Land coverage and density are other significant spatial features that might potentially affect social interaction and place dependency. It was observed that high land coverage, no matter whether with medium- or low-rise buildings, caused comparatively less social interaction and less place dependence, as shown in Cases III and IV at the neighbourhood scale, respectively. This partially contradicts a common belief in the literature that high-density environments create more opportunities for social interaction, while low-density living areas results in less interaction amongst the residents (Putnam, 2000).

Some scholars have claimed that low and medium housing densities help residents to build a stronger SoP without feeling lost in the community (Fincher & Gooder, 2007; Ng, 2010, cited in Smith, 2011). As seen in Cases III and IV, these claims may be true at the street level where the residents interact with their neighbours, but not at the neighbourhood level. The houses in these cases (III and IV) are located within small individual plots. In this type of setting, the areas for communal facilities are limited since the houses have their own private open space (Cheng, 2010). The scores for social interaction, place dependence, social bonding, place attachment and sense of belonging were relatively lower in Case III and Case IV compared to that of the earlier case (Case II) and the later case (Case V). This is most probably because the residents are more likely to spend their time in their individual private gardens in Case IV or the private shared gardens in Case III and less likely to travel to the communal spaces such as the playground area and communal gardens than to the streets designed in the neighbourhoods. Accordingly, their interaction is limited to their immediate surroundings and the residents living in the same street.

The scores for the indicators mentioned above were also slightly higher in Case III than Case IV. Case III consists of multi-family, low-rise apartment buildings located on an open site, while Case IV consists of single-family houses located in a neighbourhood, the boundaries of which are clearly defined by the surrounding fences. This might indicate that the residents of Case III are more social at the neighbourhood level since they have street-facing semi-private communal gardens. Limited numbers of people living in the same low-rise apartment building in Case III perhaps cannot enjoy the garden privately, but frequently use it, at least for access purposes. This design facilitates casual interaction and enhances social relationships at the neighbourhood level. In contrast, although the individual private gardens in Case IV are also useful in facilitating social interaction, this is at the street scale, not at the neighbourhood scale. This is because the grid design of the street network segregating the communal gardens in the neighbourhood makes the residents of Case IV more dependent on their individual private gardens and much less likely to travel to the communal space than those in Case III. The ineffective design of communal areas in Case IV also increases this dependency and therefore the social bonding at the neighbourhood level is negatively affected. Thus, it is clear that integrated street design centralising the communal areas is preferable in high-coverage low-rise developments like Case IV.

It is also claimed that high housing density prevents the development of meaningful neighbourly relations because of the lower possibility of people meeting other people, feeling lost in the crowd and becoming relative strangers to each other (Smith, 2011). Case VII, which is a high-rise, low land coverage, but high-density development, reflects the claim in the literature. Its residents reported a low level of satisfaction with social interaction and social bonding at the neighbourhood scale, and the type of setting results in people living oblivious of each other in the same apartment building. Interviewed residents reported that they only knew a small number of neighbours in their neighbourhood. Knowing the neighbours is significantly important for the development of SoP since it will provide residents with more attachment to the place (Cuba & Hummon, 1993; Hay, 1998b; Semenza & March, 2009; Wen Li et al., 2010). High-rise developments like Case VII offer expansive communal areas. The quality of social interaction and sense of community heavily depends on the open space design because the place might be "*left over, not properly managed and producing problems*" (Cheng, 2010, p. 9). However, as mentioned earlier, the communal space design is also not attractive to the residents because of the hard-paved car parks surrounding the buildings in Case VII, which accordingly results in dissatisfaction with nature bonding, place attachment and social interaction scores. Quality communal space design, as proved in this study, is therefore of crucial importance in achieving residents' satisfaction with their social relations in high-density, low land coverage housing developments at the neighbourhood level.

Overall, areas with the same densities can be perceived differently because of the types of buildings and their arrangements (Rapoport, 1969b; 1969c). Depending on the land coverage and the building typology, it is therefore important to design quality communal spaces with quality landscape design and planting, and allocate less land for car parking and more land for spaces for social interaction and integrated movement network.

c. Surveillance

Safety is also an important concern affecting the level of SoP and the use of communal spaces (Brown et al., 2003; Lewicka, 2010; Smith, 2011). When a place is allocated to a small number of house units, the common places, such as the pedestrian streets leading to housing units in Case IV, are used by only those limited numbers of residents. As discussed in the above section, this strengthens the social bonds at the street level amongst residents of the same street. However, because of the less frequent use of the streets here compared to that seen with other house types, the residents of Case IV, as reported by most of them during the interviews as well, also develop a sense of fear about leaving their homes empty since they might not know who is passing along their streets, with good or bad intentions, and they may feel suspicious and not secure. Therefore, the residents spend more time inside their houses or in their private garden, which allows them to watch their streets as well. This makes their bonds stronger at the house and street levels but not at the neighbourhood level. People feel safer and more attached in spaces that are frequently used, integrated rather than segregated, and visually accessible (Shu, 1999, cited in Jiang et al., 2000). This is well achieved in traditional cases (Case I and Case II), which offer the opportunity for surveillance where the residents can observe activities outside from their windows (Figure 8.26).

Figure 8.26 Surveillance in Case I and Case II

In other neighbourhood typologies, the opportunity for surveillance is restricted by a number of different spatial characteristics. For instance, building height can limit the degree of connectedness to the ground level, as seen in Case VII where upper-floor residents are less connected not only physically but also visually. As another example, in low-rise housing developments, the size and depth of the front gardens and also the elevation/access level of the house units can sometimes limit social surveillance (e.g. Case IV). Overall, the observations showed that surveillance is an important design quality, in particular in the Turkish context. However, it is more desirable/preferable if the houses are single-family housing units or low-rise apartment blocks rather than high-rise apartment buildings.

d. Developing Movement Network Prioritising Pedestrians

As identified above through the spatial characteristics of the cases and their potential implications for the different indicators of SoP, it is important that open spaces should be designed in a way that a place is dominated by its users rather than by vehicles. This is because a pedestrian-friendly neighbourhood arrangement facilitates social interaction and accordingly helps in the establishment of casual relationships amongst the residents (Wilkerson et al., 2012; Alfonzo, 2005). In addition, since the residents will develop a sense of control over the public space in time, this will accordingly benefit the sense of community and belonging and create a more socially sustainable living environment (Beidler, 2007; PPS, 2015). Clarity, identity and legibility are of concern in deciding whether a place/street is successful or not, especially regarding its contribution to SoP (Ujang, 2010). The general belief is that the new and modern street patterns are more legible and clear, and therefore benefit wayfinding; thus, they can contribute to satisfaction with the streets, even though they might not be identifiable. However, those criteria for good streets are mainly from a vehicle user's point of view, and represent a purely engineering solution. Moreover, during this practice, the social function of streets has been neglected in contemporary design (PPS, 2015), even though it is currently an accepted notion in urban planning that streets are places for humans rather than only being conduits for vehicles (PPS, 2015). Therefore, streets should not only allow traffic, but also satisfy the pedestrians and provide social usages in a way that the traditional settings did. However, it is also important that the streets are shared with vehicles because they are technological solutions developed as part of the evolution of human mobility and sustainable development. In this sense, the design of streets as places should enable the right balance between pedestrian and car dominance so that the SoP of the street users is not ignored.

Overall, the results clearly indicate that the contemporary houses fail to evoke SoP in many aspects. To be more specific, almost all aspects of SoP need to be improved in contemporary housing design at the street and neighbourhood scales, while, at the building scale, only nature bonding and familiarity need special attention. To improve these qualities, future housing design should learn the lessons from the previous experiences at the three scales as discussed above. However, they were formed within the Turkish context. They are not universal; therefore, they should only be applied in the Turkish context and should be carried forward in design.

8.4. Social Implications of the Survey Design

Apart from the discussion above with regard to the main research questions and hypotheses focusing on the interplay between typological transformation and development of SoP and the lessons learnt from the previous experiences during the morphological changes at the three scales, the conducted study also has positive implications relating to the social awareness of the interview participants with regard to the problems of their living environment.

At the end of the interviews, most of the respondents showed a keen interest in the study and enhanced the discussion over the living area problems. The overall impression is that they were surprised to admit that they had never devoted much thought to their residential environment.

A particular respondent after the interview expressed her desire to thank the interviewer for bringing up such an important topic for achieving life quality emotionally rather than materially. She said:

> *Thank you very much for giving me the change to take part in this research and making me aware of the things which are crucially important in our living environments but we mostly ignore or unfortunately prefer to ignore because of our dominant materialistic lifestyle and the demanding human nature. Before this interview, I was looking for a house which is close to the amenities or with good transportation links; however, I have realised that we have much more serious issues to consider. Now I know how a space can contribute to the development of the relations with family, friends and neighbours and how privacy, aesthetic and social interaction are important. I have realised that the statements brought by the interview are the most important things we always desired; however, unfortunately, we forgot to desire them and I feel so sorry for ourselves [for] simply accepting the circumstances proposed by the contemporary living environment. Now I feel I am more aware of what SoP means and [what] my problems are, which have a negative impact on our subjective life quality. (Translation from Turkish.)*

Another respondent also expressed her positive feelings, as follows:

> *Before taking part in this interview, I was not aware [that] the neighbourhood relations are [so] important. As usual, the priority in my family is given to the needs of the family members. Therefore, living anywhere was acceptable as long as our family needs are met, like having a house that is big enough, affordable and close to amenities. However, I realised that I have also neighbours who make me feel [I] belong here but I feel ashamed of having few important neighbours and I don't even know the names of the others living in the same apartment block. (Translation from Turkish.)*

Given the post-interview feedback above, the research can be considered a successful attempt at increasing the public's awareness regarding their problems with their living environment since most of the time they do not know the reasons behind their dissatisfaction with life. In order to have a better QoL, it is crucially important that one should know the problem so that the solutions can be developed.

CHAPTER IX

"Historic places should be assessed dispassionately for the practical lessons they offer to the present, and no more. Planners must be neither nostalgic like traditional architects nor ideological like the modernist ones; urbanism must remain dedicated to whatever works best in the long run."

(Duany, 2005, p. 125)

9. CONCLUSION

This chapter firstly summarises the findings of the research and reflects on their implications. Attention is paid to how the research identified problems and answered the research questions. The implications are discussed with regard to the main research hypotheses. Secondly, the overview of the research contribution is presented both in the fields of typo-morphology and SoP and in the Turkish housing context. Thirdly, the methodological considerations and research limitations are discussed. This is followed by a discussion of the applicability of the adopted methodological framework and suggestions for future work.

9.1. Findings of the Study

The main initiative of this research was the neglect of local, social and cultural values during the rapid transformation of Turkish residential areas and the urban disorder that has led to a loss of SoP. To find out the deficiencies in the contemporary living environment and how to create successful living places by benefitting from tradition, this study has bridged the concept of SoP and typo-morphological analysis and investigated the interplay between SoP and the typological transformation of house form in the Turkish context.

This study firstly proposed a methodological framework and applied it to the Turkish housing context to assess SoP during the changing process of house forms. SoP monitoring during the typological transformation of house form initially showed that SoP was generally negatively affected by spatial changes as new house types were introduced over time. This indicates that changing housing typology is one of the factors influencing SoP, although the degree of its impact is not entirely clear compared to the impact of other socio-economic and demographic factors. However, such comparison is not the intention of this research.

The detailed investigation of the pairwise comparison of the cases in chronological order further revealed the dynamic link between SoP and the three degrees of spatial transformation, namely continuity, partial continuity and mutation. It has empirically proved that typological continuity can help maintain/rebuild SoP, particularly at the street and neighbourhood scales. Most importantly, this claim has been verified by the lay public in this research, which is very valuable. Additionally, the systematic evaluation of SoP and typo-morphological characteristics of the living environment was also useful in clarifying what spatial characteristics should be retained and what dimensions of SoP should be paid more attention to in the design of new housing developments.

The study has also identified that the perception of SoP varies at different place scales, which are the building, street, and neighbourhood scales. Typo-morphological study was the key to the identification of the place scales and it was used to bridge between building scale and urban scale. Typo-morphological analysis not only helped to reveal this distinction, but also offered a new methodological approach enabling the systematic assessment of SoP through the changes in housing typology.

Overall, the research has emphasised the importance of incorporating some spatial characteristics of traditional types in new housing developments, particularly at the street and neighbourhood scales. However, the research does not advocate the imitation of traditional images in new developments, but a positive response to the spatial relations of urban form, which would give the residents a better chance to establish an SoP in the new environment. Given this, the study stresses the importance of the following to achieve high quality in the design of contemporary housing:

At the building scale:

- The traditional principles of functional zoning are not necessarily suitable for contemporary houses, since the new generation of Turkish families is in favour of individualisation of space.

- It is important that the layouts of contemporary houses should meet the demand for different degrees of privacy. Shared space and individual space should be well defined.
- Functional zoning should not result in total segregation of the family members, and should still encourage family togetherness through a compact house layout planning and circulation pattern.
- The entrance hall design and the positioning of the entrance doors also play an important role in regulating social interaction and privacy. Their design should prevent people outside from seeing the living space or the other internal function areas, which are accessible from or after the entrance hall.
- In contemporary houses, balconies at the building scale and communal gardens at the street and neighbourhood scales are used to meet the demand for connectedness to nature. Private gardens are unlikely to be provided due to the intensification of urban growth. Therefore, it is important that communal spaces are created with good landscape design to promote nature bonding.
- For the same reason mentioned above, it is important that balconies are better designed to allow urban gardening.
- With regard to form and details, the research suggests that new housing developments need careful aesthetic considerations since the current standardised solution has negatively affected the aesthetic quality of the domestic spaces.
- Openings of the houses should be oriented to frame views of the surrounding area rather than being standardised. This will contribute to the aesthetic quality at the building scale; however, it should not compromise the sense of privacy.
- The housing layout configuration should be flexible so that the residents can adjust it according to their personal preferences. Personalised space will in turn help the residents develop place identity at the building scale.

At the street scale:

- The way that the building entrances are positioned, either facing the streets or not, has different implications for the privacy and social interaction of residents living on the same street.

- As far as safety is concerned, residents in contemporary developments do not prefer direct access from the public streets. In comparison, direct access to houses has contributed to a strong social bond in traditional developments.
- Private pathways leading to the individual houses are preferred as they provide a high degree of privacy. This setting is particularly welcome in housing developments where multiple family houses share a central common public space.
- Where the building entrances face the public streets, it is preferable to have a transitional semi-public or semi-private space between the public streets and the private building entrance.
- It is also preferable that the buildings are accessed from either pedestrianised streets or streets where the pedestrians are protected from cars if they are sharing spaces. This physical setting contributes to safety and a sense of belonging.
- There should also be the right balance between the ratio of open and built-up areas along the streets to provide high-quality green space for people to feel connected to nature and to facilitate social interaction.
- The places created for social interaction should have clear boundaries which are created through plants, green spaces, small permeable structures, etc.

At the neighbourhood scale:

- High-quality public space design is crucial to facilitate social interaction at the neighbourhood level, particularly in high-density, low land coverage housing developments. Common spaces should have good landscape design rather than being allocated for car parking; this will encourage the inhabitants to spend more time in the communal gardens.
- This will also enhance nature bonding at the neighbourhood level since people are becoming less and less connected to the ground as the buildings grow vertically.
- The gradual transition from public to private spaces helps the residents to develop a sense of belonging, place dependence and familiarity with their living environment.

- It is also important that the boundaries of the public and private spaces are clearly perceived.
- Neighbourhood boundaries do not have to be formed by physical barriers. Boundaries could be created by using trees, slightly different building setbacks and curved streets.
- To encourage social interaction and create a sense of community at the neighbourhood level, it is important that the neighbourhood arrangement should prioritise pedestrians, and the street network should be integrated to provide easy connection between individual family houses and the communal spaces.
- A centrally located common space in housing developments of individual houses will facilitate frequent use of streets and avoid the sense of fear.

9.2. Significance of the Study

This research is the first to combine the typo-morphological analysis and the empirical assessment of SoP. Given this, the proposed methodological framework offering an integrated research design between typo-morphology and SoP contributes to both fields and is useful to fill both research gaps. On the one hand, the research has aimed to find an empirical proof for the claim in typo-morphology that continuity or gradual transformation of the built environment helps to maintain/rebuild SoP. On the other hand, it has aimed to empirically identify the place dimension of the SoP concept. Furthermore, the research is also particularly important in the context of Turkey in terms of benefiting future housing design.

The research has contributed to the development of typo-morphological studies. The characteristics of urban housing and its transformation process have been studied by type. The types, which were deeply rooted in the local culture and people's spontaneous consciousness, have been defined according to a set of spatial characteristics at the building, street and neighbourhood scales to reflect the essence of the Turkish housing transformation. Since there is no universally agreed framework defining what spatial characteristics should be examined in the typo-morphological analysis, the research has put forward its own definition of typo-morphological characteristics of the types at the three scales and developed a framework that is particularly relevant to the Turkish context.

The adopted spatial analysis also offers an innovative way of conducting typo-morphological analysis for researchers in the fields of architecture, urban design and urban planning for two reasons. Firstly, part of the typo-morphological analysis integrated some language and graphic representations from space syntax, which is another tradition from morphological study. Secondly, it has stressed the social dimension of typo-morphology by promoting typo-morphological investigation as a useful design tool in making successful places evoking SoP.

The study also contributes to the field of SoP research. SoP studies are mainly phenomenological since its social construction has attracted more attention and it is believed that SoP is a subjective concept, which is impossible to measure. Despite the criticism of the quantitative methods for subjective matters, this study has adopted the positivistic view and contributed to the field regarding the empirical assessment of SoP. It has introduced a conceptual framework of a set of 10 indicators offering a multi-dimensional view of SoP assessment. It is the most comprehensive SoP model compared to those one-dimensional, two-dimensional and four-dimensional models of SoP proposed in literature.

Defining SoP or questioning what SoP entails was the first step of this research, similar to many other studies of SoP reviewed in Chapter 2. However, in contrast to the other studies that mainly identify the socio-economic and cultural factors affecting SoP, in the second step, this research particularly stressed the physical dimension of SoP and contributed to the lesser extent literature empirically identifying the potential impact of the physical characteristics on SoP. Scholars have already agreed that the physical space is also one of the factors affecting SoP. However, their studies have mainly identified the space-related problems by dominantly focusing on the subjective views and the degree of emotional attachment towards a particular setting. In other words, the primary concern was the emotional attachment, which has been mainly associated with the special activities, experiences and visual images in a place. Therefore, previous research has not profoundly revealed the real contribution of the physical space amongst the other social, cultural and physical factors affecting SoP, in particular that of certain spatial characteristics, the different combinations of which create distinct living environments. The results of the study partly supported the claim empirically since the impact of socio-economic demographic variables might still be in effect. However, since the impacts of demographic variables are minimised in this research, the results have validated the claim.

In addition, the research has strengthened the focus on the physical dimension with the integration of typo-morphological analysis and has monitored SoP from the perspective of typological classification and transformation. Although it is just a first tentative exploration of one aspect of the place dimension, the results can provide many advantages in pursuing more research in this direction. For instance, the other aspects of the place dimension rather than the typological classification and transformation or the contribution of individual spatial elements of urban design might be identified. Moreover, following the proposed integration of the typo-morphological analysis, the aspects of spatial characteristics of the physical living environment have been investigated at the three place scales, starting from housing layout level to street and neighbourhood levels. The results have revealed the importance of the scale dimension of the place in SoP research, which can further inform researchers to carry out scale-sensitive SoP research, which is currently paid less attention.

The research findings are also closely relevant to Turkey today and are particularly important for Turkish people living in Ankara because the city has suffered a great deal from the identity crisis in residential area development together with cultural change, migration and changing political situation after WWI and the proclamation of the Turkish Republic. Today, Turkey as a republic is relatively young; however, it has a rich multi-cultural background inherited from Byzantine, Seljuk and Ottoman empires which is highly challenging to manage and conserve under the adverse effects of urbanisation and globalisation processes (Kaymaz, 2013). As a response to this problem, through the adopted typo-morphological investigation, this research has offered a systematic understanding of the impact of the physical living environment on SoP at the three place scales and identified the role of Turkish housing transformation in managing SoP in new housing developments. Although more research is needed to verify the findings in other house types, in other neighbourhoods and other cities, this study has found strong indications that transformation is influential on SoP and can cause its impairment. It is generally agreed that housing design guidance is a challenging task in terms of evoking SoP since the meaning of home and the emotions attached towards homes are personal, change over time, and therefore vary a great deal (Gjerde & Vale, 2015). However, the systematic investigation of the transformation process of house form from the perspective of SoP offered in this study can open up a much better understanding of current architectural and urban design practice in Turkey. Given this, since the research has proved that continuity is good for SoP, planning and design should aim to achieve typo-morphological continuity in the Turkish context to help maintain SoP.

9.3. Methodological Considerations and Research Limitations

The limitation of the research perhaps firstly lies in the definition and the measurement of SoP since it is a vague concept and is difficult to measure. The research has tried to deal with this difficulty through an assessment of the multiple variables and indicators, which have provided an interpretable base for SoP satisfaction. However, there is also a lack of consensus regarding the definite determinants of SoP and therefore the question of 'What creates SoP?' remains. Thus, the study does not claim to measure SoP in its absolute value; instead, it proposes a comprehensive framework of 10 indicators. However, one may also ask to what degree each indicator contributes to SoP and what other factors affect SoP. In this case, the validity of the results is limited to the chosen variables only and the study only focuses on the physical environment without bias against other factors. In addition, the adopted SoP model does not also provide a scale capable assessment model to elucidate SoP, for instance as seen in Shamai (1991, p.349)'s work where seven levels starting from "*not having a sense of place*" to "*sacrificing for the place*" (mentioned earlier in p.61 in Section 3.2.3). It is because challenging to determine a sharp distance between these feelings. This thesis therefore regarded SoP positively even though occasionally, SoP may be associated with some negative or dark memories of a place (e.g. Arnon 2001, cited in Shamai & Ilatov, 2005; Feldman 1990). Such discussion was not the focus of this research, rather it assessed the intensity of SoP - strong or weak - by using a continuous rating system and focussed on its comparison chronologically throughout the cases.

Secondly, the choice of level or scale of typo-morphological analysis has limited the scope of the study, and only three small scales of typo-morphological analysis were conducted and associated with the SoP. As a result, the thesis has dealt with SoP in part only and associated it with residential satisfaction and the spatial transformation process. The researcher, however, believes that the study was designed in the best possible way to assess the SoP through typological transformation.

The assessment procedure for SoP through the interviews may be another limitation that might affect the results. Although the necessary reliability tests and procedures were carried out and all the precautions were taken to eliminate misinterpretation of the questions, the results are still questionable because people do not all pay attention, interpret, feel and enjoy a place in the same way. They all experience it differently and are encouraged or discouraged by different aspects, which might not be taken into consideration in this thesis.

Fourthly, the limitation lies in the small sample size. A larger sample size could have been used. However, the research already had to analyse a large number of attributes of the physical characteristics of the seven house types, and also aimed to conduct an equal number of in-depth interviews with the residents of each of the seven cases. Because of time constraints, the research was only able to conduct 20 interviews for each of the seven cases. However, this number is amongst the most common sample sizes used in qualitative research and is still above the smallest acceptable size (15).

What is more, the case selection itself was another challenge because the sample sizes for the potential house developments were not always adequate. Some of them had been mainly knocked down and just a few still existed, or they were no longer used for residential purposes. For this reason, this research could not use any cases from a particular morphological period, as explained earlier in Chapter 6 in detail. However, this constraint has been eliminated with alternative case selection from other periods in a way that reflects the essence of typological transformation of house form in Ankara, Turkey, and also follows the rationale for the case selection.

Another methodological challenge concerning the case selection was the difficulty in controlling the socio-economic demographic variables, which might still have affected the results to a certain degree, despite the measures implemented to minimise their impact. Such measures include selecting cases from the same city; looking for similarities in the participants' socio-economic background; and seeking household consensus in the interviews. Although some strategies were developed and their impacts were tested statistically, it was inevitable that the study would have demographic differences. However, in particular, the number of years of occupancy were simply restricted by the case selection since it required choosing the cases in chronological order over a period. This made the maximum possible length of residence comparatively less in newer developments (e.g. the latest case was built in 2007, so the maximum length of occupancy can be only eight years at the time of the interviews) compared to older ones. Therefore, the number of years of occupancy is unavoidably an uncontrollable factor in this research.

In addition, another limitation might be related to the ways through which typological process and different degrees of transformation were identified. The decision made for a case with regard to continuity, partial change or mutation in its transformation is not clear cut. It was made based on the researcher's judgement. However, the judgement has provided a rational way of assessing the certain spatial characteristics and focusing on their interrelationship from a comparative perspective. Therefore, these limitations do not invalidate the results of this study.

9.4. Applicability of the Research Framework and Design

Today, urban design practice requires a strong foundation with both physical and social responsibilities to guide future developments. In this sense, the research has proposed a new methodological framework, which could serve this purpose. This framework offers a way to monitor SoP during the typological transformation of house form. The theoretical background behind the framework is founded on a detailed review of the SoP literature and the typo-morphological approach in order to provide a bridge between them. The systematic analysis offered at the three scales can provide a firm basis for place making, and can help develop scale-based and socially more effective design strategies, in particular to improve/maintain SoP in the residential areas.

Accordingly, the architects and urban designers should focus more on the social consequences of their design while meeting the material expectations of the residents.

Apart from the methodological approach, the proposed multi-dimensional SoP model is novel for the empirical assessment of SoP. It is a comprehensive approach, which can be effectively used particularly in the measurement of perceived residential satisfaction. It is in its current form appropriate to the Turkish context. However, generally, the indicators are universally applicable to other contexts, except for some questions chosen for the assessment of aesthetic, privacy and nature bonding indicators, which are more specific to the Turkish context.

This study assessed the SoP amongst the residents of a series of housing developments where a typological transformation could be traced between them over time; however, the model can also be applied to other research contexts. For instance, SoP can be evaluated between the residents of different socio-economic backgrounds living in the same housing development. How locational differences or different house typologies regardless of their transformational links affect SoP can also be assessed by the same method.

The field of typo-morphology could benefit from a widely acknowledged list/categories of spatial characteristics. These characteristics are not necessarily the same amongst the studies in the field of typo-morphology. However, considering the difficulty in defining forms, patterns, types and hierarchies, it is still important to have a rigid framework/a list to track the changes through the defined spatial characteristics. In this sense, this study has its own definition of these characteristics, which are mainly relevant to the Turkish context. Therefore, the applicability of the list of these characteristics to other contexts is arguable. However, the way to link new to old in any other context is through incorporating earlier structural/spatial relations in the new design, rather than copying the traditional images/aesthetics, which has limited benefit and can damage the authenticity of historic forms. Given this, this study can help designers of other contexts to take inspirations from the tradition and produce contextually sensitive designs. In this sense, the physical characteristics that this research has emphasised to describe the different house forms at different scales can be the main points of departure in this process regarding the choice, identification and groupings of the physical characteristics to observe.

9.5. Further Research

This research was conducted with a small sample size, and the scope of the research was limited to the Turkish context, in particular, to Ankara. To test its reliability, future research could use a larger sample size for both interviews and house types and be extended to different house types, neighbourhoods and cities. It is important to provide a fuller picture of the association between SoP and typological transformation at the different place scales.

This research weighted the impact of the chosen indicators equally in the SoP assessment because of the difficulty in determining the real weighting scale for each indicator. Although it is quite ambitious to look for the ways to determine the importance and contribution of each indicator to overall SoP since their interpretation is quite subjective, future research still needs to look at more robust ways of assessing SoP empirically from a housing transformation perspective. In this sense, for example, the types and degrees of SoP (e.g. alienation, relativity, placelessness, rootedness, as offered by David Hummon (1992)) can be investigated under the impact of the different spatial relations with special focus on the scale dimension of place.

This study has proposed a new approach to housing design practice for future guidance from a typo-morphological perspective. Therefore, the study can also spur further work from the typo-morphological perspective regarding the improvement of housing design policy and regulations. In this sense, it is vital to investigate the regulations to find out their strengths and weaknesses and on what design characteristics they should mainly focus. In this way, it could contribute to an improvement in the housing design guidelines and the governmental legislation and building regulations to promote SoP.

In addition to the typological transformation, there are also other contexts that can be associated with SoP and help to identify its physical dimension. In this regard, for instance, the success of a place regarding accessibility, environmental benefit and adaptability can be studied together with SoP. The research can also be extended regarding the availability and the cost of land and the socio-economic profile of the residents and how these are reflected in the development of SoP.

REFERENCES

Adams, A. & Cox, A.L., 2008. Questionnaires, in-depth interviews and focus groups. In: Cairns, P. and Cox, A.L., eds. Research Methods for Human Computer Interaction. Cambridge, UK: Cambridge University Press, pp. 17–34.

Adamson, K.A. & Prion, S., 2013. Reliability: Measuring Internal Consistency Using Cronbach's α. *Clinical Simulation in Nursing*, 9(5), pp.e179-e180.

Laerd Statistics, 2013. *Testing for Normality using SPSS Statistics*. [Online] Available at: https://statistics.laerd.com/spss-tutorials/testing-for-normality-using-spss-statistics.php [Accessed 24 April 2016].

Agyefi-Mensah, S., Post, J., Egmond, E.E.L.C., Mohammadi, M., 2015. A typological analysis of public apartment buildings in Ghana. *Architectural Engineering and Design Management*, 11(5), pp.376-389.

Ahrentzen, S.B., 1992. Home as a Workplace in Lives of Women. In Low, S.M. & Altman, I. *Place Attchment: A Conceptual Inquiry*. New York: Plenum.

Alexander, C., Ishikawa, S., Silverstein, M., Jacobson, M., Fiksdahl-King, I. and Angel, S., 1977. *A Pattern Language: Towns, Buildings, Construction*. New York: Oxford University Press.

Alexender, E., Reed, K. & Murphy, P., 1988. *Density Measures and Their Relation to Urban Form*. Milwaukee, WI: Center for Architecture and Urban Planing Research, University of Wisconsin-MIlwaukee.

Alfonzo, M.A., 2005. To walk or not to walk? The hierarchy of walking needs. *Environment and Behavior*, 37, pp.808-836.

Ali, H.H., Malkawi, F.K. & Al-Betawi, Y.N., 2009. Quality of Life in Cities: Setting up Criteria for Amman-Jordan. *Social Indicators Research*, 93(2), pp.407–432.

Altaban, O., 1998. Cumhuriyetin Kent Planlama Politikaları ve Ankara Deneyimi (The Republic's City Planning Policies and the Experience of Ankara). In: *75 Yılda Değişen Kent ve Mimarlık (City and Architecture changing in 75 years)*. Istanbul: Is Bankası Kultur Publishing, pp.41–64.

Andrews, F.M., 1980. Comparative studies of life quality: Comments on the current state of the art and some issues for future research. In: Szalai, A. & Andrews, F.M., eds. *The Quality of Life: Comparative Studies*. London: Sage Publications, pp.273-285.

Andrews, F.M. & Withey, S.B., 1974. Developing measures of perceived life quality: Results from several national surveys. *Social Indicators Reseach*, 1(1), pp.1-26.

Ankara Development Agency, 2012. *The Heart of Anatolia*. [Online] Available at: http://www.ankaraka.org.tr/tr/files/yayinlar/discover-ankara.pdf [Accessed 6 April 2016].

Ankara Development Agency, 2013. *Istatistiklerle Ankara (Ankara with Statistics)*. [Online] Available at: http://www.ankaraka.org.tr/tr/files/yayinlar/istatistiklerle-ankara-2013.pdf [Accessed 5 April 2016].

Ankara Development Agency, N.D.a. *Ankara Regional Plan 2011-2013*. [Online] Available at: http://www.ankaraka.org.tr/en/files/ankara-regional-plan-summary.pdf [Accessed 19 November 2016].

Ankara Development Agency, N.D.b. *The potential of capital is on the move*. [Online] Available at : http://www.ankaraka.org.tr/tr/files/yayinlar/ankara-development-agency-en.pdf [Accessed 5 April 2016].

Anton, C.E. & Lawrence, C., 2014. Home is where the heart is: The effect of place of residence on place attachment and community participation. *Journal of Environmental Psychology*, 40, pp.451-461.

Apparicio, P., Se´guin, A., M. & Naud, D., 2008. The Quality of the Urban Environment Around Public Housing Buildings in Montre´al: An Objective Approach Based on GIS and Multivariate Statistical Analysis. *Springer Science + Business Media B.V. Social Indicators Research*, 86(3), pp.355–380.

Ardoin, N.M., Schuh, J.S. & Gould, R.K., 2012. Exploring the dimensions of place: A confirmatory factor analysis of data from three ecoregional sites. *Environmental Education Research*, 18(5), pp.583-607.

Aribas-Tokman, Y., 1985. *Konut Politikalari Uygulamalarinda Ozel Bir Ornek: Yenimahalle (A Special Example of the Implementation of the Housing Policies: Yenimahalle)*. Ankara: Batikent Konut Uretim Yapi Kooperatifleri.

Arifwidodo, S.D. & Chandrasiri, O., 2013. The relationship between housing tenure, sense of place and environmental management practices: A case study of two private land rental communities in Bangkok, Thailand. *Sustainable Cities and Society*, 8, pp.16-23.

Ariga, T., 2005. Morphology, Sustainable Evolution of Inner-urban Neighbourhoods in San Francisco. *Journal of Asian Architecture and Building Engineering*, 4(1), pp.143-150.

Assi, E., 2000. Searching for the Concept of Authenticity: Implementation Guidelines. *Journal of Architectural Conservation*, 6(2), pp.60–69.

Ataov, A. & Osmay, S., 2007. Türkiye'de Kentsel Dönüşüme Yöntemsel Bir Yaklaşim (Translation: A Methodological Approach to Urban Regeneration in Turkiye). *METU Journal of Faculty of Architecture*, 24(2), pp.57-82.

Atkinson, R. & Tranter, B., 2011. Outside Society? The social implications of gated and secured neighbourhoods in Australia? *Working Paper, Centre for Urban Research (CURB), University of York / University of Tasmania*. Available at : http://eprints.whiterose.ac.uk/43076/1/Outside_society_Atkinson_Tranter.pdf [Accessed 15 May 2015].

Bafna, S., 2003. Space Syntax: A Brief Introduction to Its Logic and Analytical Techniques. *Environment and Behaviour*, 35(1), pp.17-29.

Baker, K., 2014. Sense of Place: Understanding Architectural and Landscape Design through a Layering of Visual Representations. *Journal of Learning Design*, 7(1), pp.74-83.

Balamir, M., 1994. Kira evinden kat evlerine apartmanlaşma: Bir zihniyet dönüşümü tarihçesinden kesitler (The apartmentalisation from rent houses to floor houses: Cross sections of a mentality conversion history). *Mimarlık*, 260, pp.29-33.

Bandini, M., 1981. Aldo Rossi. *AA Files*, 1, pp.105-111.

Barker, J.E., 1979. Designing for a Sense of Place in Mississippi Small Towns. In: Prenshaw, W.P. & McKnee, J.O., eds. *Sense of Place: Missisippi*. University of Missisippi: Jackson, M.I., pp.162-178.

Barnes, J.N., Christensen, D.S. & Stillman, T.F., 2014. For the Accounting Profession, Leadership Matters Regarding Ethical Climate Perceptions. *Journal of Accounting, Ethics and Public Policy*, 15(1).

Barrie, E., Cameron, A., Esslemont, K., Gowenlock, K., Innes, C., Jones, P., McDonald, N., Nicol, D., Pittner, C., Young, A., Ralph, M., D'all, S., Ince, P. & Mclean, N., 2010. *A Policy Statement for Scotland Designing Streets*. Edinburgh: RR Donnelley The Scottish Government. ISBN:978-0-7559-8264-6

Barua, A., Kademane, K., Gubbiyappa, K.S., Verma, R.K., Iqbal, M.S., AL-Dubai, S.A.R., 2013. A Tool for Decision-Making in Norm-Referenced Survey Questionnaires with Items of Continuous Variables. *Journal of Asian Scientific Research*, 3(11), pp.1109-1118.

Baruch, Y., 1999. Response rate in academic studies - A comparative analysis. *Human Relations*, 52(4), pp. 421-438.

Batuman, B., 2006. Turkish Urban Professionals and the Politics of Housing, 1960-1980. *METU Journal of Faculty of Architecture*, 23(1), pp.59-81.

Batuman, B., 2013. City Profile: Ankara. *Cities*, 31, pp.578-590.

Beidler, K.J., 2007. Sense of Place and New Urbanism: Towards a Holistic Understanding of Place and Form. PhD Thesis*, Department of Environmental Design and Planning*. Virginia Polytechnic Institute and State University.

Beidler, K.J. & Morrison, J.M., 2016. Sense of Place: Inquiry and Application. *Journal of Urbanism: International Research on Place Making and Sustainability*, 9(3), pp.205-215.

Bergdoll, J.R. & Williams, R.W., 1990. Density Perception on Residential Streets. *Berkeley Planning Journal*, 5(1), pp.15-38.

Berghauser Pont, M.Y. & Haupt, P.A., 2009. *Space, Density and Urban Form*. PhD Thesis. Netherlands: Technishe Universiteit Delft.

Berghauser Pont, M. & Marcus, L., 2015. What can typology explain that configuration can not? In: *SSS10 Proceedings of the 10th International Space Syntax Symposium*. London, 2015.

Biddulph, M., 2007. *Introduction to Residential Layout*. Oxford: Elsevier Architectural Press.

Biddulph, M., 2012. Radical Streets? The impact of innovative street designs on liveability and activity in residential areas. *Urban Design International*, 17(3), pp.178-205.

Billig, M., 2005. Sense of place in the neighbourhood, in locations of urban revitalisation. *GeoJournal*, 64, pp.117-130.

Bingol, E., 2006. *A Quality of Life Perspective to Urban Green Spaces of Ankara*. Phd Thesis. Middle East Technical University.

Birol, G., 2006. Modern Mimarligin Ortaya Cikisi ve Gelisimi (The Emergence and Development of Modern Architecture). *Megaron*, October, pp.3-16.

Bonaiuto, M., Perugini, M., Bonnes, M., Ercolani, A.P., 1999. Multidimensional perception of residential environment quality and neighbourhood attachment in the urban environment. *Journal of Environmental Psychology*, 19, pp.331-352.

Bonaiuto, M., Fornara, F., Ariccio, S., Cancellieri, U.G., Rahimi, L., 2015. Perceived Residential Environment Quality Indicators (PREQIs) relevance for UN-HABITAT City Prosperity Index (CPI). *Habitat International*, 45, pp.53-63.

Bonaiuto, M., Fornara, F. & Bonnes, M., 2003. Indexes of perceived residential environment quality and neighbourhood attachment in urban environment: a confirmation study on the city of Rome. *Landscape and Urban Planning*, 65, pp.41-52.

Bonnes, M., Bonaiuto, M. & Ercolani, A.P., 1991. Crowding and residential satisfaction in the urban environment: A contextual approach. *Environment and Behaviour*, 23(5), pp.531-552.

Boyko, C., 2014. Sense of Life, Spirituality. In: Michalos, A.C., ed. *Encyclopedia of Quality of Life and Well-Being Research*. Dordrecht, Netherlands: Springer. pp.5839-5841.

Bozkurt Azezli, S.G., 2009. *Investigation at instance of Safranbolu Houses of Indoor Montage in Ottoman Domestic Architecture in 19th Centruy*. Master's Dissertation. Istanbul Kultur University.

Bozkurt, S.G., 2013. 19.yy' da Osmanli Konut Mimarisinde Ic mekan Kurgusunun Safranbolu Evleri Orneginde Irdelenmesi (An investigation of interior design principles of Ottoman Residential Architecture: The Case of Safranbolu Houses) *Journal of the Faculty of Foresty*, Istanbul University, 62(2), pp.37-70.

Bramley, G., Dempsey, N., Power, S., Brown, C., Watkins, D., 2009. Social sustainability and urban form: evidence from five British cities. *Environment and Planning A*, 41, pp.2125 -2142.

Brand, S., 1994. *How buildings learn: What happens after they are built*. London: Penguin Books.

Bricker, K.S. & Kerstetter, D.L., 2000. Level of Specialisation and Place Attachment: An Exploratory Study of Whitewater Recreationists. *Leisure Sciences*, 22, pp.233–257.

Brock, D., 1993. Quality of Life Measures in Health Care and Medical Ethics. In: Nussbuam, M. & Sen, A., eds. *The Quality of Life*. Oxford: Clarendon Press. pp.95-132.

Brown, B., Perkins, D.D. & Brown, G., 2003. Place attachment in a revitalising neighborhood: Individual and block levels of analysis. *Journal of Environmental Psychology,* 23, pp.259–271.

Brown, B.B. & Werner, C.M., 1985. Social Cohesiveness, Territoriality, and Holiday Decorations: The influence of Cul-de-Sacs. *Environment and Behaviour*, 17(5), pp.539-565.

Brown, B.B. & Werner, C.M., 2009. Before and After a New Light Rail Stop: Resident Attitudes, Travel Behavior, and Obesity. *Journal of the American Planning Association*, 75(1), pp.5-12.

Browson, R.C., Hoehner, C.M., Day, K., Forsyth, A., Sallis, J.F., 2009. Measuring the Built Environment for Physical Activity: State of the Science. *American Journal of Preventive Medicine*, 36(4), pp.99-123.

Burkay, H.O., 2006. *Social Policy of Urban Transformation: Social Housing Policies in Turkey from the 1980s to Present*. Master's Dissertation. Istanbul: Bogazici University.

Comert, N., Z., 2013. *Testing an Integrated Methodology for Urban Typo-morphological Analysis on Famagusta and Ludlow*. PhD Thesis. Gazimağusa, North Cyprus: Eastern Mediterranean University.

Caliskan, O., 2009. Pattern Formation in Planned Urban Peripheries: A Typo-morphological Approach for Design. *Urbanism PhD Research 2008-2012*, pp.42-63.

Caliskan, O., 2013. *Pattern Formation in Urban Design: Typomorphology as a tool for design-based planning approach*. PhD Thesis. TU Delft.

Camagni, R., Gibelli, M. & Rigamonti, P., 2002. Urban mobility and urban form: The social and environmental costs of different patterns of urban expansion. *Ecological Economics*, 40(2), pp.199–216.

Caniggia, G. & Maffei, G.L., 1979. *Composizione architettonica e tipologia edilizia/1 Letttura dell'edilizia di base (Architectural Composition and Building Typology: Interpreting Basic Building)*. Venezia: Marsilio Editori.

Caniggia, G. & Maffei, G.L., 2001. *Architectural Composition and Building Typology: Interpreting Basic Building*. Translated by Fraser, S.J. Firenze: Alinea Editrice.

Cansever, T. & Yener, E., 1966. Turkish Historical Society. Ankara, Turkey. pp.145-149. [online], Available at: http://archnet.org/system/publications/contents/8478/original/DTP100977.pdf?1389257720 [Accessed 12 March 2015].

Canter, D., 1983. The Purposive Evaluation of Places: A Facet Approach. *Environment and Behavior*, 15(6), pp.659-698.

Cargan, L., 2007. *Doing Social Research*. Rowman & Littlefield Publishers.

Carmona, M., Tiesdell, S., Heath, T. & Oc, T., 2010. *Public Places Urban Spaces: The Dimensions of Urban Design*. 2nd ed. Oxford: Elsevier Architectural Press.

Cataldi, G., 1998. Designing in Stages: Theory and design in typological concept of the Italian School of Saverio Murotori. In: Petruccioli, A. ed. *Typological Process and Design Theory*. Cambridge: Aga Khan Program for Islamic Architecture, Harward University and MIT. pp.35-55.

Cataldi, G., 2003. From Muratori to Caniggia: The origins and development of Italian school of design typology. *Urban Morphology*, (1), pp.19-34.

Cataldi, G., Maffei, G.L. & Vaccaro, P., 2002. Saverio Muratori and the Italian school of planning typology. *Urban Morphology*, 6(1), pp.3-14.

Chapin III, F.S. & Knapp, C.N., 2015. Sense of place: A process for identifying and negotiating potentially contested visions of sustainability. *Environmental Science & Policy*, 53(Part A), pp.38–46.

Chen, F., 2008. Operative tradition: the typological process of an urban settlement in Nanjing, China. *The Traditional Dwellings and Settlements Working Paper Series*, 219(1), pp.43-60.

Chen, F., 2009. *The role of typomorphology in sustaining the cultural identity of Chinese cities: the case study of Nanjing, China*. PhD Thesis. Glasgow: University of Strathclyde.

Cheng, V., 2010. Understanding Density and High Density. In: Ng, E., ed. *Designing High-Density Cities for Social & Environmental Sustainability*. London: Earthscan. pp.3-18.

Chen, F. & Gu, K., 2009. The reciprocity and integration of research on architectural typology and urban morphology, Architect, 4(138), pp.53-58.

Chen, Y., Li, X.Z.Y., Guan, Y. & Liu, X., 2011. Estimating the relationship between urban forms and energy consumption: A case study in the Pearl River Delta, 2005–2008. *Landscape and Urban Planning*, 102, pp.33-42.

Chen, F. & Romice, O., 2009. Preserving the cultural identity of Chinese cities in urban design through a typomorphological approach. *Urban Design International*, 14(1), pp.36-54.

Chen, F. & Thwaites, K., 2013. *Chinese Urban design: The Typo morphological Approach*. Surrey: Ashgate Publishing Limited.

Cheung, C. & Leung, K, 2008. Retrospective and prospective evaluations of environmental quality under urban renewal as determinants of residents' subjective quality of life. *Social Indicators Research*, 85(2), pp.223–241.

Christmann, A. & Van Aelst, S., 2006. Robust estimation of Cronbach's alpha. *Journal of Multivariate Analysis*, 97(7), pp.1660-1674.

Churchman, A., 1999. Disentangling the concept of density. *Journal of Planning Literature*, 13, pp.389-411.

Clemons, S.A., Banning, J.H. & McKelfresh, D.A., 2004. Importance of sense of place and sense of self in residence hall room design. *Colorado State Journal of Student Affairs*, 13, pp.8-15.

Clerici, A. & Mironowicz, I., 2009. Are landmarks essential to the city – its development? In: *Proceedings REAL CORP 2009: CITIES 3.0 – Smart, Sustainable, Integrative Strategies, concepts and technologies for planning the urban future*. Tagungsband. ISBN: 978-39502139-7-3. Available at: http://www.corp.at/archive/CORP2009_56.pdf [Accessed 12 October 2016].

Clifton, K., Ewing, R., Knaap, G. & Song, Y., 2008. Quantitative analysis of urban form: A multidisciplinary review. *Journal of Urbanism: International Research on Place Making and Urban Sustainability*, 1, pp.17-45.

Coban, A.N., 2012. Cumhuriyetin Ilanindan Gunumuze Konut Politikasi (Housing Policies from the Proclamation of the Republic to the Present). Ankara University *SBF Dergisi (Journal of Faculty of Political Sciences)*, 67(3), pp.75-108.

Cohen, J., 1988. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Hove and London: LEA Lawrence Erlbaum Associates Publishers.

Cohen, L., Manion, L. & Morrison, K., 2000. *Research Methods in Education*. 5th ed. London: RoutledgeFalmer.

Coiacetto, E., 2007. The Role of the Development Industry in Shaping Urban Social Space: A Conceptual Model. *Geographical Research*, 45(4), pp.340-347.

Comstock, N., Dickinson, L.M, Marshall, J.A., Soobader, M., Turbin, M.S., Buchenau, M., Litt, J.S., 2010. Neighbourhood attachment and its correlates exploring neighbourhood conditions, collective efficacy, and gardening. *Journal of Environmental Psychology*, 30(4), pp.435-442.

Connelly, L.M., 2011. Research roundtable. Cronbach’s alpha. *Medsurg Nursing*, 20(1).

Conzen, M.R.G., 1960. Alnwick, Northumberland: A study in town-plan analysis. *Institute of British Geographers Publication*, 27.

Conzen, M.R.G., 2004. *Thinking about urban form: Papers on Urban Morphology; 1932-1998*. Conzen, M.P. ed. Bern: Peter Lang AG, European Academic Publishers.

Cooper-Marcus, C. & Sarkissian, W., 1988. *Housing as if People Mattered: Site Design Guidelines for Medium-Density Family Housing*. Berkeley, CA: University of California Press.

Coulton, C., 2012. Defining Neighbourhoods for Research and Policy. *Cityscape: A Journal of Policy Development and Research* , 14(2), pp.231-236.

Coulton, C.J., Jennings, M.Z. & Chan, T., 2013. How big is my neighbourhood? Individual and contextual effects on perceptions of neighbouhood scale. *American Journal of Community Pscychology*, 51(1-2), pp.140-150.

Coulton, C.J., Korbin, J., Chan, T. & Su, M., 2001. Mapping Residents' Perceptions of Neighbourhood Boundaries: A Methodological Note. *American Journal of Community Psychology*, 29(2), pp.371-383.

Cronbach, L.J., 1951. Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), pp.297-334.

Cross, J.E., 2001. What is Sense of Place? In: *The 12th Headwaters Conference, November 2-4*, Western State College.

Cuba, L. & Hummon, D.M., 1993. A Place to Call Home: Identification with Dwelling, Community, and Region. *The Sociological Quarterly, Journal of the Midwest Sociological Society*, 34(1), pp.111-131.

Cummins, R.A., 2000. Objective and Subjective Quality of Life: An interactive model. *Social Indicators Research*, 52, pp.55–72.

Cuthbert, A.R., 2006. *The form of cities, political economy and urban design*. Oxford: Blackwell Publishing.

Cutter, S.L., 1985. *Rating place: A geographer's view on quality of life*. Washington DC: Association of Geographers Resource Publications in Geography.

Darin, M., 1998. The study of urban form in France. *Urban Morphology*, 2(2), pp.63-76.

Das, D., 2008. Urban Quality of Life: A Case Study of Guwahati. *Social Indicators Research*, 88, pp.297-310.

Davenport, M. & Anderson, D., 2005. Getting From Sense of Place to Place-Based Management: An Interpretive Investigation of Place Meanings and Perceptions of Landscape Change. *Society and Natural Resources*, 18(7), pp.625-641.

Day, K., 2003. New Urbanism and the Challenges of Designing for Diversity. *Journal of Planning Education and Research*, 23, pp.83-95.

Deutsch, K., Yoon, S. & Goulias, K.G., 2011. Unpacking the Theory of Sense of Place. Is it Useful for Choice Modeling? In: *International Choice Modeling Conference*. 4-6 July. Leeds.

Dickinson, R., 1948. The Scope and Status of Urban Geography: An Assessment. Land Economics, 24(3). pp.221-238. University of Wisconsin Press.

Diener, E., Inglehart, R. & Tay, L., 2013. Theory and Validity of Life Satisfaction Scales. *Social Indicators Research*. 112(3). pp.497-527.

Diener, E. & Suh, E., 1997. Measuring Quality of Life: Economic, Social and Subjective Indicators. *Social Indicators Research*, 40, pp.189-216.

Dikmen, C.B., 2012. Cumhuriyetin ilanindan gunumuze Ankara'da katli konutlarin cephe duzeni (Façade organisation of the floor houses in Ankara from the proclamation of the Republic to date). In: *6. Ulusal Çatı & Cephe Sempozyumu (6th National Roof & Façade Symposium), 12-13 April*, Bursa.

Djokic, V., 2009. Morphology and Typology as Unique Discourse of Research. *Serbian Architectural Journal*, 1, pp.107-130.

Dovey, K., 1999. *Framing Places: Mediating Power in Built Form*. London: Routledge: Taylor&Francis Group.

Dovey, K., 2010. *Becoming places: Urbanism/Architecture/Identity/Power*. New York: Routledge: Taylor and Francis Group.

Duany, A., 2005. Neighbourhood design in practice. In: Neal, P., ed. *Urban Villages and the Making of Communities*. e-book ed., London and New York: Spon Press, Taylor & Francis Group. pp.122-148.

Duany, A., Plater-Zyberk, E. & Alminana, R., 2003. *The New Civic Art: Elements of Town Planning*. New York: Rizzoli International Publications.

Duffy, B., Smith, K., Terhanian, G. & Bremer, J., 2005. Comparing data from online and face-to-face surveys. International Journal of Market Research, 47(6), pp.615-639.

Eisenhauer, B., Kannich, R. & Blahna, D., 2000. Attachments to Special Places on Public Lands: An Analysis of Activities, Reason for Attachments, and Community Connections. *Society & Natural Resources*, 13, pp.421-441.

Eldem, S.H., 1968. *Turk Evi Plan Tipleri (Turkish House Layout Types)*. Istanbul: ITU Mimarlik Fakultesi (ITU the Faculty of Architecture).

Ellis, P.D., 2009. *Thresholds for Interpreting Effect Sizes*. [Online] Hong Kong Polytechnic University: Hong Kong Polytechnic University. Available at: http://www.polyu.edu.hk/mm/effectsizefaqs/thresholds_for_interpreting_effect_sizes2.html [Accessed 19 May 2016].

Elprama, S.A., Haans, A. & de Kort, Y.A.W., 2011. Relation between Privacy and Place Attachment in Student Housing. In: *Proceedings of 9th Biennial Conference on Environmental Psychology*. Eidhoven, The Netherlands.

Erman, T., 2001. The Politics of Squatter (Gecekondu) Studies in Turkey: The Changing Representations of Rural Migrants in the Academic Discourse. *Urban Studies*, 38(7), p.983-1002.

Erturk, Z. & Ozen, H., 1987. Günümüzde Toplu Konut Planlamasında Geleneksel Türk Evinin Uygulanabilirliği (The Adjustability of Traditional Turkish Houses to Current Mass Housing Projects). In: *The 9th Technical Congress*. Ankara, 1987. TMMOB İnşaat Mühendisleri Odasi, pp.559-566.

Eyles, J. & Williams, A., 2008. *Sense of Place, Health and Quality of Life*. Aldershot: Ashgate.

Fabrigar, L., Wegener, D., MacCallum, R. & Strahan, E., 1999. Evaluating the use of exploratory factor analysis in psychological research. *Psychol. Methods*, 4(3), pp.272–299.

Falkirk Council, 2007. *Housing Layout and Design: Supplementary Planning Guidance Note*. Falkirk Council, Development Services [Online] Available at : https://www.scribd.com/document/75600186/House-Layout-and-Design [Accessed 20 November 2016].

Farquar, M., 1995. Definitions of quality of life: a taxonomy. *Journal of Advanced Nursing*, 22(3), pp.502-508.

Farshchi, S.K., Mabhoot, M. & Rastegar, A.A., 2014. How Citizens' Perception is Influenced by the Sense of Belonging and Identity to Urban Deteriorated Texture (Case Study: Sarshoor District in Mashad). *The SIJ Transactions on Computer Science Engineering & Its Applications*, 2(5), pp.177-181.

Feldman, R.M., 1990. Settlement-identity: Psychological Bonds with Home Places in a Mobile Society. *Environment and Behaviour*, 22(2), pp.183-229.

Feng, Q., 2014. *A Typo-morphological Enquiry into the Evolution of Urban and Architectural Forms in the Huangpu District of Shanghai, China*. Master's Dissertation. Concordia University.

Ferdous, F., 2012. The spatial analysis and morphological evolution of the 'Bazaar Streets' and urban structure of Dhaka city. *Urban Design International*, 17(3), pp.206-220.

Fernandez-Ballesteros, R., 1998. Quality of Life: The Different Conditions. *Psychology in Spain*, 2(1), pp.57-65.

Ferriss, A.L., 2006. A Theory of Social Structure and the Quality of Life. *Applied Research in Quality of Life*, 1(1), pp.117-123.

Ferwati, M.S., 2010. Controllability of Traditional Neighbourhood and its Simplified Layout. *International Journal of Architectural Research*, 4(1), pp.75-84.

Field, A., 2009. *Discovering Statistics Using SPSS*. 3rd ed. London: Sage.

Fincher, R. & Gooder, H., 2007. At home with diversity in medium-density housing. *Housing, Theory and Society*, 24(3), pp.166-182.

Finlay, S.J., 1999. *Sharpening the focus on the urban; Approaches in landscape analysis*. Master's Dissertation. Department of Geography, University of Toronto.

Fishman, R., 1982. *Urban Utopias in the Twentieth Century: Ebenezer Howard, Frank LLoyd Wright; and Le Corbusier*. London: The MIT Press.

Flachsbart, P.G., 1979. Residential Site Planning and Perceived Densities. *Journal of Urban Planning and Development Division*, 105(2), pp.103-117.

Florida, R., Mellander, C., & Stolarick, K. (2011). Beautiful Places: The Role of Perceived Aesthetic Beauty in Community Satisfaction. *Regional Studies, 45*(1), pp.33-48.

Fornara, F., Bonaiuto, M. & Bonnes, M., 2010. Cross-validation of Abbreviated Perceived Residential Environment Quality (PREQ) and Neighbourhood Attachment (NA) Indicators. *Environment and Behavior,* 42, pp.171-196.

Forsyth, A., 2003. Measuring Density: Working Definitions for Residential Density and Building Intensity. *Design Brief*, 8, pp.1-8.

Frank, K.A., 1994. Types are us. In: Frank, K.A. & Schneekloth, L.H., eds. *Ordering Space: Types in Architecture and Design*. New York: Van Nostrand Reinhold. pp.345-372.

Galloway, S., 2006. Cultural participation and individual quality of life: A review of research findings. *Applied Research in Quality of Life*, 1, pp.323-342.

Gauthiez, B., 2004. The history of urban morphology. *Urban Morphology*, 8(2), pp.71-89.

Gehl, J., 2010. *Cities for People*. Washington: Island Press.

Gehl, J., 2011. *Life Between Buildings: Using Public Space*. Translated by Koch, J. Washington: Island Press.

George, R.V. & Campbell, M.C., 2000. Balancing Different Interests in Aesthetic Controls. *Journal of Planning Education and Research*, 20, pp.163-175.

George, D. & Mallery, P., 2002. *SPSS for Windows step by step: A simple guide and reference. 11.0 update*. 4th ed. Boston: Allyn & Bacon.

Gjerde, M., 2013. *A framework for evaluating and improving design guidance & control*. [Online] Available at: http://www.conference.net.au/cibwbc13/papers/cibwbc2013_submission_152.pdf. [Accessed 20 November 2016].

Gjerde, M. & Vale, B., 2015. Aiming for a Better Public Realm: Gauging the Effectiveness of Design Control Methods in Wellington, New Zealand. *Buildings*, 5, pp.69-84.

Google Maps, 2016. [online] Available at: https://www.google.co.uk/maps. [Accessed 21 February 2016].

Gosling, E. & Williams, K.J.H., 2010. Connectedness to nature, place attachment and conservation behaviour: Testing connectedness theory among farmers. *Journal of Environmental Psychology*, 30, pp.298–304.

Graham, H., Mason, R. & Newman, A., 2009. *Literature Review: Historic Environment, Sense of Place and Social Capital*. Report for English Heritage. Newcastle: International Centre for Cultural and Heritage Studies (ICCHS), Newcastle University.

Green, J. & Thorogood, N., 2004. *Qualitative methods for health research*. London: Sage Publications.

Griffin, A. & Hauser, J.R., 1993. The voice of the customer. *Marketing Science*, 12(1), pp.1-27.

Gross, H. & Lane, N., 2007. Landscapes of the lifespan: Exploring accounts of own gardens and gardening. *Journal of Environmental Psychology*, 27(3), pp.225-241.

Groth-Marnat, G., 2009. *Handbook of psychological assessment*. 5th ed. Hoboken, N.J: John Wiley & Sons.

Grubbauer, M., 2011. Architecture and the creation of place specificity in urban development projects: the case of Hamburg's HafenCity. In: *International RC21 conference: The struggle to belong Dealing with diversity in 21st century urban settings*. Amsterdam.

Guest, G., Bunce, A. & Johnson, L., 2006. How many interviews are enough? An Experiment with Data Saturation and Variability. *Field Methods*, 18(1), pp.59-82.

Gulgonen, A., 1988. A typo-morphological approach to design thinking. In:Bentley Sevcenko, M., ed. *Theories and Principles of Design in the Architecture of Islamic Societies*. Cambridge: Massachusettsi Aga Khan Program for Islamic Architecture. pp.115-24. Available at: http://archnet.org/system/publications/contents/4237/original/DPC0437.pdf?1384781936 [Accessed 7 May 2014].

Gunay, B., 2012. Ankara Spatial History. In: *AESOP (Association of European Schools of Planning) Congress*. Ankara. [online] Available at: http://crp.metu.edu.tr/sites/crp.metu.edu.tr/files/Ankara%20spatial%20history.pdf [Accessed 15 September 2016].

Guney, Y.I., 2007. Type and Typology in Architectural Discourse. *Journal of BAU FBE*, 9(1), pp.3-18.

Guney, Y.I. & Wineman, J., 2008. The Evolving Design of 20th Century Apartments in Ankara. *Environment and Planning B: Planning and Design*, 35, pp.627-646.

Gur, M., 2012. Kimlik Sorunu: TOKI Konutlari (Identity problem: TOKI Houses). In: *6th National Roof and Facade Symposium, 12-13 April*. Bursa, 2012. Uludag University.

Gurer, T.K., 2012. A Theory for Sustainablility of Townscape: Typomorphology. In: *Regional Development: Concepts, Methodologies, Tools, and Applications: Concepts, Methodologies, Tools, and Applications*. Heshey, USA: Information Science Reference (IGI Global), pp.1418-1433.

Gu, K. & Xu, Z., 2014. Applying Conzenian and Caniggian ideas in China: recent research advances and problems. *Urban Froum and Design*, 1, pp.10-21.

Hagerty, M.R., Cummins, R., Ferris, A.L., Land, K., Michalos, A.C., Peterson, M., Sharpe, A., Sirgy, J. & Vogel, J., 2001. Quality of Life Indexes for National Policy: Review and Agenda for Research. *Social Indicators Research*, 55(1), pp.1-96.

Harris, P.B., Werner, C.M., Brown, B.B. & Ingebritsen, D., 1995. Relocation and Privacy Regulation: A Cross-Cultural Analysis. *Journal of Environmental Psychology*, 15, pp.311-320.

Hay, R., 1998a. A rooted sense of place in cross-cultural perspective. *Canadian Geographer*, 42(3), pp.245-266.

Hay, R., 1998b. Sense of place in development context. *Journal of Environmental and Psychology*, 18, pp.5–29.

Hernandez, B., Hidalgo, M., Salazar-Laplace, M. & Hess, S., 2007. Place atachment and place identity in natives and non-natives. *Journal of Environmental Psychology*, 27(4), pp.310-319.

Hidalgo, M.C. & Hernandez, B., 2001. Place Attachment: Conceptual and Empirical Questions. *Journal of Environmental Psychology*, 21, pp.273-281.

Hillier, B., 2007. *Space is the Machine: A Configurational Theory of Architecture*. London: The Press Syndicate of the University of Cambridge.

Hillier, B., Burdett, R., Peponis, J. & Penn, A., 1987. Creating Life: Or, Does Architecture Determine Anything? *Arch.&Comport/Arch. Behav.*, 3(3), pp.233-250.

Hillier, B. & Hanson, J., 1984. *The Social Logic of the Space*. Cambridge: Cambridge University Press.

Holden, E., 2004. Ecological footprints and sustainable urban form. *Journal of Housing and the Built Environment*, 19(1), pp.91–109.

Houston, M.J. & Nevin, J.R., 1977. The Effects of Source and Appeal on Mail Survey Response Patterns. *Journal of Marketing Research*, 14(August) pp.374-378.

Hughes, M.A. & Hayhoe, G.F, 2009. A Research Primer for Technical Communication: Methods, Exemplars, and Analyses. New York and London: Lawrence Erlbaum Associates, Taylor & Francis Group.

Hummon, D., 1992. Community Attachment: Local Sentiment and Sense of Place. In: Altman, I. & Low, S., eds. *Place Attachment*. New York: Plenum. pp.253-278.

Hunt, L.M., 2008. Examining State Dependence and Place Attachment within A Recreational Fishing Site Choice Model. *Journal of Leisure Activities*, 40(1), pp.110-127.

Hunter, M.C.R. & Brown, D.G., 2012. Spatial contagion: Gardening along the street in residential neighbourhoods. *Landscape and Urban Planning*, 105, pp.407-416.

Hwang, J-H., 1994. *The reciprocity between architectural typology and urban morphology*. PhD thesis. City and Regional Planning, University of Pennsylvania.

Inalhan, G. & Finch, E., 2004. Place Attachment and Sense of Belonging in the Offices. *Facilities*, 22(5/6), pp.120-128.

Larkham, P. & Jones, A. 1990. ISUF Glossary [Online]. Available at: http://www.urbanform.org/glossary.html [Accessed 23 July 2015].

Jacobs, A.B., 1995. *Great Streets*. USA: Massachusetts Institute of Technology.

Jamali, S., PourMohammadi, M. & Mousavi, M.S.S., 2011. A Review on Urban Morphology Schools. *Arid Regions Georaphic Studies*, 2(5), pp.1-16.

Jenkins, P., Smith, H. & Wang, Y.P., 2007. *Planing and Housing in the Rapidly Urbanising World*. New York: Routledge.

Jensen, M.P., 2003. Questionnaire validation: A brief guide for readers of the research literature. *The Clinical Journal of Pain*, 19(6), pp.345-352.

Jiang, B., Claramunt, C. & Klarqvist, B., 2000. An Integration of Space Syntax into GIS for Modelling Urban Spaces. *International Journal of Applied Earth Observation and Geoinformation*, 2(3/4), pp.161-171.

Jiven, G. & Larkham, P.J., 2003. Sense of Place, Authenticity and Character: A Commentary. *Journal of Urban Design*, 8(1), pp.67–81.

Johns, R., 2010. *Likert Items and Likert Scales, Survey Responses Network*. [Online] Available at: https://www.ukdataservice.ac.uk/media/262829/discover_likertfactsheet.pdf [Accessed 13 December 2015].

Jorgensen, B.S. & Steadman, R.C., 2006. A Comparative Analysis of Predictors of Sense of Place Dimensions: Attachment to dependence on, and identification with Lakeshore properties. *Elsevier Journal of Environmental Management*, 79, pp.316-327.

Jorgensen, B.S. & Steadman, R.C., 2011. Measuring the spatial component of sense of place: a methodology for research on the spatial dynamics of psychological experiences of places. *Environment and Planning B: Planning and Design*, 38, pp.795-813.

Jorgensen, B.S. & Stedman, R., 2001. Sense of place as an attitude: Lakeshore property owners’ attitudes toward their properties. *Journal of Environmental Psychology*, 21, pp.233–248.

Kaltenborn, P.B., 1998. Effects of sense of place on responses to environmental impacts: A study among residents in Svalbard in the Norwegian High Arctic. *Applied Geography*, 18(2), pp.169-189.

Kamp, I.v., Leidelmeijer, K., Marsman, G. & Hollander, A.D., 2003. Urban environmental quality and human well-being towards a conceptual framework and demarcation of concepts; a literature study. *Landscape and Urban Planning*, 65, pp.5-18.

Katsamagka, A., 2013. *Developing Place Attachment to the Natural Surroundings of the School: The Role of Outdoor Education*. Master's Dissertation. Linköping University.

Kaymaz, I., 2013. Urban Landscapes and Identity. In: Ozyavuz, M., ed. *Advances in Landscape Architecture*. Rijeka, Croatia: Intech. pp.739-760.

Keniger, L.E., Gaston, K.J., Irvine, K.N. & Fuller, R.A., 2013. What are the Benefits of Interacting with Nature? *International Journal of Environmental Research and Public Health*, 10, pp.913-935.

Khalil, H.A.E.E., 2012. Enhancing quality of life through strategic urban planning. *Sustainable Cities and Society*, 5, pp.77–86.

Kim, J., 2000. Creating Community: Does the Kentlands Live Up to Its Goals. *Places*, 13(2), pp.48-55.

Kim, Y.O., 2001. The Role of Spatial Configuration in Spatial Cognition. In: *Proceedings of the 3rd International Space Syntax Symposium*. Atlanta, UCL, pp.49.1-49.21

Komorowski, B., 2007. *The Death and Life of Local Building Traditions: Typomorphological Analysis as a Basis for Urban Design in Montreal*. Supervised Research Project. McGill University.

Krier, L., 1978. The resconstruction of the city. In: Deleroy, R.L. *Rational Architecture*. Brussels: Archives d'Architecture Moderne. pp.38-44.

Krier, R., 1979. *Urban Space*. London: Academy Editions.

Krier, L., 1998. *Architecture: Choice or Fate*. Windsor: Andreas Papadakis Publishers.

Kropf, K., 1993. *The Definition of Built Form in Urban Morphology*. PhD Thesis. Birmingham: University of Birmingham.

Kropf, K.S., 1998. Typological Zoning. In: Petruccioli, A., ed. *Proceedings of the International Symposium on Typological Process and Design Theory*. Cambridge, 1998. MIT Press.

Kropf, K., 2005. The handling characterisitics of urban form. *Urban Design*, Winter(93), pp.17-18.

Kropf, K., 2006. Crisis in the typological process and the language of innovation and tradition. *Urban Morphology*, 10(1), pp.70-77.

Kropf, K., 2009. Aspects of urban form. *Urban Morphology*, 13(2), pp.105-120.

Kropf, K., 2014. Ambiguity in the definiton of built form. *Urban Morphology*, 18(1), pp.41-57.

Kuban, D., 1976. *Sanat Tarihimizin Sorunlari (The Problems of Our Art History)*. Istanbul: Cagdas Yayinlari.

Kurtz, H., 2001. Differentiating multiple meanings of garden and community. *Urban Geography*, 22(7), pp.656-670.

Kyle, G., Giraefe, A. & Manning, R., 2005. Testing the Dimensionality of Place Attachment in Recreational Settings. *Environment and Behaviour*, 37(1), pp.153-177.

Kyle, G., Graefe, A., Manning, R. & Bacon, J., 2004. Effects of place attachment on users' perceptions of social and environmental conditions in a natural setting. *Journal of Environmental Psychology*, 24(2), pp.213–225.

Laerd Statistics, 2013. *Testing for Normality using SPSS Statistics*. [Online] Available at: https://statistics.laerd.com/spss-tutorials/testing-for-normality-using-spss-statistics.php [Accessed 24 April 2016].

Lang, J., 1987. *Creating Architectural Theory: The Role of the Behavioural Sciences in Environmental Theory*. New York: Van Nostrand Reinhold.

Larkham, P., 2006. The Study of Urban Form in Great Britain. *Urban Morphology*, 10(2), pp.117-141.

Larson, S., De Freitas, D.M. & Hicks, C.C., 2013. Sense of place as a determinant of people's attitudes towards the environment: Implications for natural resources management and planning in the Great Barrier Reef, Australia. *Elsevier Journal of Environmental Management*, 117, pp.226-234.

Lawrence, R.J., 1994. Type as Analytical Tool: Reinterpretation and Application. In: Frank, K.A. & Schneekloth,L.H., eds. *Ordering Space: Types in Architecture and Design*. New York: Van Nostrand Reinhold. pp.271-287.

Lee, C.C.M., 2011. *The City as a Project*. [Online] Available at: http://thecityasaproject.org/2011/08/type/ [Accessed 19 October 2015].

Leech, N.L., Barret, K.C. & Morgan, G.A., 2005. *SPSS for Intermediate Statistics: Use and Interpretation*. 2nd ed. London: Lawrence Erlbaum Associates, Inc.

Lever, J.P., 2000. The Development of an Instrument to Measure Quality of Life in Mexico City. *Social Indicators Research*, 50, pp.187-208.

Levesque, C., Lafontaine, M.F., Caron, A. & Fitzpatrick, J., 2014. Validation of the English version of the dyadic coping inventory. *Measurement and Evaluation in Counseling and Development*, 47(3), pp.215-225.

Lewicka, M., 2008. Place attachment, place identity, and place memory: Restoring the forgetten city past. *Journal of Environmental Psychology*, 28, pp.209-231.

Lewicka, M., 2010. What makes neighbourhood different from home and city? Effects of place scale on place atachment. *Journal of Environmental Psychology*, 30(1), pp.35-51.

Lewicka, M., 2011. On the Varieties of People's Relationships with Places: Hummon's Typology Revisited. *Environment and Behaviour*, 43(5), pp.676-709.

Lewis, P., 1979. Defining a sense of place. *Southern quarterly*, 17(3). pp.24-46.

Lopez, R., 2009. *Enhancement Plan for Downtown Cayucos, Ca*. Master's Dissertation. San Luis Obispo: California Polytechnic State University.

Lopez, R., 2010. Sense of Place and Design. *Focus*, 7(1), Article 16, pp.46-52. [online], Available at: http://digitalcommons.calpoly.edu/focus/vol7/iss1/16 [Accessed 15 April 2016].

Lotfi, S. & Koohsari, M.J., 2009. Analyzing Accessibility Dimension of Urban Quality of Life: Where Urban Designers Face Duality between Subjective and Objective Reading of Place. *Social Indicators Research*, 94, pp.417-435.

Low, S.M. & Altman, I., 1992. *Place Attachment: A Conceptual Inquery*. New York: Plenum.

Lynch, K., 1960. *The Image of City*. Cambridge: The MIT Press.

MGM, 2016. [online], Available at: https://mgm.gov.tr [Accessed 20 February 2016].

Mihcioglu B. E., 2010. *The Physical Evolution of the Historic City of Ankara between 1839 and 1944: A Morphological Analysis*. PhD Thesis. Ankara: Middle East Technical University.

Maller, C., Townsend, M., Pryor, A., Brown, P. & Leger, L.S., 2005. Healthy nature healthy people: 'contact with nature' as an upstream health promotion intervention for populations. *Health Promotion International*, 21(1), pp.45-54.

Mansoori, S.T. & Jahanbakhsh, H., 2014. Factors Affecting the Measurement of Place Identity in Urban Space (Case Study: Modares Street Kermanshah). *International Journal of Engineering Sciences*, 3(9), pp.94-98.

Mao, Y., Fornara, F., Manca, S., Bonnes, M. & Bonaiuto, M., 2015. Perceived Residential Environment Quality Indicators (PREQIs) and Neighbourhood Attachment: A Confirmation Study on a Chinese Sample in Chongqing. *PsyCh Journal*, 4(3), pp.123-137.

Maphill, 2013. *Maphill*. [Online] Available at: http://www.maphill.com/turkey/ankara/maps/physical-map/shaded-relief-outside/ [Accessed 19 March 2016].

Marans, R.W. & Stimson, R., 2011. Investigating quality of urban life: Theory, methods, and empirical research. *Social Indicators Research Series*, 45, pp.1–29.

Marcus, C.C., 1992. Environmental Memories. In: Altman, I. & Low, S.M. *Place Attachment: A conceptual Inquiry*. New York: Plenum.

Markus, T.A., 1994. Social Practice and Building Typologies. In: Frank, K.A. & Schneekloth, L.H., eds. *Ordering Space: Types in Architecture and Design*. New York: Van Nostrand Reinhold ITP A Division of International Thomson Publishing Inc. pp.147-163.

Marshall, S., 2005. *Streets & Patterns*. New York: Spon Press Taylor & Fransis Group.

Marzot, N., 2001. Critical Glossary. In: Caniggia, G. & Maffei, G.L. *Architectural Composition and Building Typology*. Firenze: Alinea Editrice. pp.243-252.

Marzot, N., 2002. The Study of Urban Form in Italy. *Urban Morphology*, 6(2), pp.59-73.

Maslow, A., 1954. *Motivation and personality*. New York: Harper and Row.

Mason, M., 2010. Sample Size and Saturation in PhD Studies Using Qualitative Interviews. *Forum: Qualitative Social Research (Art.8)*, 11(3). Available at: http://www.qualitative-research.net/index.php/fqs/article/viewArticle/1428/3027.

May, J., 1970. *Kant's Concept of Geography*. Department of Geography, University of Toronto.

Mazloomi, S.M., Ariffin, S.I. & Shahminan, R.N.R., 2014. A comparative analysis of perceptual and demographic predictors of sense of place dimension in the State Mosques of Malaysia. *Asian Journal of Social Pschologhy*, 17, pp.128-140.

McCrea, R., Shyy, T-K. & Stimson, R., 2006. What is the strength of the link between objective and subjective indicators of urban quality of life? *Applied research in quality of life*, 1, pp.79-96.

McGlynn, S. & Samuels, I., 2000. The Funnel, the Sieve and the Template: Towards and Operational Urban Morphology. *Urban Morphology*, 4(2), pp.79-89.

McLeod, S.A., 2014. *The Interview Method*. [Online] Available at: http://www.simplypsychology.org/interviews.html [Accessed 8 September 2016].

Memken, J.A., Garber-Dyar, C. & Crull, S., 1997. Space planning in residential design. *Housing and Society*, 24(3), pp.69-93.

Mendes, J.F.G. & Motizuki, W.S., 2001. Urban Quality of Life Evaluation Scenarios: The case of Sao Carlos in Brazil. *CTBUH Review*, 1(2), pp.13-23.

Mercer, C., 2002. Little Supplements of Life: Urban Governance and Quality of Life. *Canadian Journal of Communication*, 27(2), pp.315-330.

Mezini, L. & Pojani, D., 2015. Defence, Identity, and Urban Form: The Extreme Case of Gjirokastra. *Planning Perspectives*, 30(3), pp.397-428.

Milligan, M.J., 1998. Interactional past and potential: The social construction of place attachment. *Symbolic Interaction*, 21(1), pp.1-33.

Milne, J. 1998. Questionnaires: Advantages and Disadvantages. In: Evaluation Cookbook, J., Harvey, ed., Edinburgh: Learning Technology Dissemination Initiative Institute for Computer Based Learning, Heriot-Watt University [online] Available at: http://www.icbl.hw.ac.uk/ltdi/cookbook/cookbook.pdf [Accessed 12 November 2016]

Mitchell, M.Y., Force, J.E., Carroll, M.S. & McLaughlin, W.J., 1993. Forest places of the heart: Incorporating special places into public management. *J. Forest*, 91(2), pp.32-37.

Mitchell, G., Namdeo, A. & Kay, D., 2000. A new disease-burden method for estimating the impact of outdoor air quality on human health. *The Science of the Total Environment*, 246, pp.153–164.

Mlozi, S., Pesamaa, O., Haahtii, A. & Salunke, S., 2012. Determinants of Place Identity and Dependence: The Case of International Tourism in Tanzania. *Tourism, Culture and Communication*, 12(2), pp.97-114.

Mohd, T., Johari, N., Ghani, R.A. & Rahman, N.A.Y.A., 2015. The Impact of Gated and Guarded Development Concept from the Social Aspect. *Procedia Social and Behavioral Sciences*, 170, pp.567-574.

Montello, D., 1993. Scale and Multiple Psychologies of Spaces. In: Frank, A.U. and Campari, I. eds. Spatial Information Theory: A theoretical basis for GIS, pp.312-321. Berlin: Springer-Verlag. Lecture Notes in Computer Science 716.

Montgomery, J., 1998. Making a City: Urbanity, Vitality and Urban Design. *Journal of Urban Design*, 3(1), pp.93-116.

Moore, R.L. & Graefe, A.R., 1994. Attachments to recreation settings: The case of rail-trail users'. *Leisure Sciences*, 16, pp.17-31.

Morgan, L.J., 2013. Gated Communities: Institutionalizing Social Stratification. *The Geographical Bulletin*, 54, pp.24-36.

Moudon, A.V., 1989. The Role of Typo-morphological Studies in Environmental Design Research. *EDRA*, 20, pp.41-48.

Moudon, A.V., 1994. Getting to know the Built Landscape:Typomorphology. In: Frank, K.A. & Schneekloth, L.H., eds. *Ordering Space: Types in Architecture and Design*. New York: Van Nostrand Reinhold.

Moudon, A.V., 1997. Urban morphology as an emerging interdisciplinary field. *Urban Morphology*, 1, pp.3-10.

Moughtin, C. & Mertes, M., 2003. *Urban Design: Street and Square*. 3rd ed. Oxford: Elsevier Ltd.

Naess, S., 1999. Subjective Approach to Quality of Life. *Feminist Economics*, 5(2), pp.115-118.

Najafi, M. & Shariff, M.K.B.M., 2011. The Concept of Place and Sense of Place in Architectural Studies. *World Academy of Science, Engineering and Technology*, 56, pp.1100-1106.

Nanzer, B., 2004. Measuring Sense of Place: A Scale for Michigan. *Administrative Theory & Praxis*, 26(3), pp.362-382.

Nasih, S., 1933. Ankara icin ucuz aile evi tipleri (Cheap family housing typologies for Ankara). *Arkitekt, 06*(30), 174. [Online] Available at: http://dergi.mo.org.tr/dergiler/2/98/1056.pdf [Accessed 15 January 2014].

Newel, P.B., 1995. Perspectives on Privacy. *Journal of Environmental Psychology*, 15, pp.87-104.

Ng, S.H., Kam, P.k., Pong & W., M.R., 2005. People living in ageing buildings: Their quality of life and sense of belonging. *Journal of Environmental Psychology*, 25, pp.347-360.

Nikovic, A., Dokic, V. & Maric, I., 2014. Revising the Position of a City Block within the Morphological Frame of a Traditional City: Contemporary Perspectives. *SPATIUM International Review*, 31, pp.1-6.

Nophaket, N. & Fuiji, A., 2004. Syntactic and Network Pattern Structures of City-Comparison of Grid and Meandering Street Patterns in Kyojima and Honjo. *Journal of Asian Architecture and Building Engineering*, 3(2), pp.349-356.

Norberg-Schulz, C., 1979. *Genius Loci: Towards a Phenomenology of Architecture*. New York: Rizzoli.

Nunnally, J.C. & Bernstein, I.H., 1994. *Psychometric Theory*. 3rd ed. New York : McGraw-Hill.

Oak, N.D. *Understanding the one-way ANOVA*. [Online] Available at: http://oak.ucc.nau.edu/rh232/courses/EPS525/Handouts/Understanding%20the%20One-way%20ANOVA.pdf [Accessed 23 April 2016].

Oktay, D., 2002. The quest for urban identity in the changing context of the city Northen Cyprus. *Cities*, 19(4), pp.261-271.

Oktay, D., 2004. Urban Design for Sustainability: A study on the Turkish City. *International Journal of Sustainable Dev. World Ecol.*, 11, pp.24-35.

Okulicz-Kozaryn, A., 2013. City Life: Rankings (Livability) Versus Perceptions (Satisfaction). *Social Indicators Research*, 110, pp.433-451.

Oliveira Andrade Pereira, C.P., 2014. *Sustainability of Urban Form-Application of Salat''s Model, Case Study: Odivelas*. Dissertation. Tecnico Lisboa.

Oliveira, V., 2016. *Urban Morphology: An Introduction to the Study of Physical Form of Cities*. Porto: Springer, The Urban Book Series.

Osmay, S., 1998. 1923'ten bugüne kent merkezlerinin dönüşümü (The transformation of the city centres from 1923 to date). In: *75 Yılda Değişen Kent ve Mimarlık (City and Architecure Changing in 75 years)*. Ankara: Türkiye İş Bankası Kültür Press. pp.139-154.

Ozaloglu, S., 2006. Transformation of Ankara between 1935-1950 in relation with everyday life and lived spatiality. PhD thesis. Middle East Technical University.

Ozbek-Eren, I., 2012. Last castles of the transforming cities in Turkey: 'Mahalle' as an urban structure since the Ottoman period. *International Journal of Human Sciences*, 9(2), pp.1547-1568.

Ozbek-Sonmez, I., 2012. Significance and Threat of Urban Planning in Preserving Urban Subcultures. In: *Urban Popculture Conference*. Prague.

Ozbil, A., 2013. Modelling Walking Behaviour in Cities based on Street Network and Land-use Characteristics: The Case of Istanbul. *METU Journal of Faculty of Architecture*, 30(2), pp.17-33.

Ozbil, A., Peponis, J. & Stone, B., 2011. Understanding the link between street connectivity, land use and pedestrian flows. *Urban Design International*, 16(2), pp.125-141.

Oztank, N., 2010. An Investigation of Traditional Turkish Wooden Houses. *Journal of Asian Architecture and Building Engineering*, 2, pp.267-274.

Paccione, M., 1986. Quality of Life in Glasgow: An applied geographical analysis. *Environment and Planning A*, 18(11), pp.1499-1520.

Pacione, M., 1984. Evaluating the quality of the residential environment in a high-rise public housing development. *Applied Geography*, 4, pp.59-70.

Pacione, M., 2003. Urban environmental quality and human wellbeing: A social geographical perspective. *Landscape and Urban Planning*, 65, pp.19-30.

Panerei, P., Castex, J., Depaule, J.C. & Samuels, I., 2004. *Urban Forms: The Death and Life of the Urban Block*. Translated by Samuels, O.V. Oxford: Elsevier: Architectural Press.

Pankhania, T.B. & Jani, H.J., 2012. An Evaluation of Productivity Scenario: A Survey. *Analysis*, 1(4), pp.82-89.

Paradis, T., 2000. Main Street Transformed: Community Sense of Place for Nonmetropolitan Tourism Business Districts. *Urban Geography*, 21(7), pp.609-639.

Pellegrini, P. & Baundry, S., 2014. Streets as new places to bring together both humans and plants: examples from Paris and Montpellier (France). *Social & Cultural Geography*, 15(8), pp.871-900.

Pellow, D., 1992. Space that teach attachment to the African Compoun. In: Low, S.M. & Altman, I., *Place Attachment: A Conceptual Inquiry*. New York: Plenum.

Peponis, J., 1997. Geometries of Architectural Description: Shape and Spatial Configuration. In: *Proceedings of Space Syntax First International Symposium*. London, 1997. UCL.

Peponis, J., Bafna, S., Zhang & Zongyu, 2008. The connectivity of streets: reach and directional distance. *Environment and Planning B: Planning and Design*, 35, pp.881-901.

Perkins, D.D. & Long, A.D., 2002. Neighborhood sense of community and social capital: A multi-level analysis. In: Fisher, A., Sonn, C. & Bishop, B., eds. *Psychological sense of* *community: Research, applications and implications*. New York: Plenum Press. pp.291-318.

Pevsner, N., 1976. *A History of Building Types*. London: Thames and Hudson.

Phillips, D., 2006. *Quality of Life: Concept, policy and practice*. London and New York: Routledge Taylor & Francis Group.

Pinet, C., 1988. A Sense of Belonging in the neighbourhood: The effect of Traffic on Space Appropriation. In *Nineteenth Annual Conference of the Environmental Design Research Association*. Pomona, California.

Pinzon Cortes, C.E., 2006. Morphological Analysis of the Contemporary Urban Territory: Is it still a relevant approach? In: van der Hoaven, F. & Rosemann, H.J. *Urban Transformation and Sustainability*. IOS Press, pp.95-113.

Pinzon Cortes, C.E., 2009. *Mapping Urban Form: Morphology studies in the contemporary urban landscape*. PhD Thesis. Technishe Universiteit Delft.

Pmod, 2015. *One-way ANOVA for 3 or 4 groups*. [Online] Available at: http://www.pmod.com/files/download/v35/doc/pbas/6154.htm [Accessed 23 April 2016].

PPS, 2015. *Streets as Places: How Transportation can Create a Sense of Community*. [Online] Available at: http://www.pps.org/reference/streets-as-places-how-transportation-can-create-a-sense-of-community/ [Accessed 5 November 2016].

Prohansky, H.M. & Fabian, A.K., 1986. Psychological Aspects of the Quality of Urban Life. In: Frick, D., Hoefert, H. W., Legewie, H., Mackensen, R., & Silbereisen, R. K., eds. *Quality of Urban Life: Social, Psychological and Physical Conditions*. Berlin and New York: Walter de Gruyter & Co. pp.19-29.

Proshansky, H.M., 1978. The City and Self-identity. *Environment and Behaviour*, 10(2), pp.147-169.

Proshansky, H.M., Fabian, A.K. & Kaminoff, R., 1983. Place Identity: Physical World Socialization of the Self. *Journal of Environmental Psychology*, 3, pp.57-83.

Pukeliene, V. & Starkauskiene, V., 2009. Quality of life concept, measurements and challanges. *Taikomoji Ekonomika*, 3(2), pp.51-65.

Pulat, G., 1992. Dar Gelirli Kentlilerin Konut Sorunu ve Soruna Sosyal Icerikli Mekansal Cozum Arayislari (Housing Problem of Low-income Groups and Searching Socio-spatial Solution. *Batikent Konut Uretim Yapi Kooperatifleri Yayini*, p.49.

Punter, J., 1991. Participation in the Design of Urban Space. *Landscape Design*, 200, pp.24-27.

Putnam, R.D., 2000. *Bowling Alone*. New York: Simon and Schuster.

Raman, S., 2010. Designing a Liveable Compact City: Physical Forms of City and Social Life in Urban Neighbourhoods. *Built Environment*, 36(1), pp.63-80.

Ramkissoon, H., Weiler, B. & Smith, L.D.G., 2012. Place attachment and pro-environmental behaviour in national parks: the development of a conceptual framework. *Journal of Sustainable Tourism*, 20(2), pp.257-276.

Rapley, M., 2003. *Quality of Life Research: A Critical Introduction*. London-Thousand Oaks-New Delhi: SAGE Publications.

Rapoport, A., 1969a. *House Form and Culture*. London: Prentice-HALL, INC.Englewood Cliffs, N.J.

Rapoport, A., 1969b. Housing and Housing density in France. *Town Planning Review*, 39, pp.341-354.

Rapoport, A., 1969c. The Notion of Urban Relationships. *Area (Journal of Institude of British Geographers)*, 3, pp.17-26.

Rapoport, A., 1975. Toward a redefinition of density. *Environment and Behaviour*, 7(2), pp.133-158.

Rapoport, A., 1977. *Human Aspects of Urban Form*. New York: Pergamon Press.

Raymond, C.M., Brown, G. & Weber, D., 2010. The measurement of place attachment: Personal, community, and environmental connections. *Journal of Environmental Psychology*, 30, p.422-434.

Relph, E., 1976. *Place and Placelessness*. London: Pion Limited.

Revelle, W. & Zinbarg, R.E., 2009. Coefficients alpha, beta, omega, and the glb: comments on Sijtsma. *Psychometrika*, 74(1), pp.145–154.

Rezvani, M.R., Mansourian, H. & Sattari, M.H., 2013. Evaluating Quality of Life in Urban Areas (Case Study: Noorabad City, Iran). *Social Indicators Research*, 112, pp.203-220.

Richardson, A.J., Brunton, P.J. & Roddis, S.M., 1998. The Calculation of Perceived Residential Density. *Road & Transport Research*, 7(2), pp.3-15.

Rinner, C., 2007. A Geographic Visualization Approach to Multi-Criteria Evaluation of Urban Quality of Life. *International Journal of Geographical Information Science*, 21(8), pp.907-919.

Robinson, J.W., 1994. The Question of Type. In: Frank, K.A. & Schneekloth, L.H., eds. *Ordering Space: Types in Architecture and Design*, New York: Van Nostrand Reinhold.

Robinson, I.M., Baer, W.C., Banerjee, T.K. & Flachsbart, P.G., 1975. Trade-Off Games. *Behavioural Research Methods in Environmental Design*, pp.79-118.

Rogers, Z. & Bragg, E.E., 2012. The Power of Connection: Sustainable Lifestyles and Sense of Place. *Ecopsychology*, 4(4), pp.307-318.

Rose, G., 1995. Place and Identity: A Sense of Place. In: Massey, D. & Jess, P., eds. *A Place in the World? Places, Cultures and Globalization*. Oxford: The Open University. pp.87–132.

Rossi, A., 1984. *The Architecture of City*. Cambridge: The MIT Press.

Russell, J.A. & Ward, L.M., 1982. Environmental Pscychology. *Annual Review of Pschology*, 33, pp.651-688.

Sakhaeifar, A. & Ghoddusifar, S.H., 2016. Impact of Location-Behavior on Sense of Belonging to Place. *Modern Applied Science*, 10(5), pp.57-66.

Sam, N., Bayram, N. & Bilgel, N., 2012. The perception of residential environment quality and neighbourhood attachment in a metropolitan city: A study on Bursa, Turkey. *eCanadian Journal of Humanities and Social Sciences*, 1(1), pp.22-39.

Samuels, I., 1999. A typomorphological approach to design: The plan for St. Gervais. *Urban Design International*, 4, pp.129-141.

Samuels, I., N.D. Typomorphology and urban design practice in England. *Lecture notes*, School of Geography, University of Birmingham.

Samuels, I., 2008. Typomorphology and urban design practice. Urban Morphology, 12(1), pp.58-62.

Sandaker, B.N., 2008. *On Span and Space: Exploring Structures in Architecture*. London and New York: Routhledge, Taylor & Francis Group.

Santos, J.R.A., 1999. Cronbach's alpha: A tool for assessing the reliability of scales. *Journal of Extension*, 37(2), pp.34-36.

Saraf, S. & Ahlen, S., 2010. *On building typology*. [Online] Unversity of Technology Sydney NextGen Housing Research. Chapter 13. Available at: http://nextgenhousing.wikispaces.com/file/view/13_On%20Building%20Typology.pdf [Accessed 2 August 2015].

Scannell, L. & Gifford, R., 2010. Defining place attachment: A tripartite organizing framework. *Journal of Environmental Psychology*, 30(1), pp.1-10.

Scheer, B.C., 2016. The Epistomology of Urban Morphology. *Urban Morphology*, 20(1), pp.5-17.

Scheer, B. & Scheer, D., 2002. Towards a Sustainable Urban Form in Chiang Mai. In: Romanos, M. & Auffrey, C., eds. *Managing the Development of Intermediate Size Cities*. New York: Kluwer Academic Publishing.

Schneekloth, L.H. & Frank, K.A., 1994. Type: Prison or Promise? In: Frank, K.A. & Schneekloth, L.H., eds. *Ordering Space: Types in Architecture and Design*. New York: Van Nostrand Reinhold. pp.15-38.

Semenza, J.C. & March, T.L., 2009. An Urban Community-Based Intervention to Advance Social Interactions. *Environment and Behavior*, 41(1), pp.22-42.

Semken, S., 2012. The Relevance of Place and Sense of Place to Sustainability. *Systems, Society, Sustainability, and theGeosciences InTeGrate July 2012 Workshop*. Available at: http://d32ogoqmya1dw8.cloudfront.net/files/integrate/workshops/sustainability2012/essays/relevance_place_sense_place.pdf [Accessed 12 September 2015].

Senlier, N., Yildiz, R. & Aktas, E.D., 2009. A Perception Survey for the Evaluation of Urban Quality of Life in Kocaeli and A Comparison of the Life Satisfaction with the European Cities. *Social Indicators Research*, 94, pp.213-226.

Serra, M., Gill, J. & Pinho, P., 2013. Unsupervised Classification of Evolving Metropolitan Street Patterns. In: Kim, Y.O. & Seo, K., eds. *Proceedings of the Ninth International Space Syntax Symposium*. Seoul.

Sey, Y., 1998a. Republican Turkey Architecture and Building Production. In: *75 Yılda Değişen Kent ve Mimarlık*. Istanbul: Is Bankası Kültür Press. pp.24-39.

Sey, Y., 1998b. Housing in Republican period. In: *The Changing City and Architecture in 75 years*. Istanbul: Tarih Vakfı Press. pp.273-300.

Shafer, C.S., Koo L.B. & Turner, S., 2000. A tale of three greenway trails: user perceptions related to quality of life. *Landscape Urban Planning*, 49, pp.163-178.

Shamai, S., 1991. Sense of Place: An Emprical Measurement. *Geoforum*, 22(3), pp.347-358.

Shamai, S., Arnon, S. & Schnell, I., 2012. From Home to Community and Settlement: Sense of Place in Different Scales. *Studies on Home and Communities Science*, 6(3), pp.153-163.

Shamai, S. & Ilatov, Z., 2005. Measuring Sense of Place: Methodological aspects. *Tijdschrift voor Economische en Sociale Geographie*, 96(5), pp.467-476.

Shapiro, S., 1998. Place and Spaces: The Historical Interaction of Technology, Home and Privacy. *The Information Society*, 14(4), pp.275-284.

Sharman, R., 1997. The Anthropology of Aesthetics: A Cross-Cultural Approach. *Journal of Antropologic Society of Oxford*, 28(2), pp.177-192.

Shayesteh, H., 2013. *Typo-morphological Approach to Housing Transformation in Tehran*. PhD Thesis. London: UCL (University College London).

Shuaib, A.A., 2013. Application of Kelantan Traditional Aesthetic Values into Architecture of Contemporary Homes. *Arts and Design Studies*, 6, pp.15-25.

Sigmon, S.T., Whitcomb, S.R. & Snyder, C.R., 2002. Psychological Sense of Community: Research, Applications, and Implications. New York: Springer Science+Business Media. pp.25-41.

Sima, Y. & Zhang, D., 2009. Comparative Precedents on the Study of Urban Morphology. In: Koch, D., Marcus, L. & Steen, J., eds. *Proceedings of the 7th International Space Syntax Symposium*. Stockholm, 2009. KTH.

Sirgy, M.J., Michalos, A.C., Ferriss, A.L., Easterlin, R.A., Patrick, D. & Pavot, W., 2006. The Quality of Life (QoL) Research Movement: Past, Present and Future. *Social Indicators Research*, 76, pp.343-466.

Smith, P.F., 1987. *Architecture and the Principles of Harmony*. Worcester: RIBA Publications Limited.

Smith, K.M., 2011. *The Relationship between Residential Satisfaction, Sense of Community, Sense of Belonging and Sense of Place in a Western Australian Urban Planned Community*. PhD Thesis. Edith Cowan University.

Song, Y. & Knaap, G-J., 2004. Measuring Urban Form: Is Portland Winning the War on Sprawl? *Journal of American Planning Association*, 70(2), pp.210-225.

Southworth, M., 2003. Measuring The Liveable City. *Built Environment*, 29(4), pp.343-354.

Stangl, P., 2012. The pedestrian route directness test: A new level-of-service model. *Urban Design International*, 17(3), pp.228-238.

Stedman, R.C., 1999. Sense of place as an indicator of community sustainability. *The Forestry Chronicle*, 75(5), pp.765-770.

Stedman, R.C., 2003. Is it really just a social construction?: The contribution of the physical environment to sense of place. *Taylor & Francis Society & Natural Resources*, 16(8), pp.671-85.

Steele, F., 1981. *Sense of Place*. Massachusetts: CBI Publishing Company, Inc.

Stokols, D. & Shumaker, S.A., 1981. People in places: A transactional view of settings. In: Harvey, J., ed. *Cognition, Social Behaviour and the Environment*. New Jersey: Erlbaum.

Strauss, A. & Corbin, J., 1990. *Basics of qualitative research: Grounded theory procedures and techniques*. Newbury Park, CA: Sage Publications.

Symeonaki, M., Michalopoulou, C. & Kazani, A., 2015. A fuzzy set theory solution to combining Likert items into a single overall scale (or subscales). *Qual Quant*, 49, pp.739–762.

Szalai, A., 1980. The meaning of comparative research on the quality of life. In: Szalai, A., ed. *The Quality of Life: Comparative Studies*. Lodon: Sage.

Szolnoki, G. & Hoffmann, D., 2013. Online, face-to-face and telephone surveys—Comparing different sampling methods in wine consumer research. *Science Direct, Wine Economics and Policy*, 2, pp.57-66.

Taib, N. & Abdullah, A., 2012. Study of Landscape Gardens: Expectations and Users' Perception of a High-Rise Office Building. *Procedia-Social and Behavioral Sciences*, 50, pp.633-642.

Tapan, M., 1998. *Istanbul'un Kentsel Planlamasının Tarihsel Gelişimi ve Planlama Eylemleri (The historic development of city planning and planning practice of Istanbul)*. Istanbul: Tarih Vakfı Yayınları.

Taser, N., 2011. *Ankara*. Broshure. Ankara: Basak Matbaacilik ve Tanitim Hiz. Ltd. Sti. T.R. Ministry of Culture and Tourism.

Tatsuya, T. & Mayuko, K., 2014. Spatial Configuration of Japanese Elementary Schools: Analyses by the Space Syntax and Evaluation by School Teachers. *Journal of Asian Architecture and Building Engineering* , 13(2), pp.373-380.

Tavakol, M. & Dennick, R., 2011. Making sense of Cronbach's alpha. *International Journal of Medical Education*, 2, pp.53-55.

Tavsan, F. & Sonmez, E., 2013. An analysis of common and different concepts which exist in the design of traditional Turkish and Japanese houses. *International Journal of Academic Research Part A*, 5, pp.60-72.

Tazebay, I. & Akpinar, N., 2010. The Garden in Turkish Culture. *Bilig*, 54 (Summer), pp.243-253.

Tekeli, I., 1982. *Turkiye'de Kentlesme Yasalari (Urbanisation Laws in Turkey)*. Ankara: Turhan.

Tekeli, I., 1998. Türkiye'de Cumhuriyet Döneminde Kentsel Gelişme ve Kent Planlaması (Urban Development and City Planning in the Republican Turkey). In: *75 Yılda Değişen Kent ve Mimarlık Icinde Istanbul (Istanbul in the City and Architecture changing in 75 Years)*. Istanbul: Tarih Vakfı Yayınları.

Tesfazghi, E.S., Martinez, J.A. & Verplanke, J.J., 2010. Variability of Quality of Life at Small Scales: Addis Ababa, Kirkos Sub-City. *Social Indicators Research*, 98, pp.73-88.

Thwaites, K., Porta, S., Romice, O. & Greaves, M., eds., 2007. *Urban Sustainability through Environmental design: Approaches to time-people responsive urban spaces*. New York: Routledge.

Tice, J., 1993. Theme and Variations: A Typological Approach to Housing Design, Teaching and Research. *Journal of Architectural Education*, 46(3), pp.162-175.

Toker, U. & Toker, Z., 2003. Family structure and spatial configuration in Turkish house form in Anatolia from late nineteenth century to late twentieth century. In: *4th International Space Syntax Symposium Proceedings*. London, 2003.

Toplumsal Tarih, 2009. Jansen'in Ankara'sı için Örnek Bir "Bahçe Şehir" ya da Siedlung: "Bahçeli Evler Yapi Kooperatifi 1934–1939". *Dosya*. [online], Available at: http://www.mimdap.org/?p=21639 [Accessed 9 August 2015].

Tourangeau, R. & Plewes, T.J., eds., 2013. *Nonresponse in Social Science Surveys: A Research Agenda*. Washington, DC: The National Academies Press.

Tsaur, S.-H., Liang, Y.-W. & Weng, S.-C., 2014. Recreationist-environment fit and place attachment. *Journal of Environmental Psychology*, 40, pp.421-429.

Tsukamoto, Y., Fujimura, R. & Shiner, E., 2008. Typo-morphology of Tokyo. *Perspecta*, 40(Monster), pp.32-41.

Tuan, Y.-F., 1974. *Topophilia: A Study of Environmental Perception, Attitudes, and Values*. Morningside Edition ed. New York: Colombia University Press.

Tuan, Y.-F., 1977. *Space and Place*. Minneapolis, MN: University of Minnesota Press.

Turizmajani, 2015. [Online], Available at: htpps://www.turismajani.com.tr [Accessed 30 December 2015].

Turner, A., Doxa, M., O'Sullivan, D. & Penn, A., 2001. From isovists to visibility graphs: a methodology for the analysis of architectural space. *Environment and Planning B: Planning and Design*, 28, pp.103-121.

Ujang, N., 2010. Place Attachment and Continuity of Urban Place Identity. *Asian Journal of Environment-Behaviour Studies*, pp.61-76.

Ujang, N. & Zakariya, K., 2015. Place Attachment and the Value of Place in the Life of the Users. *Procedia Social and Behavioral Sciences*, 168, pp.373-380.

UOS (University of Surrey), 2014. *Module 9: Introduction to Research - The advantages and disadvantages of questionnaires*. [Online], Available at: http://libweb.surrey.ac.uk/library/skills/Introduction%20to%20Research%20and%20Managing%20Information%20Leicester/page_51.htm [Accessed 19 October 2015].

Uslu, A. & Gokce, S., 2010. Social interaction in urban areas and the characteristics of urban outdoor spaces. *African Journal of Agricultural Research*, 5(20), pp.2801-2810.

Vanclay, F., 2008. Place matters. In: Vanclay, F., Higgings, M. & Blackshaw, A., eds. *Making sense of place: Exploring concepts and expressions of place through different sense and lenses*. Canbera: National Museum of Australia Press. pp.3-11.

Veenhoven, R., 2007. Subjective measures of well-being. In: *Human well-being: concepts and measurement*. New York, NY, USA: Palgrave McMillan. pp.214-240.

Venerandi, A., Zanella, M., Romice, O., Dibble, J. & Porta, S., 2016. Form and urban change: An urban morphometric study of five gentrified neighbourhoods in London. *Environment and Planning B: Planning and Design*, 0(0), pp.1-21.

Vidler, A., 1998. The Third Typology. In: Hays, K.M., ed. *Oppositions Reader*. New York: Princeton Architectural Press. pp.6-26.

Wachs, M., 1993. Learning from Los Angeles: Transport, Urban Form, and Air Quality. *Transportation*, 20(4), pp.329-354.

Wang, Y., 2013. *The Evolution of Beijing's Urban Residential Form in Relation to City's Political Ideology from 1949-2004*. PhD Thesis. Hong Kong: The University of Hong Kong.

Webster, C., 1997. Effects of researcher presence and appeal on response quality in hand-delivered, self-administered surveys. *Journal of Business Research*, 38(2), pp.105-114.

Wen Li, W., Hodgetts, D. & Ho, E., 2010. Gardens, Transitions and Identity Reconstruction among Older Chinese Immigrants to New Zealand. *Journal of Health Psychology*, 15(5), pp.786-796.

Westaway, M.S., 2009. Aspects of environmental quality of life that affect neighbourhood satisfaction in disadvantaged and advantaged Johannesburg communities. *Development Southern Africa*, 26(3), pp.447-458.

Whitehand, J.W.R., 1989. Development pressure, development control and suburban townscape change. *TPR*, 60(4), pp.403-420.

Whitehand, J.W.R., 2001. British Urban Morphology: A Conzenian Tradition. *Urban Morphology*, 5(2), pp.103-109.

Whitehand, J.W.R., 2007. Conzenian Urban Morphology and Urban Landscapes. In: *6th International Space syntax Symposium*. Istanbul, 2007.

Whitehand, J.W.R. & Carr, C.M.H., 2001. *Twentieth-century Suburbs: A Morphological Approach*. London: Routledge.

Whitehand, J.W.R. & Gu, K., 2008. Conserving Urban Landscape Heritage a Geographical Approach. *Selected Papers of Beijing Forum 2007*, pp.284-293.

White, D.D., Virden, R.J. & van Riper, C.J., 2008. Effects of Place Identity, Place Dependence and Experience-use History on Perceptions of Recreation Impacts in a Natural Setting. *Environmental Management*, 42, pp.647-657.

Wiese, A., Förster, A., Gilliard, L. & Thierstein, A., 2014. A spatial strategy for the production of place in two German cities - Urban design interventions as a driver for spatial transformation. *City, Territory and Architecture*, 1(13), pp.1-9.

Wilkerson, A., Carlson, N.E., Yen, I.H. & Michael, Y.L., 2012. Neighborhood Physical Features and Relationships With Neighbors: Does Positive Physical Environment Increase Neighborliness. *Environment and Behaviour*, 44(5), pp.595-615.

Wilkie, R.W., 2003. Sense of Place and Selected Conceptual Approaches to Place. *CRitSS*, Spring, pp.29-31.

Williams, R., 2009. Place attachment, sense of belonging and identity in life history narratives of Iranian Baha'i refugees. *Baha'i Studies Review*, 15, pp.3-18.

Williams, D.R., Patterson, M.E., Roggenbuck, J.W. & Watson, A.E., 1992. Beyond the Commodity Metaphor: Examining Emotional and Symbolic Attachment to Place. *Leisure Sciences*, pp.29-46.

Williams, D.R. & Vaske, J.J., 2003. The Measurement of Place Attachment: Validity and Generalizability of a Psychometric Approach. *Forest Science*, 49, pp.830-840.

Wish, N.B., 1986. Are we measuring the quality of life? Well-being has subjective dimensions, as well as objective ones. *American Journal of Economics and Sociology*, 45(1), pp.93-99.

Yang, Y., 2011. *A Comparative and Typo-morphological Study on the Early Mass-housing of Colonial Cities in China*. PhD Thesis. University of Hong Kong.

Yang, Y. & Jia, B., 2010. A Comparative Study on the Spatial Patterns of Chinese Row Houses in Colonial in the early 20th Century. *Open and Sustainable Building*, pp.300-314.

Yavuz, F., 1952. *Ankara'nin Imari ve Sehirciligimiz*. Ankara: SBF (Faculty of Political Sciences) Press.

Yerel Net, 2016. *Yerel Net, Yerel Yonetimler Portali*. [Online], Available at: http://ankara.yerelnet.org.tr/il_tarihcesi.php?iladi=ANKARA, [Accessed 19 March 2016].

Yildirim, K. & Hidayetoglu, M.L., 2009. Türk Yaşam Kültürünün Geleneksel Türk Evlerindeki Yansımaları (Reflections in the Traditional Turkish House of Turkish life Culture). In *4th International Congress on Turkish Culture and Art*. Cairo.

Yucel, A., 1991. Contemporary Architecture in Turkey. In: Hasan-Uddin, K. ed. *Mimar 40: Architecture in Development*. London: Concept Media Ltd. pp.20-23.

Zacharias, J. & Stamps, A., 2004. Perceived building density as a function of layout. *Perceptual and Motor Skills*, 98, pp.777-784.

Zavala-Rojas, D., 2014. A procedure to prevent differences in translated survey items using SQP. *RECSM Working Paper*, 38. Available at: https://www.upf.edu/survey/_pdf/RECSM_wp038.pdf

Zhang, Y., van Dijk, T., Tang, J. & van den Berg, A.E., 2015. Green Space Attachment and Health: A Comparative Study in Two Urban Neighborhoods. *International Journal of Environmental Research and Public Health* , 12(11), pp.14342-14363.

Zia, A., Norton, B.G., Metcalf, S.S., Hirsch, P.D. &Hannon, B.M., 2014. Spatial discounting, place attachment, and environmental, concern; toward an ambit-based theory of sense of place. *Elsevier Journal of Environmental Pschology*, 40, pp.283-295.

APPENDICES

APPENDIX A: Interview Questions

INTERVIEW ON PERCEIVED RESIDENTIAL SATISFACTION (SENSE OF PLACE)

1. General Household Information

Type of house				Tenancy type		Built date	Previous Residency		
A house		Individual unit		Owned			Yes/No	House type	Location
A flat		Mass housing		Rent			If yes,		

The number of households	Education level	Profession	Years of occupancy in the house	Years of occupancy in the district	Years of settlement in Ankara	Hometown Ankara or not? (Y or N)	
1							
2							
3							
4							
5							
6							
Have you ever lived in another house(s) in and/or outside of this city?						Yes	No
If yes, what type of house was that?			In which district?				
The reasons to change your house?							

2. Overall View on the Following Aspects of Sense of Place

How do you view the QoL in your living environment in each of the following areas?	1 (Very dissatisfied)	2	3 (Moderate)	4	5 (Very satisfied)
Privacy					
Aesthetic quality					
Place attachment					
Social interaction					
Place identity					
Place dependence					
Nature bonding					
Social bonding					
Family bonding					
Neighbour bonding					
Cultural bonding					
Are you satisfied with the quality of your life in your home environment?					
Are you satisfied with life in your home?					
How has the quality of your life changed during your occupancy?	**Same**		**Improved**		**Worse**

3. Sense of Place at the Building Scale

Below are the statements with which the interview participants may agree or disagree, using the 1-7 scale. **1 = Strongly Disagree, 2 = Disagree, 3 = Slightly Disagree, 4 = Neither Agree or Disagree, 5 = Slightly Agree, 6 = Agree, 7 = Strongly Agree.**

1. Aesthetic Quality

Statements you may be agree or disagree	1	2	3	4	5	6	7
It is a pleasant house because of its architectural and artistic merits							
My house is well-built with regard to form and details							
Openings of the house are well-balanced and provides good views outside							
The house is too high							

2. Sense of Belonging

Statements you may be agree or disagree	1	2	3	4	5	6	7
I feel I belong to house							
This house is only a dormitory							
There is a peaceful rhythm of life in the house							
I do not feel I belong to house							

3. Privacy

Statements you may be agree or disagree	1	2	3	4	5	6	7
I have enough privacy at home							
I am safe at home							
I often have the impression that others are watching my home							
Private space is well-defined							
My house has enough private open space							
The private open space of the house is well-designed							
Openings of the house do not compromise the sense of privacy							
The entrance of the house is positioned to provide sufficient level of privacy							
Rooms are arranged with required level of privacy according to each activity type							
The borders of private and semi-private areas are clearly defined							
Planting/green space behind of the borderlines of the house has a positive impact on increasing the level of privacy							

4. Place Attachment

Statements you may be agree or disagree	1	2	3	4	5	6	7
I would be sorry to move out of my house, without the people I live with							
I would be sorry if the people I lived with moved out without me							
I would be sorry if I and the people I lived with moved out							
I am very attached to my house							
This house is very special to me							

5. Place Identity

Statements you may be agree or disagree	1	2	3	4	5	6	7
My house has distinct features and shows my personal preference							
My house is significantly important to me.							
I feel this house is a part of me							
My house means a lot to me							
My house is not identifiable							

6. Place Dependence

Statements you may be agree or disagree	1	2	3	4	5	6	7
My house is generally comfortable and functional							
My house is the best place for what I'd like to do							
No other place can compare to my house							
I get more satisfaction out of living in this house							
Doing what I do in my house is more important to me than doing it in any other place							

7. Nature Bonding

Statements you may be agree or disagree	1	2	3	4	5	6	7
The house is well associated with nature							
My garden/balcony is too small							
I am often used to spend time in the garden							
I prefer spending time in the garden/balcony rather than going out							
There are specific activities performed in the garden/balcony							
I would prefer to have a private garden rather than a communal garden							

8. Social Bonding

Statements you may be agree or disagree	1	2	3	4	5	6	7
Spatial organisation of the house encourages family member's togetherness							
There is enough opportunity for the members of the family to come together							
Spatial organisation of the house is suitable for hosting guests							
The size of the house is suitable for the number of households to have good social contact to each other							
I feel family bonding strong in my home							

9. Familiarity

Statements you may be agree or disagree	1	2	3	4	5	6	7
I moved to this house because of its familiarity to me							
I feel this house reflect my culture							

10. Social Interaction

Statements you may be agree or disagree	1	2	3	4	5	6	7
Spatial organisation of the house provides opportunities for family member's interaction							
Family members are generally not very sociable							
I am satisfied with my close relationships with family/friends							
Doing things with people inside my home is more important than that outside home							

4. Sense of Place at the Street Scale

Below are the statements with which the interview participants may agree or disagree, using the 1-7 scale. **1 = Strongly Disagree, 2 = Disagree, 3 = Slightly Disagree, 4 = Neither Agree or Disagree, 5 = Slightly Agree, 6 = Agree, 7 = Strongly Agree.**

1. Aesthetic Quality

Statements you may be agree or disagree	**1**	**2**	**3**	**4**	**5**	**6**	**7**
The styles of different buildings are harmonious							
It is a pleasant street because of the colour of the buildings							
The buildings along the street are well-built with regard to form and details							
It is a beautiful streetscape to see with beautiful buildings							
When I look out of the window I feel oppressed by the buildings nearby							
In this street, the open spaces and built areas are well-balanced							
There is a great difference in the street between old and new buildings							
In the street, there are buildings, which are poor quality							
In this street, there are only buildings that are all the same							
In this street, the buildings are often too high							
It is an oppressive street because of the size of the buildings/the street proportion is pleasant							
It is a street without architectural and artistic merits							
New buildings are jeopardising the regularity and simplicity of the street							

2. Sense of Belonging

Statements you may be agree or disagree	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel I belong to this street							
It is a street with many points of interest							
I feel this street is a part of me							
There is a reason for life in the street that I like							
I do not feel I belong to this street							

3. Privacy

Statements you may be agree or disagree	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I have enough privacy when I walk in the street.							
I feel safe in the street							
I often have the impression that others are watching my home							
The private open spaces around the houses are well-designed							
Arrangements of houses along the street do not compromise the sense of privacy							
The borders of semi-private, semi-public and public areas are clearly defined							
Planting/green space has a positive impact on increasing the level of privacy in the street							
Buildings are arranged with sufficient distance to each other							
I feel overlooked by the neighbours							

4. Place Attachment

Statements you may be agree or disagree	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I would be sorry to move out of my street, without the people who live there							
I would be sorry if the people who I appreciated in the street moved out							
I would be sorry if I and the people who I appreciated in the street moved out							
I am very attached to my street							
This street is very special to me							

5. Place Identity

Statements you may be agree or disagree	1	2	3	4	5	6	7
My street has distinct features showing my personal preferences							
I feel this street is a part of me							
This street is very special to me							
My street is identifiable.							

6. Place Dependence

Statements you may be agree or disagree	1	2	3	4	5	6	7
This street is generally comfortable and functional							
Compared to other streets, my street is the best place for what I'd like to do							
No other street can be compared to my street							
I get more satisfaction out of living in this street							
The space between my building and neighbour buildings is well-defined and inviting							

7. Nature Bonding

Statements you may be agree or disagree	1	2	3	4	5	6	7
Space around my building connected to nature enough							
I'd prefer to live in greener environment.							
Green spaces and buildings are well balanced							
Green spaces encourage me to use the street actively							
The lack of green spaces makes the street uninhabited during the day							

8. Social Bonding

Statements you may be agree or disagree	1	2	3	4	5	6	7
There is enough opportunity for the members of the same street to contact each other							
I feel social bonding strong in my street							
I think family values are respected in my street							
I think neighbourhood values are respected in my street							
The street layout supports social connectedness							
Neighbours are often acquainted in this area							
I know my neighbours in person							
People living in the street think about themselves and have a little interest in others							

9. Familiarity

Statements you may be agree or disagree	1	2	3	4	5	6	7
I feel familiar to my street							
I moved to this street because of its familiarity to me							
I feel this street reflects my cultural and social values							
The street was not familiar at all, when I first moved in							

10. Social Interaction

Statements you may be agree or disagree	1	2	3	4	5	6	7
This street is good for me to interact with my neighbours							
The spaces defined by the buildings around provide opportunities for social interaction							
I am satisfied with my close relationships with friends/neighbours							

5. Sense of Place at the Neighbourhood Scale

Below are the statements with which the interview participants may agree or disagree, using the 1-7 scale.
1 = Strongly Disagree, 2 = Disagree, 3 = Slightly Disagree, 4 = Neither Agree or Disagree, 5 = Slightly Agree, 6 = Agree, 7 = Strongly Agree.

1. Aesthetic Quality

Statements you may be agree or disagree	**1**	**2**	**3**	**4**	**5**	**6**	**7**
The built style of my neighbourhood is harmonious.							
It is a pleasant neighbourhood because of the colour of the buildings							
My neighbourhood is well-built with regard to form and details							
Open spaces in my neighbourhood are pleasant to use.							
In the neighbourhood, there is a contrast between very high and low quality buildings							
The scale of the buildings in my neighbourhood is pleasant.							
It is a neighbourhood with architectural and artistic merits							

2. Sense of Belonging

Statements you may be agree or disagree	**1**	**2**	**3**	**4**	**5**	**6**	**7**
I feel I belong to this neighbourhood							
It is a neighbourhood with many points of interest							
I feel I am a part of this neighbourhood							
There is a peaceful rhythm of life in the neighbourhood							

3. Privacy

Statements you may be agree or disagree	**1**	**2**	**3**	**4**	**5**	**6**	**7**
It is a peaceful neighbourhood							
I have enough privacy in my neighbourhood							
I feel safe in this neighbourhood							
The neighbourhood is disrupted often by outside visitors							
Outside visitors are welcomed in this neighbourhood							
Arrangements of houses in the neighbourhood do not compromise the sense of privacy							
The borders of semi-private, semi-public and public areas are clearly defined							
Planting/green space has a positive impact on increasing the level of privacy in the neighbourhood							
The design of the street network has a positive impact on privacy							
The neighbourhood density (other design elements such as street furniture rather than buildings) has a negative impact on sense of privacy							
Blocks are arranged with sufficient distance to each other							

4. Place Attachment

Statements you may be agree or disagree	**1**	**2**	**3**	**4**	**5**	**6**	**7**
This neighbourhood is very special to me							
I would be sorry to move out of my neighbourhood, without the people who live there							
I would be sorry if the people who I appreciated in the neighbourhood moved out							
I would be sorry if I and the people who I appreciated in the neighbourhood moved out							
I am very attached to my neighbourhood							

5. **Place Identity**

Statements you may be agree or disagree	1	2	3	4	5	6	7
My neighbourhood has distinct features showing my personal preference							
I feel this neighbourhood is a part of me							
This neighbourhood is very special to me							
This neighbourhood is identifiable							

6. **Place Dependence**

Statements you may be agree or disagree	1	2	3	4	5	6	7
This neighbourhood is generally comfortable and functional							
Compared to other neighbourhood, my neighbourhood is the best place for what I'd like to do							
I get more satisfaction out of living in this neighbourhood							

7. **Nature Bonding**

Statements you may be agree or disagree	1	2	3	4	5	6	7
My neighbourhood is connected to nature enough							
Green areas in my neighbourhood are sufficient enough.							
In the neighbourhood, there are enough green spaces for walking, relaxing and social interaction							

8. **Social Bonding**

Statements you may be agree or disagree	1	2	3	4	5	6	7
I am satisfied with my close relationships with friends/neighbours							
Spatial arrangement of the neighbourhood encourages social connectedness							
Neighbours are often acquainted in this area							
People in the neighbourhood think about themselves and have a little interest in others							
I feel neighbourhood bonding strong in my neighbourhood							

9. **Familiarity**

Statements you may be agree or disagree	1	2	3	4	5	6	7
I feel familiar to my neighbourhood							
This neighbourhood is quite similar to my previous neighbourhood							
The neighbourhood was not familiar at all, when I first moved in							
I feel this neighbourhood reflects my cultural and social values							

10. **Social Interaction**

Statements you may be agree or disagree	1	2	3	4	5	6	7
This neighbourhood is good for me to interact with other people							
There is a lack of meeting place in this neighbourhood							
There is enough opportunity for the members of the same neighbourhood to contact each other							
This neighbourhood provides enough opportunities for social interaction							

APPENDIX B: Space Syntax Values

Table A.1 Space syntax values of Case I

CASE I	Connectivity	Control value	Mean depth	Integration	RA	RRA
E	1	0.33	2.5	0.739185	0.428557	1.35196034
C	3	2.16	1.625	1.77404	0.33142857	1.045516
L	6	5.33	1.25	4.435111	0.07142857	0.22532672
WC	1	0.33	2.5	0.739185	0.428557	1.35196034
K	1	0.16	2.125	0.98558	0.32142857	1.01397026
R1	1	0.16	2.125	0.98558	0.32142857	1.01397026
R2	1	0.16	2.125	0.98558	0.32142857	1.01397026
R3	1	0.16	2.125	0.98558	0.32142857	1.01397026
B	1	0.16	2.125	0.98558	0.32142857	1.01397026
MEAN	1.777	0.994	2.055	1.401	0.318	1.004

*E: Entrance, C: Circulation/Corridor, L: Living Space, WC: Toilet, K: Kitchen, R: Room, B: Balcony

Table A.2 Space syntax values of Case II

CASE II	Connectivity	Control value	Mean depth	Integration	RA	RRA
E	1	1	2.57	0.6268	0.52	1.59
C	2	1.166	1.71	1.37	0.23	0.72
L	6	5.5	1.142	6.8957	0.04	0.14
R1	1	0.2	2	0.985	0.33	1.01
R2	1	0.2	2	0.985	0.33	1.01
R3	1	0.2	2	0.985	0.33	1.01
K	1	0.2	2	0.985	0.33	1.01
WC	1	0.2	2	0.985	0.33	1.01
MEAN	1.75	1.083	1.927	1.727	0.305	0.937

*E: Entrance, C: Circulation/Corridor, L: Living Space, WC: Toilet, K: Kitchen, R: Room

Table A.3 Space syntax values of Case III

CASE III	Connectivity	Control value	Mean depth	Integration	RA	RRA
E	2	1.2	2.2	1.10585	0.2666	0.9039
L	5	3.25	1.5	2.65405	0.1111	0.3766
R1	2	1.2	2.2	1.10585	0.2666	0.9039
R2	1	0.2	2.4	0.947875	0.3111	1.0546
B1	1	0.2	2.4	0.947875	0.3111	1.0546
K	1	0.5	3.1	0.631917	0.4666	1.5816
C	4	3.2	1.8	1.65878	0.1777	0,6026
R3	1	0.25	2.7	0.780603	0.3777	1.2806
WC	1	0.25	2.7	0.780603	0.3777	1.2806
Ba	1	0.25	2.7	0.780603	0.3777	1.2806
B2	1	0.5	3.1	0.631917	0.4666	1.5816
MEAN	1.81	1	2.436	1.093	0.319	1.129

*E: Entrance, C: Circulation/Corridor, L: Living Space, WC: Toilet, K: Kitchen, R: Room, B: Balcony, Ba: Bathroom

Table A.4 Space syntax values of Case IV

CASE IV	Connectivity	Control Value	Mean depth	Integration	RA	RRA
E	4	3	2.18182	1.20529	0.236364	0.82934737
L	2	0.25	2.90909	0.746129	0.381818	1.33971228
K	1	0.25	3.09091	0.681248	0.418182	1.4672
WC	1	0.25	3.09091	0.681248	0.418182	1.4672
S	2	0.45	2	1.42443	0.2	0.70175439
B1	1	0.5	3.81818	0.505442	0.563636	1.97767018
C	5	4	2	1.424443	0.2	0.70175439
R1	2	1.2	2.72727	0.824669	0.345454	1.2121193
R2	1	1.2	2.90909	0.746129	0.381818	1.33971228
R3	1	0.2	2.90909	0.746129	0.381818	1.33971228
Ba	1	0.2	2.90909	0.746129	0.381818	1.33971228
B2	1	0.5	3.63636	0.5403	0.527272	1.85007719
MEAN	1.833	1	2.848	0.855	0.369	1.297

*E: Entrance, C: Corridor, S: Staircase, L: Living Space, WC: Toilet, K: Kitchen, R: Room, B: Balcony, Ba: Bathroom

Table A.5 Space syntax values of Case V

CASE V	Connectivity	Control Value	Mean depth	Integration	RA	RRA
E	6	4.25	1.58333	2.59787	0.10606	0.384275
R1	1	0.1666	2.5	1.01028	0.27272	0.988142
L	2	1.1666	2.33333	1.13657	0.24242	0.878346
K	2	1.1666	2.33333	1.13657	0.24242	0.878346
St	1	0.1666	2.5	1.01028	0.27272	0.988142
WC	1	0.1666	2.5	1.01028	0.27272	0.988142
C	4	2.6666	1.83333	1.81851	0.15151	0.54896
B1	1	0.5	3.25	0.673521	0.40909	1.482213
B2	1	0.5	3.25	0.673521	0.40909	1.482213
R2	2	1.25	2.58333	0.957109	0.28787	1.043036
R3	1	0.25	2.75	0.865955	0.31818	1.152832
Ba1	1	0.25	2.75	0.865955	0.31818	1.152832
B3	1	0.5	3.5	0.606169	0.45454	1.646903
MEAN	1.846	0.999	2.589	1.104	0.289	1.047

*E: Entrance, C: Corridor, L: Living Space, St: Storage, WC: Toilet, K: Kitchen, R: Room, B: Balcony, Ba: Bathroom

Table A.6 Space syntax values of Case VI

CASE VI	Connectivity	Control value	Mean depth	Integration	RA	RRA
E	4	2.083	1.83333	1.81851	0.15151	0.54896
L	2	0.75	2.5	1.01028	0.27272	0.98814
C1	4	2.25	2	1.51542	0.18181	0.65876
C2	3	1.5	2.25	1.21234	0.22727	0.8234
WC	1	0.25	2.75	0.865955	0.31818	1.15283
B1	2	1	2.91667	0.790655	0.34848	1.26262
R1	2	0.75	2.66667	0.909253	0.30303	1.09793
R2	1	0.25	2.91667	0.790655	0.34848	1.26262
K	2	1.25	2.75	0.865955	0.31818	1.15283
R3	2	0.833	3	0.757711	0.36363	1.31752
Ba	1	0.333	3.16667	0.699426	0.39394	1.42731
B2	1	0.5	3.66667	0.568283	0.48484	1.75669
B3	1	0.5	3.91667	0.519573	0.5303	1.92138
MEAN	2	0.942	2.794	0.948	0.326	1.182

*E: Entrance, C: Corridor, L: Living Space, WC: Toilet, K: Kitchen, R: Room, B: Balcony, Ba: Bathroom

Table A.7 Space syntax values of Case VII

CASE VII	Connectivity	Control value	Mean depth	Integration	RA	RRA
E	4	2.2	1.72727	1.95859	0.145454	0.51036491
WC	1	0.25	2.63636	0.870484	0.327272	1.14832281
C	5	3.25	1.63636	2.23	0.127272	0.44656842
L	2	0.75	2.36364	1.04458	0.27273	0.95694737
K	2	1.25	2.45455	0.979294	1.45455	5.10368421
Ba1	1	0.2	2.5454	0.921689	0.30908	1.08449123
R1	2	1.2	2.27273	1.04458	0.254546	0.89314386
R2	1	0.2	2.54545	0.921689	0.30908	1.08449123
R3	2	0.7	2.36364	1.11919	0.272728	0.95694035
B2	2	1	2.63636	0.870484	0.327272	1.14832281
B1	1	0.5	3.36364	0.602643	0.472728	1.87590476
Ba2	1	0.5	3.27273	0.626748	0.51653017	1.81238654
MEAN	2	1	2.484	1.099	0.399	1.418

*E: Entrance, C: Corridor, L: Living Space, WC: Toilet, K: Kitchen, R: Room, B: Balcony, Ba: Bathroom

APPENDIX C: Comparative Spatial Characteristics Analysis at the Three Scales

Table A.8 Comparative analysis of the spatial characteristics at the building scale

BUILDING SCALE ANALYSIS	CASES						
Functional Zoning	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Not Clearly defined functions	o	o					
Partly defined functions			o				
Not separated private zone	o	o					
Partly separated private zone			o		o	o	
Strictly separated private zone				o			o
Spatial Sequence	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Public -->Public--> Private	o	o					
Public -->Public -->Public+Private-->Private			o		o		
Public-->Public-->Public+Private				o			
Public-->Public-->Public-->Private						o	o
Entrance directly leading to the living room	o	o	o				
Entrance indirectly leading to the living room				o	o	o	o
Living room mainly controls the other function areas	o	o	o				
The main controlling zone is circulation				o	o	o	o
Internal Access Patterns/Compactness	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Living oriented	o	o	o				
Circulation oriented				o	o		
Dependent rooms	o	o					
Partly dependent rooms			o				
Independent rooms				o	o	o	o
Not Compact					o		o
Less Compact			o				
Compact	o			o		o	
More Compact		o					
Connectivity/Integration	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
High connectivity in living room	o	o					
Medium connectivity in living room			o				
Low connectivity in living room				o	o	o	o
High connectivity in circulation				o			o
Medium connectivity in circulation			o		o	o	
Low connectivity in circulation	o	o					
High control value of living space	o	o					
Medium control value of living space			o				
Low control value of living space				o	o	o	o
The most integrated area is living space	o	o	o				
The most integrated area is corridors				o			o
The most integrated area is entrance hall					o	o	
Visibility	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
No visual access to living space from the entrance	o	o		o			
Partly restricted/indirect visual access to living space from the entrance			o		o		o
Direct visual access to living space from the entrance						o	
One in the living space can mainly visually control the rest of the house	o	o					
One in the living space can partly visually control the rest of the house			o				
One in the circulation areas can mainly visually control the rest of the house				o	o	o	o
One in the circulation areas partly visually control the rest of the house	o	o	o				
Justified Permeability	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Total number of steps to discover whole layout: 3					o	o	o
Total number of steps to discover whole layout: 4	o	o					
Total number of steps to discover whole layout: 5			o	o			
Linear access until living space		o	o				
Partly linear access until living space	o						
Non-linear access/Tree-like access				o	o	o	o
Living room is accessed at the first step					o	o	o
Living room is accessed at the second step			o	o			
Living room is accessed at the third step	o	o					
1 step after the living room	o	o					
2 steps after the living room					o	o	o
3 steps after the living room			o	o			

Table A.9 Comparative analysis of the spatial characteristics at the street scale

STREET SCALE ANALYSIS	CASES						
Building/Plot Arrangement	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Linearly arranged along street	o	o	o	o		o	
Buildings are adjacent to each other (side-to-side)	o	o		o			
Buildings are arranged back-to-back				o			
No setback	o	o					
Front garden			o	o			
Continuous façade with no building intervals	o	o		o			
Continuous façade with regular/close building intervals			o			o	
Identical plots in shape and size			o	o			
Irregular plots different in shape and size	o	o					
Direct access to the building entrances	o	o					
Access through the front garden			o	o	o	o	o
Gated plots			o	o			
Building entrances directly face the street	o	o		o			o
Building entrances do not face the street			o		o	o	
Single entry	o	o	o	o	o		o
Double entry						o	
Free-standing buildings					o	o	o
Plot boundaries are strictly defined			o	o			
Plot boundaries are not defined	o	o			o	o	o
Street Properties	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Irregular	o	o					
Straight			o	o	o	o	o
W=H/2, H=H/3	o	o					
W=2H			o				o
W=H				o	o	o	
Active front coverage approx:80-100%	o	o		o			
Active front coverage approx:70%			o			o	
Active front coverage approx:50%					o		
Active front coverage approx:35%							o
Street width/length: approx.0.05			o	o		o	o
Street width/length: approx.0.10	o	o			o		
Spatial and Visual Accessibility	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Building entrance close to the street side	o	o					
Building entrance setback from the street line			o	o	o	o	o
Building entrance is visible from the public street	o	o		o			o
Building entrance is not visible from the public street			o		o	o	
Public street-->Private unit	o	o					
Public street-->Semi-public front garden-->Private unit			o				
Public street-->Semi-private front garden-->Private unit				o			
Public Street --> Semi-public street-->Private unit					o	o	o
1 turn/2 direction changes until the building entrance from the nearest public street	o	o		o			o
2 turns/3 direction changes until the building entrance from the nearest public street			o		o	o	
Interrupted visual continuity along the street	o	o					
Continuous visual access along the street			o	o	o	o	o
Overlooking windows/balconies/doors in close proximity			o			o	
High control of the street from the housing units	o	o	o	o			
Medium control of the street from the housing units					o	o	
Low control of the street from the housing units							o

Table A.10 Comparative analysis of the spatial characteristics at the neighbourhood scale

NEIGHBOURHOOD SCALE ANALYSIS	CASES						
Site Arrangement	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Boundaries of block are defined by the footprint of the housing units	o	o					
Irregular polygonal blocks, varying in size	o	o			o	o	
Grid arrangement			o	o			
Mainly regular, rectangular, more or less the same in the size			o	o	o	o	o
Gated site access				o	o	o	o
Number of units/plots per block/site: 6 (single units)	o	o					
Number of units/plots per block/site: 23-24 (apartment units)			o				
Number of units/plots per block/site: 10-12 (single units)				o			
Number of units/plots per block/site: 5 (apartment units)					o		
Number of units/plots per block/site: 8 (apartment units)						o	
Number of units/plots per block/site: 2 (apartment units)							o
No defined site entrance or defined boundary (open site)	o	o	o				
Strictly defined site boundaries (gated, planned development)				o	o	o	o
Pedestrian access only				o			
Both pedestrian and vehicular access					o	o	o
Clearly separated pedestrian paths				o	o	o	
Mixed used paths (both pedestrian and vehicular)	o	o			o	o	o
Density Measures	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
1/2 Floor single family (Building height: 3-6m)	o	o					
2/3 Floor single family (Building height: 6-8m)				o			
3 Floor apartment (Building height: 10-12m)			o				
5 Floor apartment (Building height:15m)					o	o	
12 Floor apartment (Building height:40m)							o
60% Land coverage	o	o					
50% Land coverage			o	o			
30% Land coverage					o	o	
20% Land coverage							o
No or almost no side-to-side distance	o	o		o			
Approx. 3-5m distance side-to-side			o				
Approx. 8-10m distance side-to-side						o	
Approx. 20m distance side-to-side					o		
Approx. 65m distance side-to-side							o
3m distance between buildings across the street	o	o					
8m distance between builings across the street				o			
15m distance between buildings across the street					o	o	
20m distance between buildings across the street			o				
65m distance between buildings across the road							o
Street Network/Hierarchy/Configuration	**I**	**II**	**III**	**IV**	**V**	**VI**	**VII**
Primary (PUBLIC) → Secondary → Housing Unit (PRIVATE)	o	o					
Primary (PUBLIC) → Secondary → Tertiary → Housing Unit (PRIVATE)	o	o					
Primary (PUBLIC) → Tertiary → Housing Unit (PRIVATE)	o	o					
Primary (PUBLIC) → Secondary → Tertiary → Quaternary → Housing Unit (PRIVATE)			o		o	o	o
Primary (PUBLIC) → Tertiary → Quaternary → Housing Unit (PRIVATE)				o	o		o

APPENDIX D: Control Over Demographic Variables

Control over Demographic Variables at the Building Scale

Table A.11 Control over tenancy at the building scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Building Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	12.216[a]	13	.940	3.973	.000	.291
Intercept	1676.798	1	1676.798	7090.114	.000	.983
HouseType	6.846	6	1.141	4.825	.000	.187
TenancyType	.527	1	.527	2.230	.138	.017
HouseType * TenancyType	.405	6	.067	.285	.943	.013
Error	29.799	126	.236			
Total	3621.341	140				
Corrected Total	42.015	139				

a. R Squared = .291 (Adjusted R Squared = .218)

Table A.12 Control over the number of households at the building scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Building Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	14.509[a]	35	.415	1.567	.043	.345
Intercept	1190.566	1	1190.566	4501.552	.000	.977
HouseType	7.892	6	1.315	4.973	.000	.223
TheNumberOfHouseholds	1.133	6	.189	.714	.639	.040
HouseType * TheNumberOfHouseholds	2.588	23	.113	.426	.989	.086
Error	27.506	104	.264			
Total	3621.341	140				
Corrected Total	42.015	139				

a. R Squared = .345 (Adjusted R Squared = .125)

Table A.13 Control over age at the building scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Building Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	16.876[a]	30	.563	2.439	.000	.402
Intercept	2110.144	1	2110.144	9149.529	.000	.988
HouseType	6.079	6	1.013	4.393	.001	.195
Age	1.553	4	.388	1.683	.159	.058
HouseType * Age	3.894	20	.195	.844	.656	.134
Error	25.139	109	.231			
Total	3621.341	140				
Corrected Total	42.015	139				

a. R Squared = .402 (Adjusted R Squared = .237)

Table A.14 Control over gender at the building scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Building Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	11.297[a]	13	.869	3.564	.000	.269
Intercept	3261.271	1	3261.271	13377.108	.000	.991
HouseType	9.877	6	1.646	6.753	.000	.243
Gender	.077	1	.077	.314	.576	.002
HouseType * Gender	.307	6	.051	.210	.973	.010
Error	30.718	126	.244			
Total	3621.341	140				
Corrected Total	42.015	139				

a. R Squared = .269 (Adjusted R Squared = .193)

Table A.15 Control over education level at the building scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Building Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	14.711[a]	25	.588	2.457	.001	.350
Intercept	1979.549	1	1979.549	8265.081	.000	.986
HouseType	5.516	6	.919	3.839	.002	.168
Education	.449	3	.150	.625	.600	.016
HouseType * Education	3.500	16	.219	.913	.556	.114
Error	27.304	114	.240			
Total	3621.341	140				
Corrected Total	42.015	139				

Table A.16 Control over profession at the building scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Building Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	24.079[a]	60	.401	1.768	.009	.573
Intercept	1535.919	1	1535.919	6765.178	.000	.988
HouseType	5.499	6	.916	4.037	.001	.235
Profession	5.369	22	.244	1.075	.391	.230
HouseType * Profession	7.588	32	.237	1.044	.425	.297
Error	17.936	79	.227			
Total	3621.341	140				
Corrected Total	42.015	139				

a. R Squared = .573 (Adjusted R Squared = .249)

Table A.17 Control over years of occupancy in house at the building scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Building Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	18.294[a]	43	.425	1.722	.015	.435
Intercept	1840.226	1	1840.226	7447.499	.000	.987
HouseType	4.025	6	.671	2.715	.018	.145
YearsOfOccupancyInHouse	2.865	10	.286	1.159	.328	.108
HouseType * YearsOfOccupancyInHouse	4.832	27	.179	.724	.829	.169
Error	23.721	96	.247			
Total	3621.341	140				
Corrected Total	42.015	139				

a. R Squared = .435 (Adjusted R Squared = .183)

Table A.18 Control over years of occupancy in district at the building scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Building Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	20.500[a]	46	.446	1.926	.004	.488
Intercept	1754.848	1	1754.848	7585.564	.000	.988
HouseType	6.103	6	1.017	4.397	.001	.221
YearsOfOccupancyInDistrict	2.578	10	.258	1.114	.360	.107
HouseType * YearsOfOccupancyInDistrict	6.700	30	.223	.965	.527	.237
Error	21.515	93	.231			
Total	3621.341	140				
Corrected Total	42.015	139				

a. R Squared = .488 (Adjusted R Squared = .235)

Table A.19 Control over years of settlement in Ankara at the building scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Building Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	21.334[a]	41	.520	2.466	.000	.508
Intercept	1185.352	1	1185.352	5616.862	.000	.983
HouseType	5.519	6	.920	4.359	.001	.211
YearsOfSettlementInAnkara	3.347	10	.335	1.586	.122	.139
HouseType * YearsOfSettlementInAnkara	5.716	25	.229	1.083	.376	.217
Error	20.681	98	.211			
Total	3621.341	140				
Corrected Total	42.015	139				

a. R Squared = .508 (Adjusted R Squared = .302)

Table A.20 Control over hometown at the building scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Building Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	11.912[a]	13	.916	3.836	.000	.284
Intercept	2554.241	1	2554.241	10691.271	.000	.988
HouseType	7.476	6	1.246	5.215	.000	.199
Hometown	.033	1	.033	.139	.710	.001
HouseType * Hometown	.894	6	.149	.624	.711	.029
Error	30.103	126	.239			
Total	3621.341	140				
Corrected Total	42.015	139				

a. R Squared = .284 (Adjusted R Squared = .210)

Control over Demographic Variables at the Street Scale

Table A.21 Control over tenancy at the street scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Street Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	77.521[a]	13	5.963	30.456	.000	.759
Intercept	1553.772	1	1553.772	7935.621	.000	.984
HouseType	52.190	6	8.698	44.425	.000	.679
TenancyType	.049	1	.049	.249	.619	.002
HouseType * TenancyType	1.129	6	.188	.961	.454	.044
Error	24.670	126	.196			
Total	3391.396	140				
Corrected Total	102.192	139				

a. R Squared = .759 (Adjusted R Squared = .734)

Table A.22 Control over the number of households at the street scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Street Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	82.773[a]	35	2.365	12.666	.000	.810
Intercept	1119.521	1	1119.521	5995.731	.000	.983
HouseType	47.228	6	7.871	42.156	.000	.709
TheNumberOfHouseholds	.942	6	.157	.840	.542	.046
HouseType * TheNumberOfHouseholds	5.283	23	.230	1.230	.237	.214
Error	19.419	104	.187			
Total	3391.396	140				
Corrected Total	102.192	139				

a. R Squared = .810 (Adjusted R Squared = .746)

Table A.23 Control over age at the street scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Street Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	81.147[a]	30	2.705	14.010	.000	.794
Intercept	1935.314	1	1935.314	10024.091	.000	.989
HouseType	38.757	6	6.459	33.457	.000	.648
Age	1.720	4	.430	2.227	.071	.076
HouseType * Age	3.928	20	.196	1.017	.449	.157
Error	21.044	109	.193			
Total	3391.396	140				
Corrected Total	102.192	139				

a. R Squared = .794 (Adjusted R Squared = .737)

Table A.24 Control over gender at the street scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Street Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	77.979[a]	13	5.998	31.215	.000	.763
Intercept	3026.712	1	3026.712	15750.834	.000	.992
HouseType	67.043	6	11.174	58.148	.000	.735
Gender	.108	1	.108	.563	.454	.004
HouseType * Gender	1.614	6	.269	1.400	.220	.062
Error	24.212	126	.192			
Total	3391.396	140				
Corrected Total	102.192	139				

a. R Squared = .763 (Adjusted R Squared = .739)

Table A.25 Control over education level at the street scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Street Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	82.935[a]	25	3.317	19.639	.000	.812
Intercept	1818.540	1	1818.540	10765.953	.000	.990
HouseType	29.189	6	4.865	28.801	.000	.603
Education	1.272	3	.424	2.510	.062	.062
HouseType * Education	5.939	16	.371	2.198	.009	.236
Error	19.256	114	.169			
Total	3391.396	140				
Corrected Total	102.192	139				

a. R Squared = .812 (Adjusted R Squared = .770)

Table A.26 Control over profession at the street scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Street Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	88.868[a]	60	1.481	8.782	.000	.870
Intercept	1364.539	1	1364.539	8090.591	.000	.990
HouseType	37.316	6	6.219	36.876	.000	.737
Profession	3.044	22	.138	.820	.692	.186
HouseType * Profession	9.093	32	.284	1.685	.032	.406
Error	13.324	79	.169			
Total	3391.396	140				
Corrected Total	102.192	139				

a. R Squared = .870 (Adjusted R Squared = .771)

Table A.27 Control over years of occupancy in house at the street scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Street Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	82.743[a]	43	1.924	9.498	.000	.810
Intercept	1693.279	1	1693.279	8358.163	.000	.989
HouseType	38.831	6	6.472	31.945	.000	.666
YearsOfOccupancyInHouse	2.482	10	.248	1.225	.285	.113
HouseType * YearsOfOccupancyInHouse	4.103	27	.152	.750	.801	.174
Error	19.449	96	.203			
Total	3391.396	140				
Corrected Total	102.192	139				

a. R Squared = .810 (Adjusted R Squared = .724)

Table A.28 Control over years of occupancy in district at the street scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Street Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	87.556[a]	46	1.903	12.095	.000	.857
Intercept	1606.523	1	1606.523	10208.737	.000	.991
HouseType	38.877	6	6.479	41.174	.000	.727
YearsOfOccupancyInDistrict	2.587	10	.259	1.644	.106	.150
HouseType * YearsOfOccupancyInDistrict	7.772	30	.259	1.646	.037	.347
Error	14.635	93	.157			
Total	3391.396	140				
Corrected Total	102.192	139				

a. R Squared = .857 (Adjusted R Squared = .786)

Table A.29 Control over years of settlement in Ankara at the street scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Street Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	88.079[a]	41	2.148	14.918	.000	.862
Intercept	1073.681	1	1073.681	7456.067	.000	.987
HouseType	44.294	6	7.382	51.266	.000	.758
YearsOfSettlementInAnkara	3.275	10	.327	2.274	.019	.188
HouseType * YearsOfSettlementInAnkara	8.430	25	.337	2.342	.002	.374
Error	14.112	98	.144			
Total	3391.396	140				
Corrected Total	102.192	139				

a. R Squared = .862 (Adjusted R Squared = .804)

Table A.30 Control over hometown at the street scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Street Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	77.434[a]	13	5.956	30.314	.000	.758
Intercept	2393.489	1	2393.489	12181.249	.000	.990
HouseType	62.602	6	10.434	53.100	.000	.717
Hometown	.158	1	.158	.803	.372	.006
HouseType * Hometown	.986	6	.164	.836	.544	.038
Error	24.758	126	.196			
Total	3391.396	140				
Corrected Total	102.192	139				

a. R Squared = .758 (Adjusted R Squared = .733)

Control over Demographic Variables at the Neighbourhood Scale

Table A.31 Control over tenancy at the neighbourhood scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Neighbourhood Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	65.440[a]	13	5.034	26.954	.000	.736
Intercept	1354.571	1	1354.571	7253.257	.000	.983
HouseType	39.625	6	6.604	35.363	.000	.627
TenancyType	.465	1	.465	2.489	.117	.019
HouseType * TenancyType	1.301	6	.217	1.161	.331	.052
Error	23.531	126	.187			
Total	3014.340	140				
Corrected Total	88.970	139				

a. R Squared = .736 (Adjusted R Squared = .708)

Table A.32 Control over the number of households at the neighbourhood scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Neighbourhood Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	69.517[a]	35	1.986	10.618	.000	.781
Intercept	969.302	1	969.302	5181.996	.000	.980
HouseType	41.283	6	6.880	36.784	.000	.680
TheNumberOfHouseholds	.687	6	.115	.612	.720	.034
HouseType * TheNumberOfHouseholds	4.805	23	.209	1.117	.340	.198
Error	19.453	104	.187			
Total	3014.340	140				
Corrected Total	88.970	139				

a. R Squared = .781 (Adjusted R Squared = .708)

Table A.33 Control over age at the neighbourhood scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Neighbourhood Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	69.506[a]	30	2.317	12.975	.000	.781
Intercept	1718.099	1	1718.099	9621.416	.000	.989
HouseType	36.745	6	6.124	34.295	.000	.654
Age	.647	4	.162	.905	.464	.032
HouseType * Age	4.853	20	.243	1.359	.159	.200
Error	19.464	109	.179			
Total	3014.340	140				
Corrected Total	88.970	139				

a. R Squared = .781 (Adjusted R Squared = .721)

Table A.34 Control over gender at the neighbourhood scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Neighbourhood Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	64.311[a]	13	4.947	25.277	.000	.723
Intercept	2675.751	1	2675.751	13671.998	.000	.991
HouseType	59.413	6	9.902	50.596	.000	.707
Gender	.003	1	.003	.014	.904	.000
HouseType * Gender	.494	6	.082	.420	.864	.020
Error	24.659	126	.196			
Total	3014.340	140				
Corrected Total	88.970	139				

a. R Squared = .723 (Adjusted R Squared = .694)

Table A.35 Control over education at the neighbourhood scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Neighbourhood Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	69.354[a]	25	2.774	16.122	.000	.780
Intercept	1627.862	1	1627.862	9460.447	.000	.988
HouseType	24.001	6	4.000	23.247	.000	.550
Education	.802	3	.267	1.553	.205	.039
HouseType * Education	5.196	16	.325	1.887	.028	.209
Error	19.616	114	.172			
Total	3014.340	140				
Corrected Total	88.970	139				

a. R Squared = .780 (Adjusted R Squared = .731)

Table A.36 Control over profession at the neighbourhood scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Neighbourhood Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	76.758[a]	60	1.279	8.275	.000	.863
Intercept	1230.716	1	1230.716	7960.983	.000	.990
HouseType	25.010	6	4.168	26.963	.000	.672
Profession	5.023	22	.228	1.477	.107	.291
HouseType * Profession	7.316	32	.229	1.479	.082	.375
Error	12.213	79	.155			
Total	3014.340	140				
Corrected Total	88.970	139				

a. R Squared = .863 (Adjusted R Squared = .758)

Table A.37 Control over years of occupancy in house at the neighbourhood scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Neighbourhood Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	69.824[a]	43	1.624	8.142	.000	.785
Intercept	1497.707	1	1497.707	7509.358	.000	.987
HouseType	31.116	6	5.186	26.002	.000	.619
YearsOfOccupancyInHouse	1.089	10	.109	.546	.853	.054
HouseType * YearsOfOccupancyInHouse	5.021	27	.186	.932	.566	.208
Error	19.147	96	.199			
Total	3014.340	140				
Corrected Total	88.970	139				

a. R Squared = .785 (Adjusted R Squared = .688)

Table A.38 Control over years of occupancy in district at the neighbourhood scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Neighbourhood Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	74.617[a]	46	1.622	10.510	.000	.839
Intercept	1415.051	1	1415.051	9168.349	.000	.990
HouseType	32.610	6	5.435	35.214	.000	.694
YearsOfOccupancyInDistrict	2.940	10	.294	1.905	.054	.170
HouseType * YearsOfOccupancyInDistrict	6.957	30	.232	1.503	.072	.326
Error	14.354	93	.154			
Total	3014.340	140				
Corrected Total	88.970	139				

a. R Squared = .839 (Adjusted R Squared = .759)

Table A.39 Control over years of settlement in Ankara at the neighbourhood scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Neighbourhood Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	72.638[a]	41	1.772	10.631	.000	.816
Intercept	969.334	1	969.334	5816.481	.000	.983
HouseType	32.091	6	5.348	32.093	.000	.663
YearsOfSettlementInAnkara	2.270	10	.227	1.362	.209	.122
HouseType * YearsOfSettlementInAnkara	6.402	25	.256	1.537	.071	.282
Error	16.332	98	.167			
Total	3014.340	140				
Corrected Total	88.970	139				

a. R Squared = .816 (Adjusted R Squared = .740)

Table A.40 Control over hometown at the neighbourhood scale

Tests of Between-Subjects Effects

Dependent Variable: Overall SoP at Neighbourhood Scale

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Corrected Model	65.316[a]	13	5.024	26.763	.000	.734
Intercept	2123.903	1	2123.903	11313.275	.000	.989
HouseType	48.781	6	8.130	43.306	.000	.673
Hometown	.422	1	.422	2.250	.136	.018
HouseType * Hometown	.868	6	.145	.770	.595	.035
Error	23.655	126	.188			
Total	3014.340	140				
Corrected Total	88.970	139				

a. R Squared = .734 (Adjusted R Squared = .707)

APPENDIX E: Test of Normality Results

Table A.41 Test of normality results

Tests of Normality

House type		Kolmogorov-Smirnov[a]			Shapiro-Wilk		
		Statistic	df	Sig.	Statistic	df	Sig.
Case I	SoP at Building Scale	.132	20	.200*	.967	20	.686
	SoP at Street Scale	.144	20	.200*	.972	20	.787
	SoP at Neighbourhood Scale	.162	20	.177	.930	20	.156
	Overall SoP	.150	20	.200*	.941	20	.248
Case II	SoP at Building Scale	.240	20	.004	.872	20	.013
	SoP at Street Scale	.142	20	.200*	.957	20	.483
	SoP at Neighbourhood Scale	.122	20	.200*	.946	20	.315
	Overall SoP	.183	20	.078	.922	20	.109
Case III	SoP at Building Scale	.183	20	.079	.944	20	.283
	SoP at Street Scale	.165	20	.160	.916	20	.085
	SoP at Neighbourhood Scale	.160	20	.194	.942	20	.258
	Overall SoP	.165	20	.160	.946	20	.306
Case IV	SoP at Building Scale	.217	20	.014	.858	20	.007
	SoP at Street Scale	.130	20	.200*	.942	20	.267
	SoP at Neighbourhood Scale	.276	20	.000	.851	20	.006
	Overall SoP	.184	20	.075	.886	20	.023
Case V	SoP at Building Scale	.185	20	.073	.912	20	.070
	SoP at Street Scale	.094	20	.200*	.957	20	.481
	SoP at Neighbourhood Scale	.207	20	.024	.889	20	.026
	Overall SoP	.245	20	.003	.883	20	.020
Case VI	SoP at Building Scale	.129	20	.200*	.952	20	.403
	SoP at Street Scale	.121	20	.200*	.963	20	.608
	SoP at Neighbourhood Scale	.128	20	.200*	.958	20	.510
	Overall SoP	.146	20	.200*	.968	20	.701
Case VII	SoP at Building Scale	.192	20	.052	.895	20	.033
	SoP at Street Scale	.163	20	.172	.948	20	.334
	SoP at Neighbourhood Scale	.150	20	.200*	.950	20	.365
	Overall SoP	.153	20	.200*	.931	20	.159

*. This is a lower bound of the true significance.
a. Lilliefors Significance Correction